HISTORY OF SOYBEANS AND SOYFOODS IN NORTH CAROLINA (1856-2017):

EXTENSIVELY ANNOTATED BIBLIOGRAPHY AND SOURCEBOOK

Compiled

by

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SOYINFO CENTER

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Timeline of Soybeans in North Carolina
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Timeline of Soy Foods in North Carolina

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DEDICATION AND ACKNOWLEDGMENTS

This book is dedicated to Charles Burgess Williams, Charles W. Dabney, Jr., and Fred P. Latham - soybean pioneers in North Carolina.

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

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

INTRODUCTION

Brief History of Soybeans and Soyfoods in North Carolina.

North Carolina was the first state in America to grow soybeans commercially on a large scale, the first to crush domestically-grown soybeans, and the first to devise a farm implement for harvesting them mechanically. North Carolina was America's leading state in soybean seed production and acreage from the early 1900s until 1924. This early pioneering work proved to both soybean growers and crushers in other states that this new crop had great potential, and thus was a key factor in the growth of the soybean industry in America.

In 1856 soybeans were in North Carolina. On 31 May 1856 a packet of them (called Japan peas) was was sent by John J. Wyche from Henderson, Vance Co., North Carolina to the Agricultural Division of the Patent office. It seems very likely that Wyche also cultivated some of his soybeans, but we cannot be sure.

In 1882 Charles W. Dabney, Jr. first stated clearly that that the soja bean (*Soja hispida*) had been cultivated in North Carolina. Director of the North Carolina Experiment Station, he first wrote this in the station's annual report (for the year 1882, p. 116-27). The Introduction begins: "This plant has been tried by a number of persons in different sections of the State and is favorably considered by them. It appears to be well adapted to our climate and soils, and yields very well."

In 1909 North Carolina produced 13,313 bushels of soybeans; this was 79.1% of the total U.S. soybean production of 16,835 bushels, and far ahead of the No. 2 soybean-producing state, Tennessee, which produced 2,037 bushels (12.1% of the total) (Source: Thirteenth census of the United States taken in the year 1910, p. 626).

Geographically, North Carolina is located on the Atlantic coast of the United States. Its northern border, which it shares with Virginia, is at 36.5 degrees north latitude, about the same as Tokyo, Japan, and central South Korea. Long located within the Cotton Belt, since the Civil War it has been grouped with the "Southern States," which attempted to secede from the Union of States. North Carolina is commonly divided into three geographical zones: the coastal plain in the east, the piedmont in the center (lying at the base of the mountains), and the mountains in the western third of the state.

Almost all of the soybeans in North Carolina are now (and have always been) grown in the eastern one-third of the state – the coastal plain (see map).

The Early Years, to 1899. It is not known exactly when the soybean was introduced to North Carolina, but it was there by 1856. Tom Byrd, a journalist, reported in 1965 that C.B. Williams, the state's great soybean pioneer, once said that "The first soybeans coming to North Carolina had been brought to Hyde County about 1870 by an old sea captain who obtained them in the Orient. They later spread to other coastal locations." Hartwig (1981) mentioned this same event, without citation. Yet Williams made no mention of this key incident in his many extensive writings on soybeans in North Carolina.

Frank W. Hollowell Jr. of Elizabeth City reported in 1982 that in about 1880 his grandfather, Christopher Wilson Hollowell, planted soybeans on his "Bay Side" plantation in Pasquotank County, in the northeast corner of North Carolina. These soybeans were obtained from China by a friend. Mr. Hollowell died in 1892.

According to Dabney (1882), Dr. R.H. Lewis of Raleigh apparently grew soybeans the year before, and noted that their yield was 3 times as great as cowpeas.

For many years soybean proponents in North Carolina believed that their state had been the first in America to grow the new crop. As late as 1927 W.E. Ayers, Secretary-Treasurer of the American Soybean Association, was able to write: "Hyde County [North Carolina] 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." Only later did soybean historians realize that soybeans had been introduced to North America as early as 1765 by Samuel Bowen in Savannah, Georgia (Hymowitz and Harlan 1983), that by 1804 they were growing in Pennsylvania (Mease 1804), and by 1880 they had been grown in many states.

The earliest known written reference to the soybean in North Carolina was in 1882 by C.W. Dabney, who was a trained chemist but only an academic farmer. In the Fifth Annual Report of the North Carolina Agricultural Experiment Station, he wrote a very positive 12-page section titled "The Soja Bean--*Soja hispida*." He noted that soybeans were superior to cowpeas in yield and feeding value, described Haberlandt's early work introducing soybeans to Europe, gave a long condensed translation of Dr. Ernst Wein's *Die Sojabohne as Feldfrucht* (1881), stated that yellow soybeans had been grown in North Carolina, and gave a nutritional analysis of these yellow soybeans (18.0% fat and 34.6% protein on an "as is" basis) and an average of 16 analyses by German chemists. He compared the composition of soybeans with that of yellow cowpeas, white beans, green peas, and cottonseed, showing that soybeans were remarkably

rich in both fat and protein, and that their yield per acre of these two nutrients far surpassed that of cottonseed. He also demonstrated that soybeans produced superior hay and forage. Finally Dabney noted the widespread food uses of the soybean in East Asia, and gave a recipe for mashed soybeans and potatoes (from Prof. Hecke of Vienna). But he concluded that "The chief interest of this bean is, however, as a feeding stuff for stock."

In 1890 McCarthy, a botanist at Raleigh, in a bulletin titled "The Best Agricultural Grasses," noted of the "soja bean" or "Japan pea": "Though this bean has been known in the Southern States for a long time, its cultivation has never become very extended. The beans are regarded as a staple food in Japan, but in this country they are scarcely edible, probably because they are not properly cooked." In numerous tables, he analyzed soybean hay and compared it with that of cowpeas and various grasses.

In 1892 Emery (an agriculturalist) and Kilgore (a chemist) at Raleigh analyzed the digestibility of "soja bean" silage for goats and a bull; they found it to be of excellent nutritive value, especially when fed with corn. In 1897 Emery got similar results on feeding experiments with milch cows.

In 1894 McCarthy and Emery wrote North Carolina Agricultural Experiment Station Bulletin No. 98, titled "Some Leguminous Crops and Their Economic Value." Referring to the soybean by various names (soja bean, soy bean, Japan pea, Japanese pea, Mongolian pea, soy pea, or *Glycine hispida*), they stated that it was one of North Carolina's "most valuable and generally used forage and fertilizing plants," described three varieties, and gave a nice illustration. They also published America's earliest known recipe for cooking green vegetable soybeans, submitted by Dr. J.H. Mills of Thomasville, NC. In the Station's annual report of 1894 (p. 241, 254) Emery elaborated on the soybean's food uses:

> *It is also a good table bean, but requires a long time in cooking, and most people will have to learn to like its flavor. . . The bean parched similar to coffee has been used as an acceptable substitute for it, and at far less cost. It has not the exact aroma of coffee, but is recommended as a cheap substitute probably just as good and in some cases better than the low grades of coffee after being adulterated with peas or beans with a value less than the soy bean.*

By the mid-1890s the soybean was probably being grown fairly extensively in North Carolina, especially in the eastern part of the state, and largely as a forage, hay, or silage crop for livestock, rather than for the seeds. Unfortunately no production statistics are available (McCarthy and Emery 1894; Williams 1917; Winters and Herman 1921). The earliest varieties grown were the Mammoth Yellow (introduced by 1882 and by far the most popular), the Mammoth Brown, and the Tarheel Black or Shanghai (Morse 1918; Winters 1927; Hartwig and Nelson 1947).

1900 to 1909. During this period there were few publications on soybeans in North Carolina (except in newspaper articles), so little is known of new developments. But at the turn of the century the School of Agriculture of North Carolina State University at Raleigh was looking for new crops. In 1904 Burkett reported that experiments with soybeans began at the College farm. These included fertilizer tests and the effects of lime, variety evaluation, quantity of seed to plant, and methods of planting.

In about 1907 the Tokyo and Haberlandt varieties were introduced to North Carolina, and in 1909 the first soybean production statistics were reported; 12,000 acres were grown in the state that year, with an average yield of 12 bu/a (808.7 kg/ha) on the acres used to grow seed (Hartwig and Nelson 1947). But most of the crop was still used for forage, hay, and silage.

By 1907 the soybean was still considered a minor crop in America, with less than 50,000 acres under cultivation nationwide for all purposes; North Carolina produced more than 90% of all the harvested seed, but still less than 50,000 bushels.

In 1907 the North Carolina Agricultural Experiment Station discovered a treasure trove of new information and soybean varieties when they began correspondence with USDA's Bureau of Plant Industry (Washington, DC). Soon North Carolina was receiving the latest and best soybean varieties with requests to report back on their performance. C.B. Williams wrote his first letter to USDA concerning soybeans on 26 Nov. 1907; it is also the first evidence we have of his interest in soybeans. This correspondence and exchange of seeds continued until at least 1923 with more than 100 letters being exchanged. These letters have been preserved by the National Archives (College Park, Maryland).

1910 to 1919. During this decade, soybeans in North Carolina rose to national prominence.

One of the crop's early pioneers was Fred P. Latham, a farmer from Belhaven. In 1925 he recalled how he had first met William Morse, soybean expert with the USDA, when Morse visited his farm in about October 1910. "It took just about two minutes to find that I was right next to the 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." Latham's work with soybeans and with Morse (who may have supplied Latham with soybeans) started at that time. Latham later recalled that this had been "one of the most profitable and 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." At the 1925 Field Meeting of the American Soybean Association (ASA) Latham gave a talk on "The Economic Value of the Soybean to Southern Agriculture." In 1926 he was Vice-President of the ASA, and in 1927 he was President. That latter year Latham hosted the Eighth Annual ASA Field Meeting and Convention, held in eastern North Carolina. He was acknowledged as one of the state's "leaders in agricultural thought."

Although William Morse, soybean specialist at the USDA's Bureau of Plant Industry, worked in Washington, DC, and Beltsville, MD, he took such a strong and active interest in the development of soybeans in nearby North Carolina that he would have to be ranked as one of the state's true pioneers. Piper and Morse (1923) gave a good summary of soybean research in North Carolina. It was the leadership, knowledge, and enthusiasm of men like Morse, Latham, and soon thereafter C.B. Williams, and their extensive contacts with farmers, that boosted the soybean from an unknown immigrant to a major North Carolina crop in the space of several decades (Hartwig 1981).

In a letter (dated 4 Dec. 1914) to his boss and mentor Dr. C.V. Piper, William Morse states: 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.

The earliest recorded (published) crushing of American-grown soybeans for oil and meal took place in December 1915 in North Carolina, which was then America's leading soybean producing state. (Imported soybeans had been crushed by 1911 in Seattle, Washington.) In 1915 there was a surplus of soybeans and a shortage of cottonseed in the state; many farmers had planted soybeans instead of cotton, since the latter's price was often below production costs. During World War I., there was also a rapidly growing importation of and interest in soy oil nationwide. Moreover local cottonseed mills were looking for a way to prolong their operating season. From December 13 to 20, 1915 the cottonseed mill of the Elizabeth City Oil and Fertilizer Company, located on the banks of Knobbs Creek in Elizabeth City, did a test run in which 10,000 bushels (272 tonnes) of soybeans were crushed and the oil expelled in the mill's six Anderson expellers. The work was done under the direction of William Thomas Culpepper Sr., manager of the firm, as part of his efforts to promote local soybean production. The experiment was so successful that the mill continued to crush local soybeans. Other North Carolina cottonseed oil mills soon followed suit and by the spring of 1916 mills in at least nine of the state's cities and towns (including the Winterville Cotton Oil Co. at Winterville and the Havens Oil Co. Washington) had crushed about 80,000 to 100,000 bushels (2,177 to 2,722 tonnes) of soybeans. During the 1916-17 seasons, however, no domestically grown soybeans were crushed, due to the extremely high price of seed (Morse 1918).

In 1917 C.B. Williams estimated that soybean acreage in North Carolina was more than 180,000 acres – which is three times the published estimate (letter to C.V. Piper, 23 Oct. 1917).

The most important figure promoting the growing and crushing of soybeans in North Carolina from 1907 until the late 1930s was Charles Burges Williams. He was also one of America's great soybean pioneers. Born at Shiloh, Camden County on 23 December 1871, he was a member of the first class at North Carolina A&M College, later named N.C. State University. Captain of the university's first football team, he obtained his bachelor's degree in agriculture and chemistry with honors in 1893. After earning a master's degree in 1896 followed by a year's study of chemistry at Johns Hopkins in 1896-97, he was assistant chemist of the N.C. Agricultural Experiment Station and of the Experiment Station of the State Department of Agriculture during 1893-1906. In 1907 Mr. Williams returned to college work as Director of the North Carolina Experiment Station and Chief of the Department of Agronomy (1907-12), then served as the first Dean of the College of Agriculture (1917-23). In 1926 he became the first Head of the Department of Agronomy. He was truly the state's pioneer agronomist and he served the university for 53 years. Williams had first come to know soybeans as a boy in Camden County. Early in his university career he became convinced that the soybean was one of the most valuable plants ever to come to North Carolina. At the time he stood almost alone in his conviction of its great potential (Norris 1939; Winters 1953; Byrd 1965).

Dr. R.Y. Winters recalled in 1953, at the dedication of Williams Hall Agronomy Building to his friend and co-worker C.B. Williams:

> *North Carolina was the first State to recognize the soybean as a valuable forage and industrial crop and this was largely due to the efforts of Mr. Williams. He initiated studies of soybeans in the rotation systems, their fertilizer requirements, and varieties adopted to different areas of the state. Extensive cooperative studies were made of the new introductions by the U.S. Department of Agriculture. . . He stood almost alone during the early days in his crusade for agricultural research*

Winters then quoted from a letter by W.J. Morse of the USDA regarding 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 trying to get the soybean oil industry started in North Carolina along with all 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 [of 1947] before his death, as he was the time I met him in 1910.*

The extensive campaign to increase the state's soybean production, started and led by Williams in 1916, caused soybean acreage to expand from the eastern part of the state (especially the tidewater area) to many other sections. He used the old Farmers' Institutes as part of this successful campaign. From 1915 on, C.B. Williams wrote numerous scientific and popular articles, describing all aspects of soybean growing and processing, and praising the plant's many virtues. Williams' publications issued by the N.C. Agricultural Experiment Station included "Soy-Bean Growing in North Carolina" (1915, Circular 31, revised 1922 and 1929, Circular 127), "The Commercial Use of the Soybean" (1916, Extension Circular 29), "Soy-Bean Products and Their Uses" (1916, Circular 34), "Soybeans – A Future Economic Factor in North Carolina" (1917, Extension Circular 57). Among his more popular articles were "Soy Beans in North Carolina" (1916), "Soy Beans for Seed" (1916), "More Soybeans for the South" (1916), "Producing Soybean Seed for the Oil Mills" (1926). In 1918 C.B. Williams was selected by *Country Gentleman* magazine as one of seven Blue Ribbon men and women for his research on soybeans.

The growth of soybean crushing and production from 1915 on stimulated new research and publication by Williams' colleagues at the Experiment Station. D.T. Gray, who had published three studies (1908, 1911, 1912) on the feeding value of soybeans at the Alabama Experiment Station, came to North Carolina as Chief in Animal Industry. During 1915-19 Gray published four positive studies on the feeding value of soybeans for hogs. B. White (1916), reporting on the thriving soybean industry of eastern North Carolina, noted that the crop (then also called the "stock pea") played an important role in the present movement for diversified farming. It served as hay, pasture for hogs, ensilage with corn, green manure, for soil improvement, and as a substitute for cottonseed meal in livestock feeds.

A patented soybean harvester facilitated that difficult process. By 1916 there were at least five plants in North Carolina manufacturing movable (nonstationary) soybean harvester-threshers. Pate (1917, 1918) discussed America's first mechanical soybean seed harvesters in detail. The main machines were the Gordon Harvester (the first on the market), Pritchard Harvester, Little Giant machine, Tarheel Harvester, Keystone Machine, and Scott Machine.

Kaupp (1917, 1919) reported on the feeding value of soybean meal for chicks. And extension agronomist Herman (1919) found soybeans superior to cowpeas in most respects. He reported that from 1915 numerous variety tests were done at the Experiment Station Farm at West Raleigh, and at three branch station farms. Most of the seeds of these varieties were furnished by William Morse of the USDA. Top yields ranged from 22.5 to 25.6 bu/a. In 1918 A.G. Smith of the USDA wrote "Soy Beans in Systems of Farming in the Cotton Belt," which included an economic study of soybeans in northeastern North Carolina, the most important soybean district in America. There soybeans had largely replaced cowpeas for three reasons: The better adaptability of the soil for growing soybeans, the frequent failure of cowpeas to produce seed, and the greater ease with which soybeans could be harvested. He found at least eight different cropping patterns, including in the row with corn, in alternate rows with corn, as a second crop for seed (or hay) planted after small grain or Irish potatoes, and drilled in alternate rows with cotton. Yields of seed ranged from 4 to 39 bu/a, with an average of 18.9.

By 1915 North Carolina was unquestionably America's leading soybean producing state. The earliest USDA statistics on soybean production in leading states go back to 1917. First published in the *Monthly Crop Reporter* in 1920 (Feb. and Dec.), they show that in 1917 North Carolina was by far America's top soybean producer in terms of acres producing soybean seeds (68,000), total seed production (1,088,000 bu), and nonseed (forage or hay) acres (about 80,000). Each figure was more than twice that of second place Virginia. By 1919 soybeans ranked sixth in importance among North Carolina crops (Herman 1919). The growing menace of the boll weevil in this Cotton Belt state during the 1910s also spurred expansion of soybeans.

In a letter of 23 Oct. 1917 C.B. Williams stated that the reported estimate of 60,000 acres devoted to soybeans in North Carolina was much too low: "I do not believe that this is one third of the acreage of soybeans sown in this State this year."

Some of America's earliest research on soybean diseases was done at the North Carolina Agricultural Experiment Station. The first of these studies were done by plant pathologist R.O. Cromwell, who published "Fusarium Blight, or Wilt Disease of the Soybean" (1917) and (after moving to Nebraska) "Fusarium Blight of the Soybean and the Relation of Various Factors to Infection" (1919).

Early research on soybean insects included papers by F. Sherman and co-workers written from 1918 to 1920, focusing on the green clover worm as a pest on soybeans, and an outbreak of this insect that occurred in 1919.

1920 to 1929. Important work on soybean diseases continued during the 1920s, under plant pathologists Frederick A. Wolf and S.G. Lehman. They described many of today's major soybean diseases. Key publications included "Plant Pathology: Soybean Diseases" (Wolf 1920, on mosaic, anthracnose, and phoma blight), "Further Studies on the Bacterial Blight of Soybeans" (Shunk and Wolf 1921), "Pod and Stem Blight of Soy Bean" (Lehman 1923, PhD thesis at Missouri), "Bacterial Pustule of the Soybean" (Wolf 1924), "A New Downy Mildew on Soybeans" (Lehman and Wolf 1924), "Diseases of Soybeans Which Occur in North Carolina and the Orient" (Wolf and Lehman 1926). In the latter, very important paper, the authors showed that soybean wilt, mildew, brown spot, pod-and-stem blight, anthracnose, Cercospora leaf spot, and bacterial blight may well have been transmitted on soybean seeds from East Asia to North Carolina. Also during 1926 Lehman and Wolf alternated as senior authors of papers on soybean pythium root rot, anthracnose, and brown-spot disease.

New publications on soybeans kept pace with expanding research. Smith and Hope (1920) described new soybean farming practices. Winters and Herman (1921) encouraged farmers in the piedmont and mountain areas of the state to grow soybeans. In a report containing many interesting photographs, they noted that "Although high priced seed have at times made this crop at times rival cotton as a money crop, the greatest value has come from its use as a grazing crop, for soil improvement, and for hay." They showed that soybeans yielded 2.7 times as much seed and 36% more hay than cowpeas at the mountain research station. C.B. Williams (1926), however, argued otherwise; he cited statistics showing that in 1922-24, 47% of the state's soybean acreage was used for seed, 29% for hay, and 24% for grazing. Winters (1927) summarized the important contribution that soybeans had made to North Carolina's agriculture, and noted that Midwest farmers and crushers had used soybean seed from North Carolina as the basis of their huge expansion during the 1920s.

In 1920 North Carolina was producing 54.6% of all soybean seeds in America. The state retained its lead as America's foremost soybean producer until 1924; that year it was passed by Illinois. Thereafter North Carolina's dominance of production and acreage statistics rapidly faded. In 1924 the top five producers were Illinois (1,380,000 bu; 26.5% of total), North Carolina (1,160,000 bu; 22.3%), Missouri (656,000 bu; 12.6%), Indiana (653,000 bu; 12.6%), and Ohio (195,000 bu; 3.8%) (Stewart et al. 1932). In 1929 Indiana snatched the second place spot from North Carolina.

Two factors caused North Carolina's reduced rate of growth. First was the rapid expansion of soybean production in the Midwest. And second was a growing set of unforeseen problems with soybeans in North Carolina. For example, as soybeans spread from the coastal lowlands, tobacco growers said they made the land too fertile. Continuous planting of soybeans was also found to hurt tobacco (Byrd 1965). Acreage and production continued to grow, but not as rapidly as previously, and not nearly as rapidly as in the Midwest.

In 1927 (Aug. 9-11) the American Soybean Association's Eighth Annual Field Meeting was held at Washington, North Carolina. Attendees visited major soybean producing countries and Elizabeth city, and saw a demonstration of several types of soybean harvesters made in the state. Many of ASA's members were North Carolina soybean growers (Ayers 1927; Winters 1927).

1930 to 1980s. In 1930 North Carolina produced about 10% of America's soybeans. Soybean acreage and production grew rapidly from the early 1930s, doubling between 1936 and 1943. In that year it reached a peak of 500,000 acres, which was not attained again until 1956. Yet the state's percentage of national production had fallen steadily since 1920, and after the late 1930s North Carolina was no longer one of America's largest soybean producing states. The key soybean workers in the state in the late 1930s were C.B. Williams and R.L. Lovvorn (Morse 1937).

A rather extensive soybean breeding program was initiated in 1942, then expanded in 1943 in cooperation with the U.S. Regional Soybean Laboratory, where Dr. E. E. Hartwig played the most active role. Traditional major varieties at the time were Mammoth Yellow, Tokyo, Haberlandt, Woods Yellow (a selection from Mammoth Yellow introduced in 1936), and Biloxi. Ogden and Roanoke were introduced in 1946. By 1947 soybean production was still confined largely to the Coastal Plain area, especially in the Tidewater area immediately along the coast. There a large portion of the crop was planted in rows and harvested for seeds. In some Tidewater counties, 35-45% of cultivated acreage was planted to soybeans. In the Piedmont area, a large portion of the soybeans were seeded solid after small grain and cut for hay (Hartwig and Nelson 1947; Soybean Digest 1960)

Herbert W. Johnson was an important U.S soybean breeder. After earning his PhD degree from the University of Nebraska, Dr. Johnson started his soybean breeding research with the USDA in 1948 in North Carolina, when E.E. Hartwig was transferred to Stoneville, Mississippi. In North Carolina Johnson participated in the development of the Jackson and Lee soybean varieties. In 1953 he transferred to the Plant Industry Station at Beltsville, Maryland, as head of the soybean section (*Soybean Digest*, Sept. 1968, p. 22).

North Carolina was the first U.S. state where nematodes (especially the soybean cyst nematode) became a real problem that reduced soybean yield. By the early 1950s

breeders in North Carolina were working to limit the spread of nematodes and to breed nematode resistance into some soybean varieties.

From 1944 to 1953 North Carolina soybean acreage and production grew slowly but steadily. Thereafter they expanded dramatically, with a growing percentage of the total acreage being harvested for beans. By 1965 only tobacco and cotton, the state's old workhorse crops, would bring Tar Heel farmers more cash income than soybeans (Byrd 1965). And by the early 1970s soybeans had passed cotton. During the 1970s soybeans rose to major importance in the state, and research expanded. Deitz et al. (1976), for example, wrote a lengthy report on soybean insects in the state, and also published figures showing the growth and distribution of the crop in the state.

In the summer of 1965 the North Carolina Soybean Producers Association was formed. On 9 Sept. 1966 the members voted to pay half a cent per bushel checkoff on 1966-crop soybeans.

The rise of soyfoods in North Carolina (not counting soybean oil and meal) began in Nov. 1978, when Natural Instant Miso Coup was launched. The miso in this product was made in Japan.

In April 1981 the state's 2nd soyfood product (also made with miso) was introduced – Wizard Baldour's Hot Stuff in Regular and Blazing flavors. It was conceived and marketed by John Troy of Elf Works Ltd. in Chapel Hill.

In 1979 John and Jan Belleme went to Japan, where they apprenticed with a traditional miso master, then returned to North Carolina where they started American Miso Co. to make traditional miso. Their first product, Red Miso, went on the market in Oct. 1981.

The state's 4th soyfood product, which was also a miso product, was Miso Mustard. Developed by John Troy, it became available in Sept. 1984.

In October 1982 the first North Carolina Soybean Festival (a 3-day event) demonstrated the importance of the crop to North Carolina. On 19 November 1982 an historical marker was placed in Elizabeth City to paid tribute to the origins of the state's soybean crushing industry. A second Soybean Festival, held in Elizabeth City in December 1983, served the same historical purpose.

Soybean production in North Carolina had risen steadily since World War II, reaching a peak in 1982 of 52.5 million bushels; it did not reach that level of production again until 2008, after which it rose rapidly (see graph and statistics near front of book).

In 1984 North Carolina was the 12th largest soybean producing state in the United States.

In 2014-15 (the most recent year for which we have data), American Miso Company has by far the largest sales volume in the natural foods channel; their brand is Miso Master.

Current Status (as of 2016):

Acreage: Soybean are North Carolina's No. 1 crop by far, with 1,666,000 harvested acres (2016 Agricultural Statistics North Carolina, p. 61).

Value: 2016. Tobacco is No. 1, worth $647 million, followed by soybeans ($572 million) and corn ($491 million).

In 2016 North Carolina produced 58.1 bushels of soybeans, down slightly from the state's all-time record of 62.4 million bushels in 2012, but well above the 44.2 million bushels in the year 2000 and 34.7 million bushels in 1980 (USDA Quick Stats = quickstats.nass.usda.gov).

ABOUT THIS BOOK

This is the most comprehensive book ever published about the history of soy in North Carolina. It has been compiled, one record at a time over a period of 35 years, in an attempt to document the history of this interesting subject. 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:

- 64 different document types, both published and unpublished.
- 1321 published documents - extensively annotated bibliography. Every known publication on the subject in every language.
- 328 unpublished archival documents.
- 154 original Soyinfo Center interviews and overviews never before published, except perhaps in our books.
- 172 commercial soy products.

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

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

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

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

A complete subject/geographical index is also included.

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

1. Read the Introduction and Chronology/Timeline located near the beginning of the book; it contains highlights and a summary of the book.

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

Click on the link to this book and wait for the book to load completely and the hourglass by the cursor to disappear (4-6 minutes).

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

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

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

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

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

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

"**Note**:" When this term is used in a record's summary, it indicates that the information which follows it has been added by the producer of this database.

Asterisks at End of Individual References:

1. An asterisk (*) at the end of a record means that Soyinfo Center does not own that document. Lack of an asterisk means that Soyinfo Center owns all or part of the document.
2. An asterisk after eng (eng*) means that Soyinfo Center has done a partial or complete translation into English of that document.
3. An asterisk in a listing of the number of references [23* ref] means that most of these references are **not** about soybeans or soyfoods.

Documents Owned by Soyinfo Center: Lack of an * (asterisk) at the end of a reference indicates that the Soyinfo Center Library owns all or part of that document. We own roughly three fourths of the documents listed. Photocopies of hard-to-find documents or those without copyright protection can be ordered for a fee. Please contact us for details.

Document Types: The SoyaScan database contains 135+ 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!

BIBLIO: The software program used to produce this book and the SoyaScan database, and to computerize the Soyinfo Center Library is named BIBLIO. Based on Advanced Revelation, it was developed by Soyinfo Center, Tony Cooper and John Ladd.

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 and many finished chapters are available free of charge in PDF format on our website and on Google Books.

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

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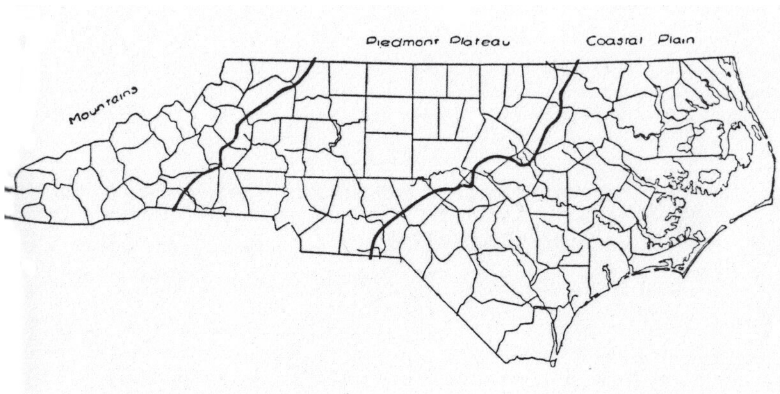
Piedmont Plateau
Coastal Plain
Mountains


VIRGINIA
TENN.
SOUTH CAROLINA
ATLANTIC OCEAN
Lansing
Jefferson
Mt. Airy
Sparta
Toast
Dobson
Eden
Wentworth
Yanceyville
Danbury
Reidsville
Roxboro
Oxford
Warrenton
Henderson
Roanoke Rapids
Halifax
Jackson
Winton
Gatesville
Elizabeth City
Currituck
Camden
Kitty Hawk
Boone
Hays
Yadkinville
Rural Hall
Altamahaw
Hillsborough
Louisburg
Rich Square
Edenton
Hertford
Bakersville
Newland
Wilkesboro
Winston-Salem
Greensboro
Graham
Durham
Nashville
Rocky Mount
Windsor
Columbia
Manteo
Burnsville
Lenoir
Taylorsville
Mocksville
High Point
Chapel Hill
Raleigh
Tarboro
Williamston
Plymouth
Morganton
Marion
Statesville
Lexington
Asheboro
Cary
Wilson
Hickory
Newton
Landis
Salisbury
Pittsboro
Clayton
Greenville
Washington
Kannapolis
Sanford
Smithfield
Kenly
Rutherfordton
Lincolnton
Albemarle
Lillington
Goldsboro
Winterville
Bath
Swanquarter
Forest City
Concord
Carthage
Erwin
Dunn
Snow Hill
Columbus
Shelby
Gastonia
Troy
Vass
Mt. Olive
Kinston
New Bern
Buxton
Hatteras
Charlotte
Southern Pines
Fayetteville
Trenton
Bayboro
Ocracoke
Pineville
Monroe
Wadesboro
Raeford
Clinton
Kenansville
Havelock
Rockingham
Richlands
Waxhaw
St. Pauls
Rose Hill
Jacksonville
Laurinburg
Elizabethtown
Beaufort
Lumberton
Morehead City
Rowland
Fairmont
Burgaw
Holly Ridge
Fair Bluff
Whiteville
Wilmington
Tabor City
Bolivia
Carolina Beach
Southport
82°
81°
80°
79°
78°
77°
76°
36°
35°
34°
33°
TENNESSEE
84°
83°
Newland
Bakersville
Burnsville
Hot Springs
Mars Hill
Marshall
Marion
Bryson City
Waynesville
Asheville
Sylva
Robbinsville
Hendersonville
Rutherfordton
Franklin
Brevard
Columbus
Murphy
Lake Toxaway
Hayesville
GA.
SOUTH CAROLINA
NORTH CAROLINA
CITIES
State capitals
County seats
Cities
BOUNDARIES
State
County
0 15 30 45 60 mi
0 20 40 60 80 km
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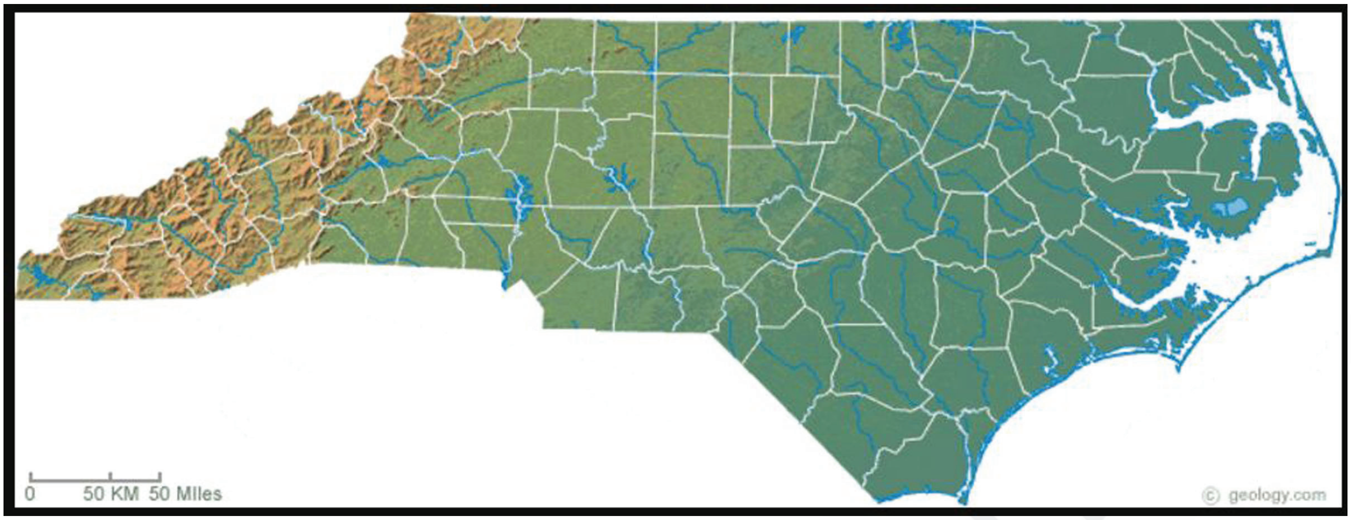
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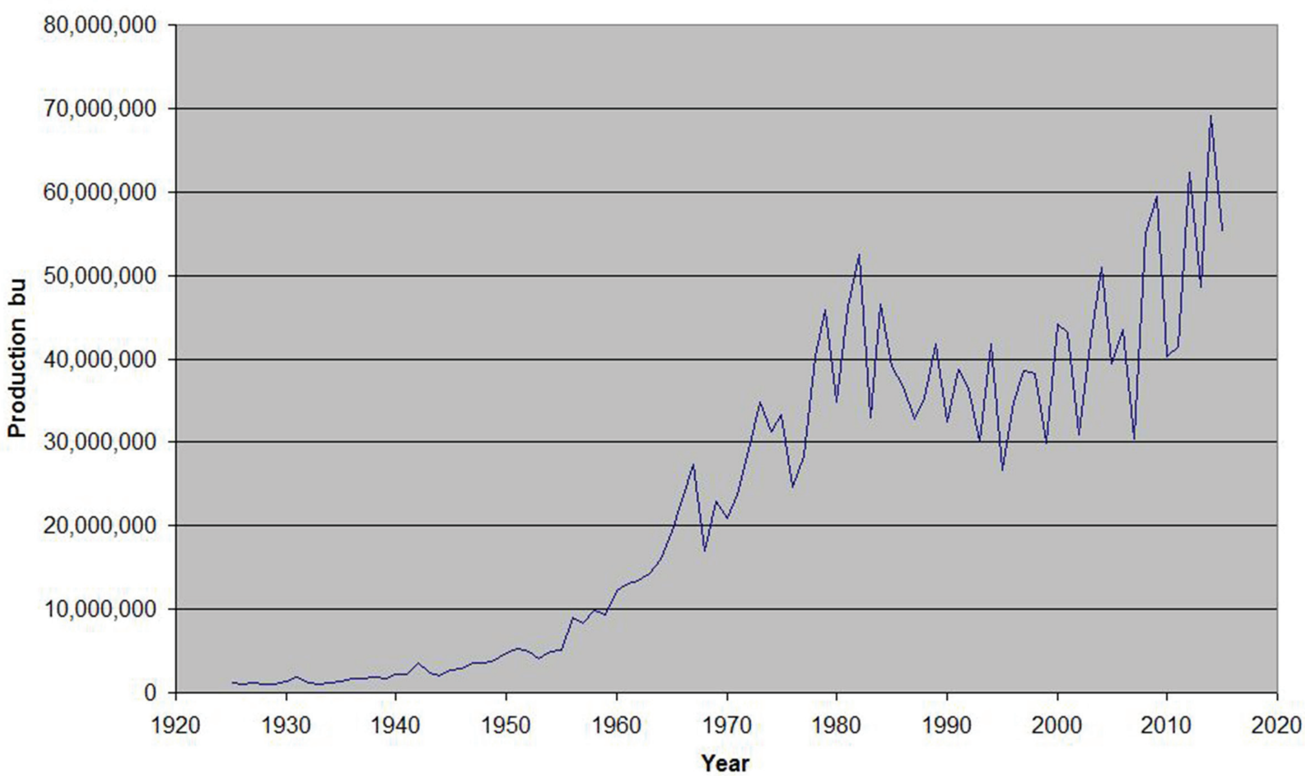
Soybean Production in North Carolina (1924-2016)



North Carolina Soyfean Production (1924-2016)

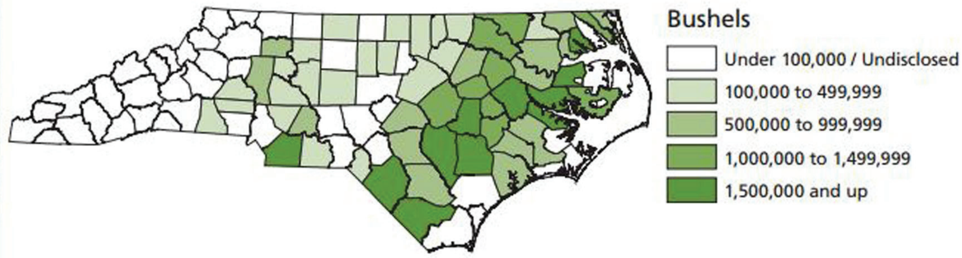
Year	Production (bu)		Year	Production (bu)		Year	Production (bu)
1924	1,162,000		1955	5,068,000		1986	36,720,000
1925	1,160,000		1956	8,944,000		1987	32,830,000
1926	1,062,000		1957	8,400,000		1988	35,370,000
1927	1,200,000		1958	9,844,000		1989	41,850,000
1928	1,080,000		1959	9,396,000		1990	32,400,000
1929	1,058,000		1960	12,262,000		1991	38,645,000
1930	1,344,000		1961	13,064,000		1992	36,450,000
1931	1,809,000		1962	13,392,000		1993	30,000,000
1932	1,150,000		1963	14,288,000		1994	41,850,000
1933	1,026,000		1964	16,004,000		1995	26,750,000
1934	1,176,000		1965	19,400,000		1996	34,800,000
1935	1,438,000		1966	23,075,000		1997	38,570,000
1936	1,728,000		1967	27,366,000		1998	38,205,000
1937	1,776,000		1968	17,010,000		1999	29,900,000
1938	1,863,000		1969	23,010,000		2000	44,200,000
1939	1,760,000		1970	20,808,000		2001	43,200,000
1940	2,280,000		1971	23,760,000		2002	30,960,000
1941	2,180,000		1972	29,125,000		2003	42,000,000
1942	3,484,000		1973	34,800,000		2004	51,000,000
1943	2,313,000		1974	31,240,000		2005	39,420,000
1944	2,110,000		1975	33,370,000		2006	43,520,000
1945	2,700,000		1976	24,640,000		2007	30,360,000
1946	2,862,000		1977	28,380,000		2008	55,110,000
1947	3,495,000		1978	40,320,000		2009	59,500,000
1948	3,564,000		1979	45,825,000		2010	40,300,000
1949	3,960,000		1980	34,740,000		2011	41,480,000
1950	4,752,000		1981	46,250,000		2012	62,410,000
1951	5,253,000		1982	52,500,000		2013	48,575,000
1952	4,862,000		1983	33,000,000		2014	69,200,000
1953	4,128,000		1984	46,540,000		2015	55,360,000
1954	4,913,000		1985	39,100,000		2016	58,100,000


Now, you can add sure-fire magic to all your favorite foods with Wizard Baldour's Hot Stuff. Shake it—wake up the dragon—and watch the magic make food disappear. Hot Stuff is much more than America's newest, best-tasting, all natural, all-purpose hot sauce. It's good for ya' too! Wizard Baldour doesn't just make Hot Stuff. He concocts it. From the most wondrous places around the world he selects nutritious and delicious ingredients: real apple cider vinegar, pure honey, hearty organic miso, Indian cayenne, African bird peppers, Umeboshi plums from Japan and a magical blend of rare herbs and spices all mingled together and simmered in dragon's fire. And Hot Stuff tastes great on everything—chicken, fish, vegetables, rice, beans and greens and soups and salads. Kids love it on pizza and tacos. One fella' even puts it on peanut butter! Use your imagination with your favorite recipes. Create sizzling sautés, zippy dips and warm up your leftovers. Hot Stuff adds a 'Hot-tastic' new flavor sensation that you know is positively good for ya' too. Be sure to try **Blazing** Hot Stuff for a double dose of dragon fire! Hot Stuff is sure-fire magic. It makes food disappear!
IT'S HOT STUFF
Concocted by: Elf Works, Ltd., Box 2321, Chapel Hill, NC 27515 • 919-929-0113
Distributed by: U.S. Naturals Corp., 84 Galli Drive, Novato, CA 94947

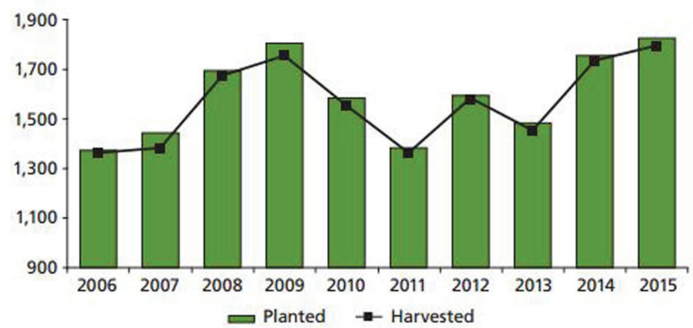
SOYBEANS
2015 Production

Leading Counties [1]	*Bushels*
Beaufort	2,780,000
Sampson	2,435,000
Robeson	2,425,000
Wayne	2,219,000
Pitt	2,200,000
Duplin	2,080,000
Union	1,985,000
Perquimans	1,828,000
Washington	1,759,000
Columbus	1,730,000

[1] *Ranking of published counties only.*



SOYBEANS
Planted and Harvested *(Thousand Acres)*



Charles Burgess Williamma

Charles William Dabney

1984

The Love Affair of Miso and Mustard

You know mustard. It's one of your favorites. But you may not know miso. Miso is an extraordinary source of essential nutrition, and a sensational seasoning too. And now, for the first time, you can enjoy these two fantastic flavors together. That's why Miso Mustard has gourmets and natural cooks more excited than they've been in years.

Miso Mustard marries three carefully chosen mustard seeds–a highly valued yellow seed, a robust, dark seed and a pungent Oriental seed–with Amakuchi Miso, the prized barley miso from Japan, now made in America.

The mustard seeds are stone ground, sensitively and sparingly, to release their flavor while protecting the delightful grainy texture.

The Amakuchi Miso gently mellows the mustards, making the flavors rich and round with superb and memorable character.

But Miso Mustard is more than an excellent new mustard. It doesn't just season other foods, it transforms them! It makes the most of all your favorite flavors and helps you discover new tastes you never knew existed. Deviled eggs themselves actually taste better, tempeh and sandwiches taste better than ever before. No other mustard does this.

Healthful, delicious Naturally Preferred Miso Mustard. It's more than just another kind of mustard. It's a love affair.

American Natural Foods, Inc.
P.O. Box 2321
Chapel Hill, N.C. 27515
(919) 929-0113

HISTORY OF SOYBEANS AND SOYFOODS IN NORTH CAROLINA (1856-2017)

1. Wyche, John J. 1856. [Japan peas]. *Letters and Reports of the Agricultural Division of the Patent Office, 1839-60.* Vol. 11. p. 641-42. May 31.
• ***Summary:*** This handwritten, faded letter is hard to read. "Accompanying (?) this you will (?) receive a lot of Japan Peas, which it is not too late to distribute in the South to which indeed it is better adapted than to the North. In return for the multiplied favors received from your Department I hope this fall (?) to be able to send (?) a number of new (?) seeds I have now under cultivation..."

Note: This is the earliest document seen (June 2017) concerning soybeans in North Carolina, and (probably) the cultivation of soybeans in North Carolina. This document contains the earliest date seen for soybeans in North Carolina (May 1856). Henderson is a city in the north central part of the state. The population in 1980 was about 13,500. First cited by Graff 1949. Address: Henderson [Vance County], North Carolina.

2. Burr, Fearing, Jr. 1865. The field and garden vegetables of America: Containing full descriptions of nearly eleven hundred species and varieties; with directions for propagation, culture, and use. Boston, Massachusetts: J.E. Tilton. xv + 667 p. See p. 499-500. Illust. Index. 20 cm. [25* ref]
• ***Summary:*** Pages 499-500 state: "Japan. *Hov. Mag.* [*The Magazine of Horticulture, Botany, and Rural Affairs.* By C.M. Hovey. Boston [Massachusetts]. Monthly. 1834 to the present time].

"Cajanus bicolor. The Japan Pea is a native of the East Indies, and also of Japan, as implied by the name. The plant makes a strong, erect growth, with numerous spreading branches; the leaves are large, light green and downy beneath; the flowers are small, yellow at the centre,–the upper petal purple; the seed-pods are small and downy, and are produced in profuse abundance,–growing in clusters over the entire plant; the seeds are small, roundish, or pea-form, and of a cream-yellow color when ripe."

Note 1. This is the earliest English-language document seen (Sept. 2004) that uses the term "cream-yellow" to describe the color of soybean seeds.

"Propagation and Culture.–It is raised from seed, which, as the plant requires the entire season for development, should be sown as soon as the ground is warm and settled. Make the drills about 20 inches apart, and drop the seeds ten or twelve inches apart in the drills, covering half or three fourths of an inch deep. The plants will blossom the last of July or beginning of August, and the seeds will be suitable for use in their green state, from the 20th of August until destroyed by frost, the crop being seldom fully perfected in the Northern States.

Use.–The seeds are the only parts of the plants eaten, and these, while young, are tender and delicate. The ripe seeds if soaked for an hour in moderately hot water, take the form and appearance of the Common White Bean, become quite soft and tender, and have a pleasant, nutty, and oily flavor. The whole plant with the seeds, is also used for feeding stock.

"A variety occurs with green seeds, which is not only considered superior to the Common Yellow-seeded just described, but is two weeks earlier."

Note 2. The plant referred to here is actually the soybean, which Mr. Teschemacher incorrectly identified as the pigeon pea *Cajanus bicolor* in Feb. 1853. Note 3. No reference to the Japan Pea appears in the 1863 edition of this book.

Also discusses: Chufa or earth almond (*Cyperus esculentus,* edible cyperus, nut rush, p. 32. When dried and pulverized, the tubers "are said to impart to water the color and richness of milk"). Note 4. This is the earliest English-language document seen (Sept. 2002) concerning a non-soy, non-dairy milk–made from chufa or earth almonds. Amaranthus (Chinese amaranthus, Chinese spinach, p. 279-80). Quinoa (*Chenopodium quinoa,* p. 292-93. Varieties: white-, black-, or red- seeded, from Mexico or Peru. Goosefoot). Pea-nut (Ground bean, earth nut, pindar nut, ground-nut, *Arachys hypogea,* p. 544-46. Varieties: African, Wilmington {North Carolina}, and Tennessee). Winged pea (*Lotus tetragonolobus,* Red birdsfoot trefoil, p. 547. Pods 3½ inches long, with four longitudinal leafy membranes, or wings; seeds globular, slightly compressed, yellowish-white. *Use.*–"The ripened seeds are sometimes used as a substitute for coffee; and the pods, while young and tender, form an agreeable dish, not unlike string beans"). Bene-plant (Oily grain, *Sesamum* sp., p. 548-49. This medicinal plant {which is "cooling and healing"} may be used for food or oil. Varieties: biformed-leaved, oval-leaved, trifid-leafed {having three parts}). Address: Hingham [Massachusetts].

3. *Southern Home* (*The*) (*Charlotte, North Carolina*). 1877. Haroun Alraschid [Harun al-Rashid], with Chinese variations. Oct. 15. p. 1.

• ***Summary:*** "T'ang, the Governor of Soochow [China], is perpetually going about in disguise and playing practical jokes upon the unsuspecting citizens. An old fellow complained late in July that his son, an able-bodied lad of thirteen, refused to support him. T'ang ordered father and son to be brought before him, and after questioning them closely, gave each a dollar. 'Now go,' said he, 'and get a good meal at the restaurant around the corner and then come back to me.' Hastily disguising himself in a coarse robe, he entered the cook shop behind them, and noticed that while the boy contented himself with a little rice and a square of bean curd [doufu; tofu], the father called for soup, pork, and all the delicacies he fancied. In the end, the good boy, who carried cakes in his sleeve for his mother, was patted on the back, and the gluttonous father was soundly flogged."

4. *Newbernian* (*The*) (*New Bern, North Carolina*). 1880. A Chinese vegetable March 20. p. 4.
• ***Summary:*** Some experiments recently carried on by two or three Austrian and German horticulturists have brought into notice an almost forgotten plant which was introduced into Europe from China nearly thirty years ago, but whose existence and whose products have been undeservedly lost sight of. This is the *soja hispida,* a species of leguminous plant, somewhat resembling in habit and appearance the well-known pea. Unlike the latter, however, it has two distinct uses–industrial as well as alimentary. It is highly prized in China and Japan, and is said, indeed, to take its scientific title from the Japanese name of a sauce sooja–which is made from its seeds. The seeds are very similar to a 'marrow-fat' pea, but contain a large quantity of oil, which is either pressed out of them or boiled out in process of cooking the seeds for the table, which is effected by simply throwing them into hot water, when the outer skin bursts and floats to the surface, together with a quantity of oil, both the oil and the husk being skimmed off together. These may be either used as cattle food, or the oil may be separated and employed for various purposes, while the husks are still valuable as a feeding stuff or as a manure. The peas are boiled for about twenty minutes, and furnish a dish which is highly relished, not only by the Celestials, but by the Europeans who have tasted it.

"It is said to resemble in flavor the green pea, but lacks its sweet taste. The boiled *soja* is also prepared as a cake and as a sauce, being fermented for the latter purpose, and salt, pepper, etc., being added. The sauce has a high reputation among the Chinese and Japanese, not merely as a condiment, but as a medicinal agent. Chemical analysis of the seeds shows them to be very rich in proteine. The oil is available for many uses–for burning in lamps or even as a substitute for olive oil. Being somewhat of a siccative [drying] nature, it is not adapted for a lubricant, but it is for that reason useful as a substitute for linseed oil in the manufacture of paints and in other similar industrial arts. Finally, to complete the list of virtues of this Celestial pea, the haulm gives an excellent fodder for cattle and horses."

5. K. 1880. The soja or Asiatic bean (Letter to the editor). *Charlotte Democrat* (*The*) (*Charlotte, North Carolina*). May 7. p. 4.
• ***Summary:*** "Editor Charlotte Democrat:–I send you a small sample of an Asiatic Bean, the *Soja Hispida,* a plant which has for ages constituted a chief article of food for man and beast throughout the great continent of Asia, from the Caucasus to Japan. Notwithstanding its prominence in the agriculture of so large a part of the human race for a great part of its history, it had failed to be adopted, or investigated, or acclimated in Europe, until the great Exposition at Vienna. A large number of its varieties were exhibited there, both from Japan and several Asiatic Continental States. Prof. Haberlandt of Vienna obtained and distributed specimens of the several varieties throughout the different States of the Empire and carried on experiments through a series of years to ascertain its relations to the climate and soil and modes of cultivation of Europe. In 1878 he published an account of these experiments and his conclusions. As these results are likely to be of great value to us, I give you the most important of them briefly.

"1. This Bean (the *Soja*) is more hardy than any other species of bean or pea cultivated in Europe, and is less liable to attacks of insects.

"2. It adapts itself to any kind of soil but produces the best results in a sandy loam.

"3. It has about the same range of climatic adaptation as Indian Corn, but is less liable to injury from frost–even freezing does not destroy it.

"4. It withstands the drouth of Summer better than all other legumes (beans and peas).

"5. It produces very largely, both seeds and vines, and excells all our other green fodder plants, being eagerly eaten by all farm animals.

"6. Both seeds and straw have an extraordinarily high nutritive value.

"7. It does not degenerate in the climates of Europe, but even improves in yield and quality. So that, it is a most important acquisition to the agriculture of Europe.

"The *Soja* yields 35 to 55 bushels of seed and two tons and upwards of straw to the acre.

"The analysis, of the *Soja* Bean, compared with the horse bean, cow pea, garden pea, wheat and corn, shows that it far surpasses them all in the two most important food constituents, viz: albuminoids and fat; and justifies the high place it has so long held among the Eastern nations as food for man and beast.

"From analysis it appears that only clover surpasses the value of the *Soja* vines as 'roughness,' and that by a smaller amount than it exceeds timothy hay, and the *Soja* is far better than the cow pea; and in this last respect it has this further

very great advantage, that it does not shatter in the ripening or curing.

"And lastly, the *Soja* furnishes a better green crop for the improvement of the soil than the cow pea, (the most valuable plant we now have for this purpose,) because its ash shows a larger percentage of potash, phosphoric acid and ammonia. Some twenty varieties of this plant are known in Asia, and Prof. Haberlandt procured and experimented with them all. He finds two, designated as the 'yellow' and the 'red brown' to be, on the whole, the most valuable.

"I have procured a half gallon of these acclimated varieties from Vienna, and distributed them to some twenty-five localities, covering the whole State, and all its varieties of soil and climate, with the request to report the result in the Fall. From one of the parties I got the answer that he has been cultivating it for five years, and 'finds them superior to all other kinds of peas for stock, especially cows,' and he says he is sure 'he can raise 100 bushels to the acre.' He adds: 'They do well planted among corn, like cow peas, or sown broadcast.' This is valuable testimony from a very intelligent and successful farmer in the Eastern section of the State, where the cow pea is so important a crop."

6. *Charlotte Democrat* (*The*) (*Charlotte, North Carolina*). 1880. Good sign about farming. May 28. p. 3.
• ***Summary:*** "It is a good sign to see how anxious some of our best farmers are to try new seed and new methods, and we take pleasure in procuring all we can for their use and trial.

"We have recently published some articles about a new Cereal and Bean introduced into this country, and have distributed specimens to intelligent farmers. The 'Egyptian Corn or Pampas Rice,' and the 'Silver Hull Rice' for Uplands has been distributed; and also the 'Asiatic or Soja Bean.' The first two were received from the Agricultural Department at Washington [DC], and the last and most important (the Soja Bean) from the Agricultural Department at Raleigh. We saved no seed for our own use, and hope those who received them will nurse carefully and report next Fall, so as to give us as many seed as we want for planting next year."

7. Boatwright (Jno. L.). 1881. Catsups, sauces, &c. (Ad). *Morning Star* (*The*) (*Wilmington, North Carolina*). Feb. 27. p. 1.
• ***Summary:*** "'Gulden's' Tomato Catsup, in Pints and Quarts.
"The Finest Tomato Catsup made.
"Cross & Blackwell Royal Osborne Sauce.
"Cross & Blackwell's Athenoum Sauce.
"Cross & Blackwell's Beef Steak Sauce.
"Cross & Blackwell's China Soy Sauce.
"Cross & Blackwell's Mushroom Catsup
"Cross & Blackwell's Walnut Catsup.
"All Standard Goods.
"For sale low by..."

Note: The famous British food company name should be spelled "Crosse & Blackwell." It has been in existence since 1706, but the company acquired its present name when it was purchased in 1830 by Edmund Crosse and Thomas Blackwell. Address: Nos. 11 & 13 N. Front St..

8. Gilbert (C.R.) & Co. 1881. Classified ad: Seeds that surprise! The farmers' "Bonanza." *Anson Times* (*The*) (*Wadesboro, North Carolina*). March 24. p. 4, col. 3.
• ***Summary:*** "Maxixe, a new vegetable from S.A., differing from anything ever grown here, delicious raw or cooked. Seed sent by mail 20 cts. a paper. Soya Bean of Japan, half bean and half pea, said by chemists to be the richest food known. Fine fodder plant also. Seed 15 cts. a paper..."

"Reference: Hon. W.L. Calhoun, Mayor of Atlanta."

Note 1. This is the earliest known seed company in the United States that sells soy beans in its seed catalog.

Note 2. This ad also appeared in the *The Daily Review* (Wilmington, North Carolina) on March 26 (p. 4) and in many other southern newspapers. Address: Atlanta, Georgia.

9. *Atchison Daily Patriot* (*Atchison, Kansas*). 1881. Scientific miscellany. Sept. 3. p. 2.
• ***Summary:*** "M. Roman, a French engineer, states that the cultivation of the interesting plant, the soja or soya, has been largely developed in Hungary and in various parts of France. He thinks that it may in the future become as important an article of food as the potato. It grows in any soil, even the driest; and the plant is an excellent fodder for cattle. The seeds are very nutricious [sic] and have the form of small kidney beans. An agreeable soup [miso soup] may be made of them. The Chinese use them for various kinds of cheese [tofu, fermented tofu], to make a condiment with oil [soy sauce? The second character in basic Chinese word for "soy sauce," *jiang-you,* means "oil"], etc. In France the seeds are roasted like coffee, and M. Roman says the decoction of the soja bean is very similar to that of average coffee."

Note 1. This is the earliest document seen (Feb. 2017) concerning soybeans (soja or soya) in connection with (but not yet in) Kansas.

Note 2. All or parts of this article also appeared in many subsequent U.S. newspapers.

The Bucks County Gazette (Bristol, Pennsylvania). 1881. Sept. 15. p. 1.

The Donaldson Chief (Donaldson, Louisiana). 1881. Sept. 17. p. 1.

The Chatham Record (Pittsboro, North Carolina). 1881. Oct. 6. p. 1.

The Daily Republican (Monongahela, Pennsylvania). 1881. Oct. 11. p. 1.

The Weekly Herald (Cleveland, Tennessee). 1881. Oct. 21. p. 1.

The Marion Star (Marion, Ohio). 1881. Oct. 22. p. 3.

The Eaton Democrat (Eaton, Ohio). 1881. Dec. 15. p. 4.

The Hickman Courier (Hickman, Kentucky). 1881. Dec. 16. p. 2.

10. *Chatham Record* (*The*) (*Pittsboro, North Carolina*). 1881. Items of interest. Oct. 6. p. 1.
• ***Summary:*** "M. Roman, a French engineer, states that the cultivation of the interesting plant, the *Soja* or *Soya,* has been largely developed in Hungary and in various parts of France. He thinks that it may in the future become as important an article of food as the potato. It grows in any soil, even the dryest, and the plant is an excellent fodder for cattle. The seeds are very nutritious, and have the form of small kidney beaus. An agreeable soup may be made of them. The Chinese use them for various kinds of cheese [tofu], to make a condiment with oil, etc. In France, the seeds have been roasted like coffee, and M. Roman says the decoction of the Soja bean is very similar to that of average coffee."

11. *Weekly Herald* (*Cleveland, Tennessee*). 1881. Popular science. Oct. 21. p. 1.
• ***Summary:*** "M. Roman, a French engineer, states that the cultivation of the interesting plant, the *Soja* or *Soya,* has been largely developed in Hungary and in various parts of France. He thinks that it may in the future become as important an article of food as the potato. It grows in any soil, even the driest; and the plant is an excellent fodder for cattle. The seeds are very nutritious, and have the form of small kidney beans. An agreeable soup [miso soup] may be made of them. The Chinese use them for various kinds of cheese [tofu, fermented tofu], to make a condiment with oil [soy sauce? The second character in basic Chinese word for "soy sauce," *jiang-you,* means "oil"], etc. In France the seeds are roasted like coffee, and M. Roman says the decoction of the soja bean is very similar to that of average coffee."

12. *News and Observer* (*Raleigh, North Carolina*). 1882. The eleventh *Bulletin,* issued by the Department of Agriculture,... March 19. p. 2, col. 2.
• ***Summary:*** "... contains some very interesting matter. The article on cotton is full of information; that on home made manures is excellent. Prof. Kerr's contribution relative to 'building stones,' and 'about some useful plants,' and Superintendent S.G. Worth's report on fish hatching will be read with interest. In the former, attention is directed to the Mongolian bean, a new food plant, which is described as being very nutritious."

Note: This article is referring to: *Monthly Bulletin, North Carolina Department of Agriculture* (Raleigh). 1882. "Geological Survey: On Some Useful Plants (Continued)." No. 12. p. 1-2. March.

13. *Monthly Bulletin, North Carolina Department of Agriculture* (*Raleigh*). 1882. Geological Survey: On Some Useful Plants (Continued). No. 12. p. 1-2. March.
• ***Summary:*** In the last *Bulletin* some results of investigations by the Survey in regard to the value to North Carolina of certain plants, new and old, were reported. Some facts were presented, which seem to indicate that the *Mongolian Bean* (*Soja*)*,* one of the most important cultivated plants among the vast populations of Asia for unknown ages, and recently introduced with signal success in several countries of Europe, is likely to prove a valuable acquisition to the agricultural resources of this State. A general statement was given of the conclusions reached by the eminent agricultural chemist of Vienna, Prof. Haberlandt."

Note: This is the earliest document seen (June 2017) that contains the term "Mongolian Bean" (or "Mongolian beans," regardless of capitalization) which it uses to refer to the Soja bean.

"The matter is of sufficient importance to require the further presentation of the results of Prof. H.'s researches which, as stated, were carried on for a period of three years, and in all parts of the empire of Austria, with its various soils and climates. He gives the results of more than 150 experiments, which were almost uniformly successful. These are embodied in the following table which shows the comparative value of this bean and our leading vegetable food products; the analyses of Soja and of the garden pea from Prof. Haberlandt, and the others from Prof. Johnson, except that of the cow pea, which is from Ledoux. I add at the bottom of each column figures showing the relative nutritive value, on the usual assumption that the nitrogenous and fat components are of equal value, (for equal weights,) and that of carbohydrates, (sugar, starch, &c.,) about one-fifth as much:"

A table (below) compares the nutritional value of wheat, corn, garden pea, cow pea, and soja. For each is given the nitrogenous matter, fat and carbohydrates, plus the "relative nutritive value." Soja has by far the highest relative nutritive value, 2.71. The next highest ia garden peas with 1.56.

"It will be seen that in both the cardinal food elements,

	Wheat.	Corn.	Garden Pea.	Cow Pea.	Soja.
Nit. mat.	13.0	10.0	22.7	23 0	38.3
Fat, ...	1.5	7.0	2.0	1.4	18.7
Carboh 's	67.6	68.0	54.3	48.1	26.2
Nut. val.	1.23	1.35	1.56	1.49	2.71

fat and nitrogenous matter, the Soja far surpasses all our richest vegetable foods, having nearly three times as much fat as corn, and of protein, as wheat, and more than double the nutritive value of both, and exceeding in this respect our familiar species of legumes by about eighty per cent.

"As it took Europe several hundred years and countless millions of money to learn from China the art of cultivating the silk worm and making porcelain, so it seems that Europeans have still much to learn from that wonderful people, and among other things the lesson which the near future urges, viz: how to feed themselves economically, so that many times the present population per square mile may be supported by its products. She has already made one contribution towards this end by teaching the art of raising fish, like pigs and chickens, and the indications are, that the Mongolian Bean is a still greater benefaction.

"But the story of the value of Soja is not yet complete. The straw (leaves and stem), of which the yield is very great, is nearly equal in, value to our best forage plants, as the following table of analyses shows:"

A table compares the nutritional value of the straw of clover, timothy, cow pea, and soja. For each is given the nitrogenous materials, fat and carbohydrates, plus the "relative nutritive value." Clover has the highest relative nutritive value, 0.99, followed by timothy (0.95), soja (0.80) and cowpea (0.73).

"And of course its value as a green crop for improving the soil, will be of the same order, and determined by the same conditions.

Prof. Haberlandt sums up the results of his numerous and exhaustive investigations in a list of valuable qualities of which the following are the chief, viz:

"1. The Soja will grow well in any sort of soil, of fair quality.

"2. It stands drought better than all other legumes.

"3. It stands frost better than either legumes or corn; even freezing does not destroy it.

"4. It is extremely prolific, both in fruit and forage; and as a green fodder plant it is unequalled.

"5. It not only has the highest value for human food, but both the seed and fodder are preferred by stock to nearly all other foods.

6. The labor and cost of cultivation are less than of any other cultivated crop.

"7. It matures early, surpassing corn in this respect.

"The above is not half the list of notable and valuable qualities enumerated.

"Such are the results of the domestication of Soja in Europe.

"As stated in the previous number of the Bulletin, the tests which have been made in this State promise equally well.

"Prof. Lane, who has experimented longer and on a larger scale than any one else, gives? it a place with his most important plants? He finds that horses and cattle will desert any other forage for the Soja fodder [?]. And as to yield, he gathered 50 bushels per acre from his ordinary cotton field, and has no doubt he could easily [?] 100 bushels, and the product of for- [?] is proportionally great. Some of the [?]aw being badly cured on account of [?]in, and thrown into the stable lot for manure, was pawed up by horses and cows and eaten, to the last stem.

"Another considerable advantage which this gentleman found, is that the seed does not shell out in handling, so that there is no waste.

"Prof. Cook, State Geologist of New Jersey, has had some experiments made, last year, on the experiment farm of the N.J. Station, and his results are in accord with those given above.

"Now if the half of this prove true–and there seems no reason to discount it in the least–the Soja will be a great boon to the agriculture of North Carolina, not only directly, but indirectly as well. For one of the great wants of the State is a system of crop rotation which will introduce stock raising, not alone for the supply of our own meat, but chiefly to furnish manure for the soil; for without this change our soils and our agriculture will go to ruin

"Soja may be planted like the cow pea, but until seeds are plenty, it is better to plant 4 to six inches apart in drills widely enough separated for cultivation." Address: Director, N.C. Agric. Exp. Station.

14. *Winston Leader* (*The*) (*Winston-Salem, North Carolina*). 1882. Diet of the Japanese. April 4. p. 4.

• ***Summary:*** "Of thirty-six thousand cows slaughtered in Japan last year, more than one half were consumed by foreigners on shore or ship. Few natives, except officers in the capital, sailors and soldiers, eat beef. Mutton and pork beyond the treaty ports are hardly yet known. About two hundred varieties of fish are eaten, one-half of the people eating fish every day. The food of the masses is '90 per cent. vegetables.' The list of food plants in use, not including sea-plants, was prepared for the pamphlet, with their analyses, by Professor Edward Kinch, of the Tokio university. A large number of these substances are unknown, or at least unused, in the United States. Of rice, which occupies in its culture one-half of the cultivated land, there are 250 varieties of seed in the country. Millet is extensively used, but bread raised from a 'sponge' of yeast is hardly yet known in the popular diet, the old Latin Portuguese word *pan* being, however, in use. The soybean, which in chemical composition closely approaches animal fiber, is extensively cultivated. Probably no country excels Japan in the variety of leguminous plants raised for food..."

15. *Farmer and Mechanic* (*The*) (*Raleigh, North Carolina*). 1882. Miscellaneous industries of North Carolina. April 26. p. 3.

• ***Summary:*** "State Geologist, Prof. Washington C. Kerr, reports that *Mongolian Soja* (bean) is apt to turn out to be–(if half that is now asserted, and seemingly proved by experiments)–a great boon to the agriculture of North Carolina, since it will stimulate stock raising which is one of the greatest needs of the State at this juncture. Plenty of stock will not only keep at home the millions of cash which go to buy western bacon, but will also furnish the manure to improve the soil of our thin uplands. *Soja,* Kerr says, has a nutritive, or food producing value of 2.71, whereas the common cow pea has only 1.49, and corn 1.35."

16. Williamson & Upchurch. 1882. Soja, or Mongolian beans (Ad). *News and Observer* (*Raleigh, North Carolina*). May 5. p. 3, col. 4.

• ***Summary:*** "We have a few Bushels of the valuable Beans that we can furnish at 20 cents per quart, $1.25 per peck. May 4, 1882."

Note 1. This is the earliest document seen (June 2017) with the term "Mongolian beans" (or "Mongolian bean") in the title.

Note 2. Since no address is given, this company is probably well known and located in Raleigh.

17. *Prairie Farmer.* 1882. Agricultural experiments. 54(7):2. Oct. 14.

• ***Summary:*** "Frequent bulletins are issued from the New York agricultural experiment station at Geneva, of which Prof. E. Lewis Sturtevaut is the director."

"If ensilage is to become a feature of the farm, then it seems probable that a variety of crops may be grown for ensilage purposes with advantage, in order to secure the mixture in the soil which will offer the more complete ration than any one article used alone. It is this which gives importance to the investigation into the adaptability of such crops as the soja bean and cow pea.

"Of Soja hispida or the Japanese bean, 'probably the most concentrated food furnished by the vegetable kingdom,' Dr. Sturtevaut says that it was on the first of the month, three feet tall, of luxuriant foliage and crowded with small pods containing from one to three beans each, and bloom still forming. As a forage plant it seems to afford promise; also for food, if it proves acceptable to the palate."

18. *Charlotte Democrat* (*The*) (*Charlotte, North Carolina*). 1882. Communicated (Letter to the editor). Nov. 17. p. 2.

• ***Summary:*** "The *Soja Bean,* which you also once mentioned, I had tried before. This year I have tried an improved variety, from the experimental grounds of the Agricultural Society of Etampes, France. Neither this nor the old variety, *Hispida,* proved very desirable, even under good care, as the small number of beans to the pod (two or three) more than balances the pretty good yields in pods."–A subscriber.

19. Helm, Thomas B. 1882. History of Carroll County, Indiana, with illustrations and biographical sketches of some of its prominent men and pioneers. Chicago, Illinois: Kingman Bros. 352 p. Illust. 32 cm. Reprinted in 1966, but without the first 100 pages.

• ***Summary:*** On page 282 is a nice biography of Solomon Fouts, who was born on 16 Dec. 1826 in Montgomery County, Ohio. In 1802 his father, Noah Fouts, came to that county with his parents from North Carolina; Noah grew to manhood there, marrying Eve Zech. In 1833 Noah and his family moved to Carroll County, Indiana, settling near Camden. After several changes of location, they finally settled on a farm in Cass County, Indiana, where Noah died in March 1845. "He was a man of upright character and possessed the warm regard of all who knew him."

Solomon Fouts, his son and the subject of this biography, first attended school in Ohio. He was 7 years old when the family moved to Indiana in 1833. "In the spring of 1838, he accompanied his father's family to what is now Deer Creek Township in Cass County, Indiana, where their family and the family of Joseph Neff were the first white settlers. It was here that he grew to manhood...

"On 11 August 1860 he was united in marriage with Miss Margaret E. Bridge, daughter of James Bridge, a prominent and highly respected citizen of Carrollton Township. In 1863, he returned to Carroll County and purchased a farm in Washington Township, but subsequently purchased and located again in Cass County, where he remained until the spring of 1872. At that time he purchased the farm where he now resides on the line of the Logansport and Burlington Turnpike in Carrollton Township."

He is a member of the Cumberland Presbyterian Church. Solomon and his wife had nine children. One, James Judson Fouts, "is deceased, while Laura J., Noah, Finis Ewing, Mary Eve, Emma, Alma, Clara, and Taylor still survive."

A large illustration between pages 282 and 283 shows the handsome two-story home and barn of Solomon and Margaret Fouts. In front of it is a horse and carriage, and a split-rail fence.

A table titled "Members of the Old Settlers' Society (p. 163) includes: (1) George S. Fouts, born in Ohio, age 54 in 1859. Date of settlement in Carroll County: 10 Oct. 1831. (2) Martin Wagoner, born in Pennsylvania, age 62 in 1861. Date of settlement: May 1832.

A history of individual Civil War regiments states (p. 204) that the 51st regiment was organized on 11 Oct. 1861 at Indianapolis, and mustered into service on 14 Dec. 1861. John W. Foutz of Carroll County was drafted into Company I of this regiment, then mustered out on 26 Dec. 1865.

A history of Carrollton Township (p. 277) notes that it is located in the eastern extremity of Carroll County. There is "no unanimity as to who was the first white family to take up its abode here for purposes of improvement. The history

of the early settlement begins with the year 1832, when George Trapp, Johnson Kirkpatrick and George Fouts [born 9 July 1806; brother of Noah Fouts who was born 28 March 1801] came to live on lands which they had purchased in the preceding year at the Government Land Office. Kirkpatrick settled in Section 10; Fouts, in Section 20; Trapp, in Section 2." With their axes, they cleared the giant trees of the forest. In 1833 Martin Wagoner and family entered land in Section 5.

A history of Clay Township (p. 284) notes that it is the southwest township of Carroll County. The first settlement, in 1835, comprised John Beard, Daniel Wagner, John Wagner, Joel Fouts, and Samuel Mooney, all of whom settled in the western part of the township. The North Fork Church (p. 287), of German Baptist denomination, was erected in 1852. Joel Fouts and his wife were among the original members.

A table (p. 350) gives information about the residents of various townships. In Carrollton Township: (1) S.W. Fouts, in Section 20, settled in 1831. Born in Ohio, his P.O. address is Deer Creek. Business: Farmer. (2) Solomon Fouts, in Section 22, settled in 1832. Born in Ohio, his P.O. address is Deer Creek. Business: Farmer.

Note: This is the earliest document seen (Oct. 2012) concerning the Fouts family, many of whom later did pioneering work with soybeans in Carroll County, Indiana. Address: Lawyer, Logansport, Cass County, Indiana.

20. Dabney, Charles W., Jr. 1883. 2. Food and fodder plants: the Soja bean. *Monthly Bulletin, North Carolina Department of Agriculture* (*Raleigh*). May 1. p. 12.
• ***Summary:*** "At the suggestion of some of our farmers, I have made analyses of Douhra corn and Soja bean, stalks and beans both. After studying the characteristics of the Soja bean quite thoroughly, I am much impressed with its good features.

"It is a legume introduced from the East. It stands upright and throws out branches, forming a pyramidal plant. It is a tremendous bearer, yielding from two to three times as many bushels of its yellow beans as can be made of cowpeas on the same area. This is the great point in its favor.

"The beans have an extraordinarily favorable composition, far surpassing any other bean or pea in richness. They contain a large percentage of albuminoids, and, what is more remarkable in seed of this kind, a very large per cent. of fat, so much that an oil can be expressed from them like pea-nut oil.

"To illustrate the character of the Soja bean, let us compare it with some other legumes, and with the kernels of cotton seed. The analyses of Soja bean, cow-pea and cotton seed kernels are our own; the others are selected."

A large table, titled "Analyses," compares the nutritional composition of soja bean, yellow cowpea, white beans, green peas, and kernels of cotton seed. For each is given: water, proteins, fat, nitrogen-free extract, cellulose, and ash. The soja bean (with 10.13% water) contains 34.63% proteins and 17.98% fat.

"The bean is almost equal to cotton-seed meal in composition, while it surpasses it very far in the amount of food which can be made to the acre.

"Sixty bushels to the acre is not an unusually large crop for the Soja. This tremendous bearing power together with its composition render it the most promising plant which has lately been introduced to us.

"The matured plant is rather rough and woody in texture, but the beans have the fortunate property of maturing after the plant has been cut up, and an excellent fodder can be made from it in this way, cutting the plants down, curing them, beating the beans out, and keeping the straw for rough food. From a chemical stand point, I know of no fodder plant which will produce as many pounds of both the concentrated and rough food per acre. It is adapted to our soils and climate. It thrives especially well upon peaty soils, reclaimed marsh lands, &c., when they have been marled. What a possibility for our eastern country!" Address: Director, N.C. Agric. Exp. Station.

21. *Prairie Farmer*. 1883. The soja bean. 55(19):290. May 12.
• ***Summary:*** The Soja bean was first brought before the Western world at the Vienna exposition in 1878. It was exhibited there from China and India, and attracted special attention from Prof. Haberlandt. On his recommendation it was tested in Central Europe.

"From the annual report of the North Carolina Experiment Station, we learn the Soja has given great promise of excellence in that State as a feeding stuff for stock. It seems adapted to almost all soils. It yields a much larger amount of feed than the cow pea, so popular at the South. It can stand cold, damp, or generally unfavorable weather exceedingly well. In the Southern States, to which it is best adapted, as it requires a long, warm season for its development, it should be planted about the first of May, in ordinary seasons. The beans are sown thinly, in shallow rows, eighteen inches apart, and covered about half an inch. The plants will blossom in July, and the beans ripen in September. A single plant will bear from 80 to 300 pods, each pod containing from one to five beans. The straw and bean have both been analyzed at the Station, and regarding results the report says:

"'These analyses compared with meadow hay and the fodder from legumes, show that the plant under consideration yields not only a been of remarkably favorable chemical composition, but also a straw and hulls which are quite nutritious. The matured straw of the Soja resembles meadow hay in composition, although it is somewhat harder and rougher in character. The green plant produces a very nutritious fodder. If it is the purpose to utilize the whole

plant, and to the best advantage, it is suggested by these analyses that probably the best time to cut them is when the pods are just fully developed and not yet hard. Out at this stage the beans will ripen sufficiently, as we saw, and the straw will be preserved in the most favorable state for hay. The straw contains, at this stage, a larger amount of proteins and fat than the fully matured and dead plant. This plan would render the Soja suitable for cultivation in our most northern States or the highest districts. "'The conclusions from this inquiry into the chemical nature of the Soja bean and its straw must be that,

"'1. The bean itself is one of the most nutritious known to us, quite unequalled in the amount of fats it contains and containing at the same time a very large amount of proteins.

"'The ripe plant yields a straw fully equal to common hay in composition; while owing to the fortunate property the beans have of maturing and drying after the plant is cut, a still more superior hay may be made from it by harvesting the plants just when the pods are fully developed and still green.'

"Our Southern friends are to be congratulated on this promising acquisition to their fodder crops. We trust the Soja will meet these early expectations, and that the region of its culture may be speedily extended northward as far as climatic conditions will permit."

22. *North Carolina Agricultural Experiment Station, Bulletin.* 1883. The soja bean–waste products of tobacco factories. May. *

23. *Charlotte Democrat* (*The*) (*Charlotte, North Carolina*). 1883. A singular "foody" bean. Aug. 17. p. 1.
• ***Summary:*** "A late Indo-Chinese steamer, arriving at Marseilles, brought specimens of a bean which has long been used by the Chinese and Japanese as an article of food. Not only is it cooked and eaten like other vegetables, but it is made into cheese. By its composition it more closely resembles animal food than any vegetable known to us, containing much greasy matter and albumen. A trial will be made to acclimate it in the south of England. In the north it could not grow, owing to the uncertain and changing climate, and the temperature being too low.

"Besides the above advantages as an article of human food, the husks serve as very good fodder for horses and cows. The cheese made from the Japanese bean has a very delicate taste, much like Parmesan. It would be worth while to attempt the cultivation of this bean in the South, where the seems scarce a doubt it would be successful and 'bean cheese' [tofu] might become a specialty among Southern products."

24. Dabney, Charles W., Jr. 1883. The soja bean–*Soja hispida. North Carolina Agricultural Experiment Station, Annual Report* 5:116-27. For the year 1882.
• ***Summary:*** Contents: Introduction. Description of the *Soja hispida* and its varieties. Cultivation of the soja bean. Chemical composition of the Soja. Yield of the soja bean. Soils and fertilizers. Uses of the soja bean.

The introduction begins: "This plant has been tried by a number of persons in different sections of the State and is favorably considered by them. It appears to be well adapted to our climate and soils, and yields very well. It produces more bushels per acre of beans than can be obtained of cow peas or any other kind of bean known to us. In feeding value, the soja bean is also superior to the highly esteemed cow pea. The plant has made a great reputation for itself in Europe in spite of decided disadvantages as to climate. Our climate is exactly suited to it, and it promises to have a useful career here.

"The soja bean was first brought to the attention of the agricultural world through the efforts of Prof. Friedrich Haberlandt, of Vienna, who found it among the products exhibited from China, India and the East generally, at the Exposition of 1873. Haberlandt's investigations showed that this new legume not only contained a large amount of proteins or flesh-producers, as was to have been expected in an article of its class, but also a remarkably large amount of fat, which is so unusual and which qualified it at once to be an excellent article of food for animals. His labors to introduce the plant have succeeded so well, against a climate which did not afford a long enough growing season, that the Soja bean is now extensively cultivated and highly valued throughout all central Europe.

"The following description of the Soja bean and its varieties is condensed from Wein's [1881] *Die Sojabohne als Feldfrucht:"* It begins: "The rough-haired Soja bean, *Soja hispida* Mönch, belongs to the family of the legumes."

This description includes extensive information based on seed shape and color published by Prof. Harz in the Journal of the Agricultural Association of Bavaria.

"The two original groups are:

"I. The *Soja platycarpa* Harz–flat pod Soja bean.

"II. The *Soja tumida* Harz–swollen pod Soja bean."

"The yellow bean has been the most popular, however, and is said to be a little heavier than the other varieties. This is the variety which we have tried in North Carolina."

Concerning cultivation: "A single plant will bear 30 to 100 pods; an average of 100 is easily reached with good cultivation, a fair season, and tolerably rich soil. The pods contain 1 to 2 seeds most often, not infrequently 3, seldom 4 or 5. We find a bushel yellow beans, variety *pallida,* grown near Raleigh, to weigh 58 pounds to the bushel. A fortunate property of the Soja bean is, that it can withstand cold, damp, or generally unfavorable weather, very well. It is not liable to be injured easily thus by a late spring or an early frost. It requires a sharp cold to kill it."

Concerning chemical composition. A table (p. 120) contains two columns. "Under One is given the analysis of

Charles W. Dabney, Jr.

a specimen of the yellow Soja bean, variety *pallida,* grown in North Carolina. Under Two, the average of 16 analyses of the same variety by German chemists." All values are given as percentages. Water 10.12 / 9.49. Proteins 34.63 / 34.30. Fat 17.98 / 17.67. Nitrogen-free [extract] or carbohydrates 30.50 / 28.44. Cellulose 3.69 / 4.79. Ash 3.07 / 5.31. The "North Carolina grown specimen 1 has a nutritive ratio of 1 to 1.5.

A second table (p. 121) compares the chemical composition Soja bean seeds with the seeds of the yellow cowpea, white beans, green peas, and cotton seed kernels. "According to these figures the Soja surpasses the other legumes in proteins considerably, in fat very far. These are the costly ingredients of feeding stuffs... The cotton seed kernels alone surpass the Soja in combined content of proteins and fat [cotton seed contains more than twice as much fat, but only 84.5% as much protein]... the Soja far surpasses the cotton seed in yield of protein and fat per acre."

Concerning yield of the Soja bean: In North Carolina they give 31-53 bu/acre plus 4,500 to 9,000 pounds of straw per acre.

Concerning soils and fertilizers: "The Soja bean is adapted to almost all soils. It will grow upon purely sandy soils, on loams or clay soils. It has done particularly well, however, upon sandy limestone or marled soils and upon well drained marshes and peaty soils. It does best of all upon such swamp soils as have been heavily marled. Prof. Wollny who has made experiments upon this subject, says: 'The Soja bean is especially adapted for cultivation upon drained bogs or swamps rich in lime (marl).' We have vast areas of such soils in North Carolina. The eastern part of the state is underlaid with marls..."

"As for fertilizers to be used upon the Soja, we find that sulphate of potash and kainite are as important manures here as we found they were with peas. The sulphate did much better than the muriate. Among nitrogenous manures nitrate of soda and animal nitrogen did much better than sulphate of ammonia. The precipitated phosphates, the phosphates of iron, alumina, &c., gave better results than the soluble phosphates. We have gathered these hints from Wein's [1881] compilation on this subject."

"Uses of the Soja bean: In its native lands this bean is an important article of food for man. In the East the crushed or ground bean is made into a kind of mush or soup and eaten with broiled or roasted meat.

"Owing to its peculiar composition, containing so much proteins and fat and no starch, it is best prepared with other things to supply the starch, such as potatoes or rice. Prof. Hecke of Vienna highly commends a dish prepared by boiling these beans and potatoes separately, mashing them, mixing one part of the beans with two of the potatoes and seasoning to taste. He thinks that the beans contain so much fat, that no milk or butter needs to be added to this dish.

"The chief interest of this bean is, however, as a feeding stuff for stock."

Other tables show: (3) Composition of the Soja bean plant at four different stages, based on recent research at the North Carolina station (p. 122). (4) Composition of Soja straw and hulls (p. 123; empty pods, based on Wein 1881, p. 13). (3) Composition of the Soja compared with other fodders: Whole plant, Sept. 1, matured whole straw, hulls, cow pea hay, meadow hay, English pea hay (p. 124; "The other analyses are from [Emil] Wolff's tables")

Note 1. This is the earliest document seen (May 2017) that clearly refers to the cultivation of soybeans in North Carolina. This document contains the earliest clear date seen for the cultivation of soybeans in North Carolina (1882). It is also the earliest publication seen on soybeans from a North Carolina Agricultural Experiment Station.

Note 2. This is the earliest agricultural experiment station publication seen (Aug. 1998) whose sole subject is the soy bean (soja bean).

Note 3 This is the earliest agricultural experiment station publication seen (Dec. 2016) with the term "soja bean" in the title.

Note 4. According to I.O. Schaub's "North Carolina Experiment Station: The First 60 Years, 1877-1937," Dr. Charles William Dabney, Jr., was director of the station from 1880 to 1887. A photo (p. 60-61) shows Dabney with other past directors on the 50th anniversary of the station on 17 April 1927. Dabney left his position as Director of the North Carolina Experiment Station in 1887 to become president of the University of Tennessee. He left that position to become Assistant Secretary of Agriculture under president Grover Cleveland. For a detailed biography of Dr. Dabney, see R.Y. Winters (1965).

Note 5. Charles Dabney, the author of this article, interested Dr. John Harvey Kellogg in meat substitutes and soybeans in about 1893-97. See: Richard W. Schwarz. 1970. *John Harvey Kellogg, M.D.,* p. 121-22.

Note 6. This is the earliest document seen that mentions kainite in connection with soybeans. *Merriam-Webster's Collegiate Dictionary* (1998) defines kainite (pronounced KAI-nait, formerly sometimes spelled kainit, derived from the Greek *kainit* or *kainos* = new or recent), a word first used in 1868, as "a natural salt [the chemical formula is given] consisting of a hydrous sulfate and a chloride of magnesium and potassium that is used as a fertilizer and as a source of potassium and magnesium compounds."

Note 7. This is the earliest English-language document seen (April 2002) that mentions the use of "sulphate of ammonia" or "nitrate of soda" as a fertilizer, or in connection with soybeans.

Note 8. This is the earliest English-language document seen (April 2003) that uses the term "cotton seed kernels" to refer cotton seeds.

Note 9 This is the earliest English-language document seen (Oct. 2006) that contains the word "cowpea"

(or "cowpeas"), spelled as one word. Address: Ph.D. (Goettingen), Chemist and Director of the Station, Raleigh, [Wake County], North Carolina.

25. *Chatham Record* (*The*) (*Pittsboro, North Carolina*). 1884. Exposition notes. May 8. p. 2.
• ***Summary:*** From the News and Observer. "Work at the grounds progresses very satisfactorily. The North Carolina Car Co. has many men at work on the main building."

"Water pipes well be laid from a supply reservoir in the centre of the race-course through beds in which will be shown the following: rice, tobacco, cotton, corn, Irish potatoes, jute, beets, sugar cane, hemp, broom corn, barley, buckwheat, turnips, golden millet, soja beans and flowers. Squares of uniform size with ample walks between them will be devoted to these growing plants. All these will be in the race-track. The ground is highly manured and carefully prepared. In a corner of the spacious grounds is a field of five acres of clover. This is now growing finely."

26. The family tree (genealogy) of William Thomas Culpepper, Elizabeth City, Pasquotank Co., North Carolina. 1884.
• ***Summary:*** William Thomas Culpepper (1884-1945) was born on 19 June 1884 in Pasquotank Co., North Carolina, the son of Leroy C. Culpepper (8 March 1858 to 30 March 1931) and Martha Davis (25 July 1866 to 1 Jan 1937).

In the 1900 U.S. census William, Luther, George and Horace was listed as a sons in Leroy C. Culpepper's household at Providence, Pasquotank Co., North Carolina.

William was married on 9 Oct. 1909 to Alice Gwendolin Butler at Pasquotank Co., North Carolina, at age 25.

In the 1910 census (on 15 April 1910) William was listed as the head of a family at Elizabeth City, Pasquotank Co., North Carolina.

Two sons were born in 1910: William B. Culpepper and (?) Culpepper.

His son, William D. died on 27 May 1912 in Pasquotank Co.

His son William Thomas Culpepper Jr. was born on 9 Jul 1916 at Pasquotank Co., North Carolina.

William registered for the World War I draft, naming Alice Gwendolin Butler as his nearest relative, on 12 Sep 1918 at Elizabeth City, Pasquotank Co., North Carolina.

He was listed as head of family in the 1920 and 1930 censuses at Elizabeth City.

His father died on 30 March 1931 in Elizabeth City.

His mother died on 1 Jan. 1937 in Elizabeth City.

He died on 11 June 1945 at age 60 in Pasquotank Co.

Burial: His body was interred circa 13 Jun 1945 at Hollywood Cemetery, Elizabeth City, Pasquotank Co., North Carolina.

"Biography: Merchant, theater owner, public official. Attended local schools and Atlantic Collegiate Institute. Promoter and manager of the Elizabeth City Cotton Oil & Fertilizer Co; president of the Carolina Amusement Co; president of Culpepper Hardware Corp; member of the General Assembly (1933); State senator (1945); postmaster, Elizabeth City (1934-43); Chairman of Pasquotank Co. Finance in WW II; president of the State Association of Postmasters in 1938."

27. *Daily Review* (*The*) (*Wilmington, North Carolina*). 1885. State news. Sept. 3. p. 4.
• ***Summary:*** From the Raleigh Register: Mr. George Shellam, an Englishman, has been farming ten years two miles east of Raleigh. Mr. Shellam when be began there had virtually nothing and began business upon a very poor tract. With an annual rental and taxes amounting to $700 a year and with a young family of eight, chiefly girls, he has made his way and greatly improved and stocked his farm. Last week be was making a silo wherein to put the green crop of 12 acres of corn, pea-vines and soja beans. He had a silo last year which did so well that he determined to enlarge this year.

"There were 30 milk cows and a fine Jersey bull and an immense stock of cured clover. A fine young peach orchard which had borne full and seven acres at young grape vines, added to a fine crop of corn, five acres of peanuts and three acres of turnips made a varied scene. There were numerous young and green looking cabbages too. Mr. Shellam had just shipped seven tons of grapes and was making wine of the remainder. He is a busy, thrifty man, and one of those who know the meaning of the term self-help."

28. Alexander Drug & Seed Co. 1890. Reliable farm & garden seeds: Send for descriptive catalogues, improved cottons, seed for forage crops, vegetable seeds (Ad). *Progressive Farmer* (*The*) (*Winston-Salem, North Carolina*). Feb. 4. p. 7.
• ***Summary:*** "Special Mail offer:

"For 35 cents, any three of them for $1.00. We mail one lb. either of the following; Lucerne, Yellow Millo Maize, Kaffir Corn, African Millet, Chufas, Pearl Millet, White Clover, Soja Bean. Okra Leaf Cotton.

"For $1,00 we will mail either of the following: 3 lbs. Lucerne, 3 lbs. Chufas, 4 lbs. Spanish Peanut, 4 lbs. Vetch, 4 lbs. Peterkin Cotton, 3½ lbs. Welborn's Pet Cotton, 3 lbs. Pearl Millet, 3 lbs. Johnson Grass, 3 lbs. Yellow Millo Maize, 3 lbs. White Millo Maize, 3 lbs. Kaffir Corn, 2 lbs. Japan Clover, 3½ lbs. Conch Pea, 3½ lbs. Okra Leaf Cotton, 3½ lbs. Soja Bean, 50 papers assorted Garden Seed,..." Address: Augusta, Georgia.

29. Jones, Philip S. 1890. Southern seed grown on Southern soil! By a Southern grower (Ad). *Progressive Farmer* (*The*) (*Winston-Salem, North Carolina*). April 15. p. 6.
• ***Summary:*** This long ad begins: "Come, brother farmers, do

you wish to plant acclimated seed grown in our own sunny climate by a man of fifteen years practical experience? Send for price list."

Among the many seeds listed are:

"Spanish peanuts 50¢ per peck, $1.50 per bushel.

"Soja Beans, per quart, by mail. post paid, 36¢, $1.00 per peck.

"Chufas, per quart, by mail. post paid, 35¢, $1.00 per peck."

Note: A peck is a unit of U.S. dry measure = 8 quarts = ¼ bushel = 8.81 liters. Address: Herndon Burke Co., Georgia.

30. McCarthy, Gerald. 1890. The best agricultural grasses. *North Carolina Agricultural Experiment Station, Bulletin* No. 73. 97 p. Oct. 15. See p. 45, 64-68, 70.

• ***Summary:*** "Soja Bean–*Glycine hispida.* The soja bean, or as it is sometimes called, Japan pea, is indigenous to South-eastern Asia, and is a near relative of the cow pea. Though this bean has been known in the Southern States for a long time, its cultivation has never become very extended. The beans are regarded as a staple food in Japan, but in this country they are scarcely edible, probably because they are not properly cooked. The soja bean is a tender annual, and its habit of growth, use and value, is much like the cow pea.

"This bean is usually sown in drills two feet apart, and on good soil has yielded as high as forty bushels per acre. This yield of vine fodder is less than that of the cow pea, and the fodder is more difficult to cure. Cattle are not so fond of it as of cow-pea hay. It makes good ensilage.

"This plant requires as good soil and treatment as are usually given to field beans."

Table I titled "Flowering period, use, &c., of grasses" (p. 64) states that the soja bean flowers in July, prefers medium soil, gives an average yield of 4-6 tons/acre on good soil, and is used for meadow (not pasture).

Table II titled "Seeds" (p. 65) states that there are, on average, 2,800 seeds/ounce, and 90% of these are vital [viable]. An average of 60-100 lb of commercial seed is required to plant 1 acre. There are 60 lb per bushel.

Table III titled "Proximate composition and feeding value of hays containing 14 to 14.3 per cent. water" (p. 66) analyzes 28 types of hay. According to analyses by the South Carolina Agricultural Experiment Station, the proximate composition and feeding value of soja bean hay is: albuminoids 14.05% total, 9.28% digestible. Crude fiber: 24.03% total, 14.09% digestible. Nitrogen free extract: 38.00% total, 23.18% digestible. Fat 2.09% total, 0.40% digestible. Nutritive ratio 1:4.1. Relative feeding value per ton: 15.09. The author then defines several key terms: "The nutritive ratio is the sum of the per cent. of digestible fiber and digestible nitrogen free extract added to the per cent. of digestible fat, multiplied by 2½, and the total divided by the per cent. of digestible albuminoids. A well balanced ration has a ratio of 1:5.

Footnote (p. 67): In Table 3, since "few of the plants included have been analyzed by American chemists, and for the sake of uniformity [Emil] Wolff's analyses have been very largely used." "The relative feeding value has been obtained by multiplying the number of pounds of digestible fat and digestible albuminoids in one ton of hay by 4½ cents, and the number of pounds of digestible fiber and nitrogen free extract by 0.9 cent. These values owe also to German experimenters."

Table IV titled "Digestion co-efficients" [coefficients] (p. 67) gives values 8 types of hay. For soja bean vines: Albuminoids 64, fiber 58, non-nitrogenous extract 61, fat 24.

Table V (p. 68) shows the dry substances contained in 2,000 pounds of air-dry hay composition and feeding value of 27 types of hay containing 14 to 14.3 per cent. water. One analysis by the South Carolina station is given. The cash value of the fertilizing matter contained in one ton of soja bean hay is $9.36, about average.

Table VI titled "The theoretical value of hay" (p. 70) gives values for 28 plants. For hay made from soja bean vines: Feeding value per ton: $15.09 (4th highest among all 28 plants tested, after lucerne $16.74, Japan clover $16.17, and cow pea vine $15.89). Net manurial per ton: $7.48 (3rd highest after cow pea vine $8.82, and lucerne $8.28). Total relative cash value per ton: $22.57 (4th highest after lucerne $25.02, cow pea vine $24.71, and Japan clover $23.88).

Note: This is the earliest English-language document seen (Oct. 2006) that contains the term "cow pea vine" (or "cow pea vines"). Address: Botanist, Raleigh, North Carolina.

31. Clark, Henry N. 1891. Soja beans (Ad). *Progressive Farmer* (*The*) (*Winston-Salem, North Carolina*). Feb. 10. p. 7.

• ***Summary:*** See next page. The title of this ad is written in big bold letters. "100 Bushels of these famous Beans for sale at $1.60 per bushel. They are unsurpassed as feed for stock and in yield per acre. As a soil improver they are better than clover or cow peas. One bushel will plant eight acres. Address:" Address: Neal, Halifax Co., N.C.

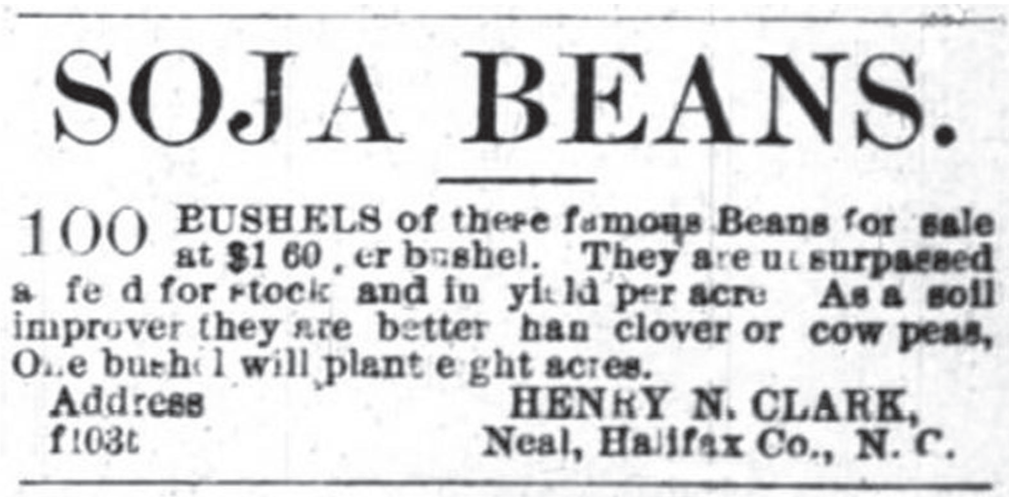
32. Parker, Fred A. 1891. Brown Leghorn chickens and Berkshire pigs! (Ad). *Progressive Farmer* (*The*) (*Winston-Salem, North Carolina*). Feb. 24. p. 8.

• ***Summary:*** "Also the famous Soja Beans 40 cts. per peck. $1.50 per bushel. Safe delivery guaranteed. Address:"

Note: this ad also appeared in the March 31 issue (p. 8), April 14 issue (p. 8), and April 28 issue (p. 8). Address: Mebane, Almanac Co., N.C.

33. F. 1891. The capture of nitrogen. *Cultivator & Country Gentleman* 56(2026):951, cols. 3-4. Nov. 26.

• ***Summary:*** "That by proper culture and rotation of crops



SOJA BEANS.

100 BUSHELS of these famous Beans for sale at $1 60 per bushel. They are unsurpassed as feed for stock and in yield per acre. As a soil improver they are better than clover or cow peas. One bushel will plant eight acres.

Address HENRY N. CLARK,
f103t Neal, Halifax Co., N. C.

we can capture nitrogen in a soil full of carbonaceous matter is doubtless true, but that in the first processes of soil improvement it will never pay to apply artificial nitrogen is far from being the case. In fact, we can more speedily get that 'proper soil,' by the use of a little nitrogen in some combination than otherwise."

"When once we can get a good growth of clover or other good leguminous crop on the land, we have secured the 'proper soil' and can then go on, with our phosphatic fertilizers, with its improvement without any need for buying nitrogen, or any need for hauling charcoal on it, for the leguminous crops such as clover, field peas or soja beans will gather it for us."

"I fully believe that the time is not far distant when intelligent farmers will have their lands in such condition that they will abandon the purchase of nitrogen, but will capture it by the use of leguminous crops." Address: Raleigh, North Carolina.

34. Massey, W.F. 1892. Notes on a recent number: Mr. Wiggins' article on "Green Manuring in Virginia." *Cultivator & Country Gentleman* (*The*) 57(2034):43-44. Jan. 21. See p. 44, col. 1.
• ***Summary:*** "While the columns of the *Country Gentleman* are always replete with matters of interest to cultivators, I think the number for January 7 is unusually suggestive."

"As a hot-weather renovating crop, there is none that can compare with the cow pea, unless it may be the soja bean. This plant (*Soja hispida*) promises to push our favorite cow pea hard. Its enormous growth of forage and wonderful productiveness in seed make it a very promising plant. My colleague, Prof. F.E. Emery, has a silo filled with them, and I am curious to note the result of his experiment. The soja bean is the only real rival we have of the cow pea. While a man's land is badly lacking the humus, it may be better to plow under the entire growth of peas or beans, but when once the land is in 'good heart,' I feel sure it is far more economical to cure the tops either as hay or ensilage and plow under only the stubble. With cow peas, soja beans and crimson clover, the reclamation of the old fields of the South is an easy matter, and the results would surprise those who have had no experience with these temporarily exhausted lands." Address: North Carolina Exp't [Experiment] Station.

35. Capehart (W.R.). 1892. Seed of Soja bean, Japan pea or Mongolian bean (Ad). *Cultivator & Country Gentleman* 57(2043):240, col. 1. March 24.
• ***Summary:*** "A most valuable forage plant–for Sale." Address: Avoca, North Carolina.

36. Wilson (John). 1892. For sale–A few bushels of Soja peas... (Ad). *Cultivator & Country Gentleman* 57(2045):261, col. 3. April 7.
• ***Summary:*** "... at $2.50 per bushel, 75 cents per peck, f.o.b."

Note: This is the earliest (and only) document seen (May 2012) with the term "Soja peas" (or "Soja pea") in the title or in the document. Address: Coleraine, North Carolina.

37. J.W. 1892. The Soja bean (Letter to the editor). *Cultivator & Country Gentleman* 57(2047):305, cols. 2-3. April 21.
• ***Summary:*** "Thinking It would be of some advantage to those who wish to plant the soja bean or pea, I will give the way we plant and cultivate, which is quite at variance with your correspondent's plan. For forage there is nothing to excel it. Plant with rows 4 feet apart on a slightly elevated ridge; drop from 10 to 12 peas in hills 18 inches apart, on edge; cultivate as you would any other crop. We bar them off and chop weeds and grass when 5 or 6 inches high; let stand a few days, turn the moldboard and put earth to them–split out middle, and if the land is good they will soon hide the ground from 4 to 6 feet high, stuck full of peas on every joint of limbs.

"If wanted for seed, let stand until leaves turn yellow and are dropping off, cut and store away until dry. If for hay, cut when a few leaves turn yellow; if you do not, the leaves will all shed when dry, but the peas will hang on. The yield per acre is very large, though I have never tested them. We plant them thick, so as to get small stalks; when cut up after drying they are very hard. All live-stock eat them. I ran mine through cutter, ½-inch long–one-third corn fodder, one-third peanut vines and one third soja peas, well mixed, and it

makes a fine feed. We never cook them to eat. Our cook says that if boiled all day they will crack in your teeth at night." Address: Coleraine, North Carolina.

38. *Fisherman and Farmer* (*Edenton, North Carolina*). 1892. Soja beans. April 29. p. 2.
• ***Summary:*** From New York Times: "The soja bean plant has no special value in this country, where we have so many other good feeding crops. It is a native of India [sic], where it is called 'gram,' and needs a hot climate to do well. It may be grown in the Southern States, but it is no better than the cowpea, which is a bean, and much the same kind of a plant. Some recent experiments with the soja bean have shown that it is exceedingly nutritious, but not more so than the cowpea. The writer grew a small crop of it in New Jersey some years ago, but discarded it as unprofitable. The cowpea may be grown in New Jersey."

39. *Homestead* (*The*) (*Des Moines, Iowa*). 1892. The soja bean. 38(19):436. May 6. Whole No. 1877.
• ***Summary:*** "The soja bean is on trial at a great many of the experiment stations where the necessity for a farm grown feeding stuff, rich in albuminoids, is strongly felt. As might be expected upon first trials, reports are quite various as to its value. Some condemn it because cows and horses do not find it palatable, and because as forage its leaves are papery and its stalks woody. Trials in New Jersey have been thought to prove it much below expectation there. On the other hand, in North Carolina, the soja bean is highly recommended for its large growth of fodder and its immense crop of beans which are believed to have a great, but as yet, not exactly determined feeding value... We are trying a few in an experimental way this year, for as yet there are few reports as to results of efforts to grow it in the Northwest."

First cited by Hymowitz. 1986. Bibliography of early, previously uncited publications on soybeans in the United States. 2 p. Unpublished.

Address: Des Moines, Iowa.

40. *Spirit of the South* (*Rockingham, North Carolina*). 1892. Soja beans. May 14. p. 2.
• ***Summary:*** From the New York Times: "The soja bean plant has no special value in this country where we have so many other good feeding crops. It is a native of India, where it is called 'gram,' and needs a hot climate to do well. It may be grown in the Southern States, but it is no better than the cowpea, which is a bean and much the same kind of plant. Some recent experiments with the soja bean have shown that it is exceedingly nutritious, but not more so than the cowpea. The writer grew a small crop of it in New Jersey some years ago, but discarded it as unprofitable. The cowpea may be grown in New Jersey."

41. Massey, W.F. 1892. Legumes in North Carolina. *Cultivator & Country Gentleman* 57(2051):385, cols. 1-2. May 19.
• ***Summary:*** "Last summer we raised on the college farm a lot of soja beans. They made a magnificent growth, and were put into the silo. To-day Prof. Emery tells me that since changing his cows from corn ensilage to the soja he finds a remarkable increase in the flow of milk. And yet the *Rural New-Yorker's* Jersey Experiment Farm decided the soja to be a worthless legume years ago, and its editor takes the station officers to task for daring to find it good after he has settled the matter for them. The soja is certainly the most formidable rival our cow pea has met. We have three varieties, one with small yellow seed, one with large round greenish seed, and one with red seed. It has been suggested that they will cross with the cow pea if planted near. We shall test this during the present summer." Address: North Carolina Experiment Station.

42. Atkinson, Edward. 1892. Soja beans and other nitrogenous foods (Letter to the editor). *Southern Planter* (*Richmond, Virginia*) 53(7):392. July. [3 ref]
• ***Summary:*** In the section titled "Farm management." "I observe that you are dealing with the 'soja' bean and other leguminous plants for use in the silo. You will find that subject treated in my book upon the 'Science of Nutrition,' which is about to be published... The deficiency in the dietaries of Europe is found to consist in nitrogen. The element of which we are depriving our soil without sufficient return is also nitrogen. The people of China and India comprehend this matter a great deal better than we do. I imported soja beans for distribution from the Cotton Exhibition in Atlanta [Georgia] in 1881, whence they went out in small parcels. Since then they seem to have attracted a good deal of attention in the South. I believe they were known before, but nothing had apparently come of the knowledge. In Church's book upon 'The Food of India,' testimony is given to the very great value of the soja bean in yielding the nitrogenous element of food which is so necessary in what are called 'the rice-fed nations.' There is no such thing as a rice-fed nation. The people would starve if fed only on the starch in the rice.

"It is absolutely certain that your soils must be renovated either with cow-peas, clover, or beans. I have reason to believe that the 'soja,' the 'mung' and some other East Indian varieties of beans are very much more nitrogenous than the cow-pea is as a rule;..."

The editor then invites the Virginia and North Carolina Experiment Stations to conduct research on Mr. Atkinson's suggestion "as to the proper proportion of Soja and cow-pea vines to be siloed with corn in order to the making of a complete nutritive ration for stock and also as to the nutritive value of the cow-pea." Address: Boston, Massachusetts.

43. McCarthy, Gerald. 1892. Pea and bean weevils: if you

want to get rid of them use Bisulphide of Carbon. *Twin-City Daily Sentinel* (*The*) (*Winston-Salem, North Carolina*). Sept. 13. p. 1.

• ***Summary:*** Many hundred bushels of garden peas and beans, cow peas and soja beans are annually destroyed by weevils in the Southern States. These weevils are two species of the genus Bruchus B. Pisi. The pea weevil is the smaller and is blackish with white spots. It attacks only the garden pea, never the cow pea, which is a true bean, or the garden bean, etc. The bean weevil B. Obsoletus or fabae is a rather small, yellowish, hairy insect. This weevil never attacks the pea, but is the great pest of beans and cow peas. Both species lay their eggs upon the growing pods in the field and garden. The eggs hatch in a few days and the young grub bores its way into the seeds. The grub lives within the seed until it has completed its growth and becomes a perfect or winged insect."

"Never bring a light into or near the room while the fumes can be smelled, as bisulphide of Carbon is very inflammable. The bisulphide may not kill the eggs and to insure complete destruction repeat the bisulphide treatment after sixty days.

"Bisulphide of Carbon may be ordered in quart or pint cans from any dealer in chemicals, etc., for about twenty cents per pound. Most druggists can supply it in smaller quantities but at a much higher price."

Note: Today (June 2017) this chemical is usually called "carbon disulphide." It is a colorless liquid with a not-unpleasant smell. Address: North Carolina Experiment Station.

44. *Rural New-Yorker*. 1892. True value of the soja bean. North, east, west, south. Will it come into general use? 51(2232):721-22. Nov. 5. Oversize.

• ***Summary:*** These questions were sent to the directors of all the stations in the country:

"1. After your experience with the Soja Bean as a forage crop, do you consider it of enough value to urge the farmers of your State to experiment with it?

"2. How does it compare in yield, cost of culture and harvesting and value for stock food with clover?

"3. What is the best way to cultivate and cure it?

"4. What is its rank as a silo crop and is it best suited for the silo?

"5. Will it come into general use in your State?

"The following typical replies cover the four sections of the country. Others on the same subject will follow later:

"Vermont too far North for it: The Soja Bean has been but little tested at this station. The whole of Vermont is too far north to make it worth while to attempt to raise it. Either corn or clover is away ahead of it as a fodder crop or for the silo. We have rather gone back on Prickly Comfrey. We had no trouble in raising enormous crops of it or in getting our stock to eat it, but the labor of cutting it by hand more than over-balanced all its good qualities, and we finally gave it up.

"Vermont Station. W.W. Cooke.

"Not Much Use for New York: The Soja Bean is not well suited to most places in our Northern climate; at least it has not proved to be a success with us. We have nitrogenous plants which are so much more certainly and easily raised than this, that I would not think for a moment of cultivating it for a forage plant. As to the cost of culture and harvesting in comparison with clover, no comparison whatever can be made. We have not had opportunity to harvest and cure this plant to such an extent as to learn how it should best be done. I doubt if it would be a good plant to put in the silo, because all highly nitrogenous plants are hard to preserve in the silos, as now made.

N.Y. Station. I.P. Roberts.

"Not Much Chance in Connecticut: Our idea of the Soja Bean as a forage crop may be expressed in the following extract from a bulletin which is in preparation: 'The Soja Bean makes a tall, slender growth and is not as succulent and leafy as the cow pea. It should be sown about May 20, and from our experience appears to need a fertile soil for the best results. The plants have made a slow growth and each season the foliage has been of a pale yellow color. The yield in 1889 was 9 tons and in 1892 6.4 tons per acre. The fodder has been well eaten by milch cows, but the yields have been lighter than for cow peas, and from the table of fodder analyses it will be seen that it is not as rich in protein. Both of these crops are ready for feeding at about the same time, and from our experience the cow pea is to be preferred.'

"It does not seem to me practicable to compare the Soja Bean with clover, since the plants mature at such very different times unless it is to be used for winter feeding. Maturing as late as it does, it is a difficult crop to cure as hay, but it is well adapted for the silo, though from our experience, as stated above, the cow pea is its superior. I very much doubt its coming into general use in this State.

"Chas. D. Wood. Connecticut Station.

"Good Where Clover Won't 'Catch.' I have a very good opinion of the Soja Bean as a soiling crop, that is to be cut and fed green. On fairly strong and fertile land, sown in drills 18 inches apart and at average intervals of three inches apart in the drills, the plants have reached a height of 36 inches. Our stock eat them with a good relish. Compared with the Southern cow pea, the stems are more 'woody,' otherwise we see little difference. I certainly think it of sufficient value to urge the farmers of our State to experiment with it as a soiling crop. For cutting and curing as dry fodder I prefer clover. Many of our New England farmers find it difficult to get a first-rate 'catch' of clover every time and with our present knowledge of the value of the legumes as renovating plants I would encourage the growth of as many and as great a variety as possible. Oats, barley and Hungarian [sic, grass?] are all grown here as soiling crops, and I think we can very profitably add, or even substitute 'Soja Beans' and cow peas.

"Rhode Island Station. Chas. O. Flagg.

"Good for a Massachusetts Silo: I am much pleased with our results in raising Soja Beans as a fodder crop. During the past season I have raised several acres of them; one variety, which was bought of J.M. Thorburn & Company, of New York, has not matured seeds thus far, yet yielded 10 tons per acre of green crop, with 24 per cent of solid matter, for ensilage; the other variety matured abundance of seeds and yielded from seven to eight tons per acre. The plant is much liked by all kinds of farm live stock; our results in milk and meat production are very satisfactory with both green crop and silo product. I have just filled a silo with alternate layers of equal weights of Soja Beans and green fodder corn (kernels glazing over.) Cost of production in drills (three feet apart) is not more expensive than of any other forage crop. The convenience of securing an additional (annual) leguminous crop for annual rotation counts for much with us in the support of our dairy industry, considering the present condition of our pastures and meadows. The Soja Bean is exceptionally rich in both nitrogenous constituents and fat; and the entire plant from the time of showing flowers is equal to, if not better than any other leguminous fodder crop on record.

"My success with serradella as a fodder crop during the past season has been marked–10 to 11 tons of green fodder (18 per cent solids) per acre. Our cows feed for some time on green fodder corn (two parts) and green serradella (one part). My former satisfactory observations are confirmed. A silo has been filled with equal weights of green serradella and Hungarian Grass (in bloom).

"C.A. Goessmann. Massachusetts Station.

"A Valuable Plant for North Carolina: Our experience with this legume now covers two seasons on soil not favorable to large or even moderate crops, yet this does well in comparison with other crops. Last year (1891) two acres on the college farm produced 23,430 pounds of Soja Beans as cut for the silo and 3,140 pounds of half cured hay. The ensilage was rather too strong in odor and was at first objected to on that score by the student feeder, and by stock as was suggested for the same reason. The driving horse was humored and fed hay while this ensilage lasted. The cows soon acquired a taste for it and seemed to be as eager for it as for any other food. Change of feeders and the grain feed during the five weeks the Soja Bean ensilage was being fed prevented any deductions on the yield of milk, though at the end of that time the flow was quite equal to that at the beginning.

"An analysis of this ensilage followed by a digestion experiment showed it to be rich food and easily digestible, although nearly 'ripe' when cut for the silo. Our crops have been planted in hills 18 inches apart with the Centennial corn planter, and in drills with a wheat drill with the rows 3 and 3½ feet apart, so that it could be easily cultivated. On our soil the crop will bear closer planting without crowding. It stands up straight, the worst fault being the too hard condition of the stems. It may be cut with a mowing machine or self-rake reaper to good advantage, and probably the new corn ensilage cutters will handle it as well as corn.

"We can recommend the Soja Bean to our friends as a valuable addition to profitable, quick-growing crops. If the college crop be calculated at 6.5 tons per acre, and 20 per cent of loss be allowed from fresh weight to ensilage, there would be 10,400 pounds of ensilage per acre. Taking it at even five tons, and comparing it with 1¼ ton of clover hay, which would be a large crop from the land on which the beans grew, we find this table. The analysis and digestibility of the Soja Beans are from Mr. Kilgore's unpublished analysis and determination, and the composition and digestibility of clover hay from Stewart's Feeding Animals:"

This 7-line table gives the amount of dry matter, ash, protein, fat, nitrogen-free extract, and crude fiber in the product of one acre of the following:

"10,000 pounds Soja Bean Ensilage

"3,000 pounds clover hay

"Digestible matter in 3,000 pounds clover hay

And the ratio of two of these.

"This difference is not very great, but is in favor of the Soja Bean as a little more cheap carbohydrate, as straw or corn stover, could be fed with it to advantage to bring up the 'ratio' to the 'standard.' Also, if 'fat' be regarded as worth 2½ times as much as carbohydrates, there would then be the value of more pounds of food from the beans, and this too after an allowance of 23 per cent for loss on the bean crop.

"Soja Beans can be ensiloed more easily than cured for hay. They will grow in favor with stockmen without doubt.

"Frank E. Emery. North Carolina Station" (Continued).

45. *Homestead* (*The*) (*Des Moines, Iowa*). 1892. The soy or soja bean. 38(48):1099. Nov. 25. Whole No. 1906.

• ***Summary:*** "Early in the fall we called attention to our readers as to the possibilities of the soy bean as a substitute for clover in Kansas and Nebraska, and especially in that part of these states where clover has not been a pronounced success. This bean has been known for some years, and been the subject of experimentation at the various stations in the East and South, but has not been very highly esteemed, especially in the eastern states. The *Rural New Yorker* has recently been taking the consensus of agricultural opinion on the matter... It does not meet with much favor in Vermont, New York or Connecticut, these states claiming that they have a better thing in the common red clover. The Massachusetts Station gives a better report probably because it has a better variety and knows better how to handle it. North Carolina reports that it is a very valuable crop, a trifle better in its nutritive value than clover grown on the same ground. Kansas, however, gives it the highest commendation, and we give the report of her experimentation in full. Prof. Georgeson, of the above station, who by the way studied the

plant in Japan, has four varieties that mature in the latitude of Manhattan, Kansas, says:

"1. I unhesitatingly recommend our farmers to experiment with it. 2. It will produce more feed to the acre here than clover, and do it in half the time required for the latter. We cannot start clover with any other crop; when the so-called 'nurse crop' is harvested the young clover is killed by the scorching sun. This is so generally the case that but few experienced farmers in central Kansas and westward ever attempt sowing clover with wheat or oats, or any other crop. The first year, even when seeded by itself, it seldom affords much hay, and it is unwise to pasture it for fear of killing it. The soja beans we have, yield a full crop of feed during three months of the summer. They are harvested, and the ground can be put in fall wheat, by the time the clover crop is fairly established. Moreover, the soja bean can be grown where clover cannot get a foothold on account of the heat and drouth. 3. So far as tried, I have found it best to grow it in rows about thirty inches or a little more apart, and let the plants average one to every two inches in the row. I cultivate them until shortly before the blossoms appear. I have so far had no difficulty in curing them as I would a heavy crop of clover. Whether it is better to cure it as hay or to put it in the silo is yet to be determined by experiment. 4. I see many reasons why it can be made a profitable crop throughout this state, and throughout the West, but especially in the region where the corn crop and tame grasses are uncertain.

"These reports are what we should have expected. It is very hard to find any better in the way of a forage producer and fertilizer combined than the red or mammoth clovers. It is where these fail that the soy bean finds its appropriate place."

This bean "has the advantage, that it will endure drouth that is fatal to the clovers... We expect much from the soy or soja bean, but most where it can be used as a substitute for the clovers. "We notice that a man down in Missouri [perhaps Mr. Cole] is selling it as 'The Domestic Coffee Berry.' It is all right for the grower to grind the beans and mix them to adulterate his own coffee if he wishes, but even then he should buy a peck or so at the price he is asked by this man for a pound, and then give his pigs and calves a share before grinding for his coffee."

Note 1. This is the earliest document seen (Feb. 2017) concerning soybeans in connection with (but not yet in) Nebraska, and Vermont.

Note 2. We have been unable to identify the source of this long, interesting quotation by Prof. Georgeson. However during the week of Nov. 19, 1892, Prof. Georgeson and George T. Fairchild (President of the Kansas State Agricultural College [and father of David Fairchild, of plant introduction fame]) attended the annual convention of Agricultural Colleges and Experiment Stations at New Orleans, Louisiana (See The *Industrialist* 19 Nov. 1892, p. 55). The quotation probably came from a talk that Prof. Georgeson gave at that convention.

46. Emery, F.E.; Kilgore, B.W. 1892. Digestion experiments: With pulled fodder, crimson clover hay, cowpea-vine hay, corn silage, soja bean silage, and cotton-seed–raw, roasted, hulls, and meal. *North Carolina Agricultural Experiment Station, Bulletin* No. 87d. 53 p. Nov. 26. See p. 13-15. Technical Bulletin No. 4. [2 ref]

• ***Summary:*** The Introduction (p. 1) states that the digestion work reported here includes determinations on Southern cattle foods such as "Soja Bean Silage with two animals" and "Cotton seed-Hulls and Cotton-seed Meal" (ratios 7 to 1, 6 to 1, and 4 to 1), with one or two animals.

Section (4) titled "Digestion of soja (soy) bean silage by black and gray goats" (p. 13-15) states that two goats were fed soja bean silage (6 pounds per day for 40 days) in March and April 1892. "The soja bean is one of our most promising crops. Soja bean silage has been fed in our stable long enough to give assurance of its value. For milch cows it has seemed to arrest the natural decline in yield for a time, when fed after a long period on corn silage...

"The high percentage of protein in proportion to carbohydrates gives this silage a narrow nutritive ratio, and this indicates that it can be used to good advantage as part of a ration of hay or straw with corn, or corn and oats, or mixed with corn silage. Indeed, we have a correspondent who is growing corn and soja beans together for silage, and who assures us that this combination saves him much grain, as less is needed with his stock when feeding this combination than with other coarse foods."

Tables (p. 14) show: (1) Percentage composition of soja bean silage, waste, and solid excrement. (2) Nutrients consumed and excreted in grams, with percentages digested: Black goat, and gray goat.

Note: This is the earliest U.S. agricultural experiment station publication or Bulletin seen (Aug. 1998) with the word "soja" or "soy" in the title. Actually "soja" is in the subtitle. Address: 1. Agriculturalist; 2. 1st Asst. Chemist. Both: Raleigh, North Carolina.

47. Emory, Frank E. 1892. North-Carolina Experiment Station: Crops, implements and the season. *Cultivator & Country Gentleman* (*The*) 57(2082):965, cols. 2-3. Dec. 22.

• ***Summary:*** "Eds. Country Gentleman–In a letter to your columns we spoke of feeding some green clover mixed with rather overripe pea-vine hay. The whole was mixed or rather put in the silo several feet deep, in layers of the hay and then the clover, alternately, to the depth of several feet. Enough was removed each day for the next day's feed."

"Most farmers here plant corn and cottonseed with a single-row planter. Few wheat drills are owned, and it is doubtful whether they are often used to sow corn in drills, as they may be to good advantage. My corn and cow peas sown

with the drill were stunted by drouth. Corn sown alone and also soy beans were good crops considering the severe dry weather."

Note: Use of the term "soy beans" instead of "soja beans." Address: Raleigh, North Carolina.

48. *Logansport Pharos-Tribune* (*Logansport, Indiana*). 1893. Farm and garden: Soja bean as a fodder crop. Jan. 4. p. 18, col. 4.

• ***Summary:*** "'Will the soja bean come into general use?' was the question asked of the directors of several of the experiment stations and variously asked in the *Rural New Yorker.* W.W. Cooke, of the Vermont Station, replied that Vermont is too far north for it. From the New York station Professor J.P. Roberts wrote that the soja bean was not of much use in New York. Not much chance in Connecticut was the tenor of C.A. Wood's letter. Charles A. Flagg, of the Rhode Island Station, has a good opinion of the soja bean as a soiling crop and thinks it of sufficient value to urge farmers to experiment with it as a soiling crop and where clover won't 'catch.' Professor Goessman thinks the soja bean good for a Massachusetts silo and is much pleased with the results gained at the station in growing it for a fodder crop. A valuable plant for North Carolina is the word from the north Carolina station, where the soja bean is recommended as a valuable addition to profitable quick growing crops. Professor Georgeson, of the Kansas Agricultural college, writes, 'I see many reasons why it can be made a profitable crop throughout this state and throughout the west, but especially in the region where the corn crop and tame grasses are uncertain.'"

49. Stewart, H. 1893. A dish of hash: Plowing–Manure–Seeding–Moonshine (Letter to the editor). *Cultivator & Country Gentleman* (*The*) 58(2106):445, cols. 2-3. June 8.

• ***Summary:*** "Eds. Country Gentleman–The contents of your paper for May 4, are of such great variety and interest as to afford any thoughtful reader mental occupation for weeks, or even months."

"Mr. McPherson (p. 346) will find an analysis of Bermuda grass in *Feeding Animals,* that useful work of my venerable friend E.W. Stewart. It is a book that should be in the library, and the mind as well, of every farmer. In regard to the grass mentioned by Mr. McPherson, *Eleusins indica,* much interesting information will be found in the report of the Madras Agricultural College, in which this and other fodder plants now being introduced into American agriculture, such as the soja bean, are described." Address: Macon Co., North Carolina.

50. *Orange County Observer* (*Hillsborough, North Carolina*). 1893. The coming man in the South. July 15. p. 2, col. 2.

• ***Summary:*** "In a recent issue of the *Manufacturers' Record,* of Baltimore, in an article written by Mr. Edward Atkinson, the well-known publicist, it is affirmed that 'the coming man in the South is the pea-vine farmer.' Beans are ideal renovators of worn-out soil and peas are a variety of the same leguminous tribe. An instance is cited of a farm in Virginia that produced five barrels of corn being bought by a course of beans, to producing fifteen barrels. 'Southern land' says the author, 'needs beans, peanuts, cow-peas or other renovating plants rather than booms for its development.' All legumens are renovators of worn-out soil."

"To know and appreciate the nutritive and fertilizing properties of beans and other leguminous plants is, according to our author, the beginning and end of agricultural wisdom for the owners of fatigued Southern soils. The virtues of the peanut, for example, stand out, prominently when they are compared with those of corn. Corn has a food value at a certain standard of 88½ while the food value of peanuts is 151. The soy, or soya beans, less rich in oil, have a food value of 105 as compared with corn. Each variety has its own merits."

51. *Charlotte Democrat* (*The*) (*Charlotte, North Carolina*). 1893. From our Raleigh correspondent. Sept. 1. p. 3.

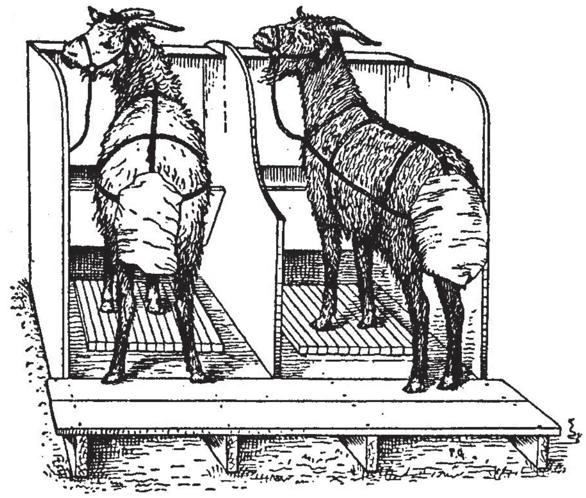
• ***Summary:*** "Professor Emory says the silos at the farm are nearly full. He has put in them seventy five tons of corn, soja bean and cow-pea ensilage. The soja bean is found to be of high value. The digestion experiments, with cows, have proved this. The bean is nutritious and grows well. Mixed with corn it make a superior ensilage."

52. *Wilmington Morning Star* (*The*) (*Delaware*). 1893. [Newspaper exchanges]. Oct. 11. p. 3.

• ***Summary:*** From Greensboro Patriot [North Carolina]: "Mr. B.N. Smith, of this county, has been experimenting with a new bean or pea. It is called the Soja bean. The vine or stalk. grows about three feet high, and is full of pea pods from top to bottom. While the bean is good for cooking purposes, it is valued very highly for cattle and horses. Just at this time of the year the vines should be cut down and dried. The hay is very much relished by cattle. The bean can be raised on very poor land, if manured."

53. Emery, F.E.; Kilgore, B.W. 1894. Digestion experiments: With soy bean hay, cat-tail millet, Johnson grass hay, sorghum fodder and bagasse, peanut-vine hay, cotton-seed meal, cotton-seed hulls, crimson clover hay, corn meal, corn-and-cob meal, and corn silage. *North Carolina Agricultural Experiment Station, Bulletin* No. 97. p. 85-102. Jan. 30. See p. 90-91, 95-96, 101-02.

• ***Summary:*** In February and March 1893 a black goat and a spotted grade Jersey heifer (a cow named "Spot") were fed soy (soja) bean hay for 14 days. The section titled "Summary of results" (p. 91) states that the results of two investigations, this year and last, show both soy bean silage and hay "to be



most valuable and highly nutritious fodders. As the soy bean is a leguminous, or nitrogen gathering plant, it is hoped that its cultivation and use will greatly increase."

Tables show: (A) Composition of foods used in experiments (p. 95), including soy bean hay. (B) Coefficients of digestibility and nutritive ratios (p. 96). Based on 2 determinations, soy bean hay has a nutritive ratio of 3.55; 71.08% of the protein is digested, and 54.18% of the albuminoids. (I) Composition of soy bean hay, waste, and solid excrement (p. 102). (II) Nutrients consumed and excreted in ounces, with percentages digested (for the black goat and Jersey cow separately) (p. 102).

An illustration (facing page 101) shows two goats, one black and one white, standing side by side in separate wooden stalls.

Note 1. This is the earliest U.S. agricultural experiment station publication or Bulletin seen (June 2014) with the word "soy" in the title or subtitle; it is in the subtitle.

Note 2. This is the earliest document seen (June 2010) with the term "soy bean hay" in the title or subtitle. Address: 1. Agriculturist; 2. Asst. Chemist. Both: Raleigh, North Carolina.

54. McCarthy, Gerald; Emery, F.E. 1894. Some leguminous crops and their economic value. *North Carolina Agricultural Experiment Station, Bulletin* No. 98. p. 133-54. March 1. • ***Summary:*** This bulletin contains three parts, the first two of which discuss soy beans. Part I, titled "Legumines as improvers of the soil," by G. McCarthy, states: "Among the natural orders or families of plants, none hold a higher place in relation to human welfare than the *Leguminoseæ* or Pulse family. This family includes every variety of bean, pea, clover, medic, vetch, and many useful and poisonous drugs, besides a number of the finest ornamental and timber trees. The legumines were among the first vegetables cultivated by mankind, and have ever been among those most esteemed. Nearly all of this family of plants have a peculiarly-shaped butterfly-like flower, and the seeds are enclosed in pods, which are often arranged in one-seeded joints. Both the stems and the seeds of all the legumines are very rich in albuminoids–the food which goes to form the muscular or lean-meat portion of flesh, and are therefore especially valuable for a young and growing stock and for working animals.

"In North Carolina, the most valuable and generally used forage and fertilizing plants of this family are the true clovers, medics [such as black medic (*Medicago lupulina*) and burr clover (*Medicago denticulata*)], Japan clover, vetches, cow-peas, and Japan peas... It is well know that most or all of this family of plants have a property possessed by no other family of plants–that of harboring in their roots a species or class of yet unnamed microbes which fix the free-nitrogen of the air which is then absorbed and utilized by the plant in its growth and fruition. We can therefore, by stimulating a luxuriant growth of legumines obtain at slight expense the nitrogen required by other nitrogen-consuming crops."

On p. 242 we read: "Japanese peas–*Glycine hispida.*– The Japanese or Mongolian pea is more commonly called 'soja' and 'soy' bean, but it is not a bean. Recently there have been introduced several new varieties of this pea. All the following varieties were sown May 20 [1893] and received the same treatment:

"The common Soja Bean or Soy Pea.–Seed round, yellow. Vigorous growing, hairy, bushy plant attaining a height of 20 to 25 inches. Stems become woody soon after flowering. A very prolific bearer of round yellow seeds, which are sometimes used as a substitute for coffee. The peas, when properly cooked, are edible and palatable. The edible qualities of the soy bean are so highly esteemed in Japan that it is there rarely fed to stock.

"The following directions [recipe] for cooking the 'soy' pea are given by Dr. J.H. Mills, of the Baptist Orphanage at Thomasville, N.C. [North Carolina]: Soak the peas till the skins come off. Then stir the peas in the water until the skins rise to the surface and skim them off. Boil the peas with bacon until soft. Add pepper and butter to suit and serve hot. If the peas are green the preliminary soaking may be omitted. This makes a most palatable dish, well liked by children.

"Japan Pea No. 9.–A vigorous, bushy plant resembling the 'soy,' but smoother and has larger dark-colored seeds. This is the best of the new varieties.

"Japanese Pea No. 7.–A small, slender, bushy plant bearing a fair crop of small cream-colored peas–inferior to the soy and No. 9.

Soak the peas till the skins come off. Then stir the peas in the water until the skins rise to the surface and skim them off. Boil the peas with bacon until soft. Add pepper and butter to suit and serve hot. If the peas are green the preliminary soaking may be omitted. This makes a most palatable dish, well liked by children.

"Japanese Beans–Phaseolus radiatus [Adzuki beans]–*Japanese Bean No. 5.*–A low and slender-growing plant bearing numerous pods well filled with a small red bean which makes excellent soup.

"Japanese Bean No. 6.–A plant scarcely distinguished from No. 5 and of about the same value. Both these beans are for table use only and not for forage."

An illustration (p. 142, non-original) by "VAC" or "VC" shows the "Japanese or Soy Pea" plus several enlarged pods in the lower right corner.

In Part III, titled "The fungous and insect enemies of legumines," by Gerald McCarthy, Section C, "Insect enemies," discusses the following insects that damage leguminous forage plants in North Carolina: (1) The pea weevil, *Bruchus pisi,* is the larger of the two common weevils. But *"Bruchus fabæ* [the bean weevil] is our most destructive weevil and is the species which infests cow-peas and table beans [including soy beans] in store [storage]." This weevil is the smaller of the two, "is light yellow in color and quite hairy." As soon as this bean weevil matures in stored beans or cow-peas, it immediately "lays eggs on the hard seeds and these soon hatch into devouring grubs, which, after eating their fill, again produce the winged form to lay more eggs, and so on while the food supply lasts. A few weevils in the stock of beans put into the bin in the fall may increase to millions by the spring and ruin a thousand bushels of beans or cow-peas.

Remedies: If the presence of weevils is suspected, the seeds of beans or peas "should be plunged into water nearly scalding hot–140ºF for five minutes before sowing. As soon as the seed is threshed out and before bagging for storage, it should be placed in a tight bin, or hogshead, or piled in a conical heap on the floor of a tight room and subjected to the fumes of carbon bisulphide."

(2) The clover-seed midge, a two-winged fly, is "a sister species of the notorious Hessian fly, *Cecidomyia destructor.* Also mentions the clover root borer and the clover hay worm.

Note 1. This is the earliest English-language document seen (May 2012) that uses the term "Japanese Pea" or "Mongolian pea" or "Japanese Pea No. 7" to refer to the soy bean. Since "Japanese Pea" is mentioned in only one other document (Soule 1907, p. 280-81, from Virginia) we conclude that this is not the name of a new soy bean variety.

Note 2. This is an early reference to the soybean in connection with Mongolia.

Note 3. This article contains one of the earliest American recipes for cooking whole soybeans.

Note 4. In the late 1800s, the adzuki bean was sometimes given the scientific name *Phaseolus radiatus.* In the U.S., Georgeson of Kansas gave it this name in 1890 and 1892. Later the name was used for the mung bean.

Note 5. This is the earliest English-language document seen (Aug. 2014) that contains the word "entomologist" in connection with soybeans.

Note 6. This is the earliest English-language document seen (March 2007) that uses the word "medic" to refer to a leguminous plant, probably alfalfa (*Medicago sativa*). It is also the earliest English-language document seen (March 2007) that uses the word "medics" to refer to members of this plant family.

Note 7. This is the earliest English-language document seen (Feb. 2007) that uses the word "legumines" to refer to legumes.

Part II of this article (p. 147-50), titled "The cultivation of leguminous plants for forage," by F.E. Emery, notes that the soy bean was one of the most common "legumines" used for hay, soiling, and silage. "The cow-pea and the soy bean will give better satisfaction for soiling or silage than for hay, unless sown broadcast..." For soiling: "Soy beans grow upright and may be planted alternately with corn in the same row and cut at the same time with it." Address: 1. Botanist and entomologist; 2. Agriculturist. Both: Raleigh, North Carolina.

55. McCarthy, Gerald; Emery, F.E. 1894. The forage plant garden, including full notes taken during growth. *North Carolina Agricultural Experiment Station, Bulletin* No. 98. p. 157-70. March 1.

• ***Summary:*** Pages 169-70 contain sections with the following titles: "Japan or Mongolian Pea.–*Glycine hispida* and Red Bean, *Phaseolus radiatus* [azuki bean]. Japan Pea No. 9.–*Glycine hispida,* variety. Japan Pea No. 5.–*Phaseolus radiatus.* Japan Pea No. 7.–*Glycine hispida,* variety. Japan Pea No. 6.–*Phaseolus radiatus.* Japan Pea.–*Glycine hispida,* common Soy Pea or 'Soja Bean.' The Japanese Peas and Beans."

Some of the information in these sections is very similar to that given in a previous section of this same bulletin, on pages 142-43 but pages 169-70 contain more details–and illustrate the confusion that existed about these plants and their names. The last section titled "The Japanese Peas and Beans" (p. 170) states: "As forage plants the common so-called Soja Bean, more properly named Soy Pea, is by far the best of all these plants. It is later than Nos. 7, 8 and 9, but grows much more luxuriant and will give 50 to 100 per cent. more forage per acre." Address: 1. Botanist; 2. Agriculturist. Both: Raleigh, North Carolina.

56. *Charlotte Observer* (*North Carolina*). 1894. The experiment station of Raleigh NC desires to assist the farmers of North Carolina. April 8. p. 1 [unnumbered].

• ***Summary:*** This is apparently an insert on unnumbered pages from the North Carolina Experiment Station. This one, dated 29 March 29 1894, has a section titled "Some late bulletins from the North Carolina Experiment Station" (Nos. 90-98). No. 97 (48 p.) is titled "Digestion experiments," "The digestion work covers feeding with soy (soja) bean hay,

cat-tail millet, Johnson grass hay,..." No. 98 (24 p.) is titled "Some leguminous crops and their economic value." "Gives the result of the year 1893, with a great many varieties of clovers, cow peas, soy (soja) beans and other legumines. The bulletin includes discussions of legumines as improvers of the soil, their cultivation for forage, and their fungous and insect enemies."

The section titled "Field peas" discusses the contents of Bulletin 98 and states: "In the soja bean class, the old yellow variety is the most productive, both in fruit [seed] and foliage, but is much later than some of the newer variety [sic, varieties].

"Concerning the popular names of these plants it may be said that the so-called cow pea is not a pea but a bean and is more properly called Chinese beans. The so-called soja bean is a true pea, and should be called soy pea, or Japan pea. But by whatever names we call them, these plants are among the most valuable crop the southern farmer can grow.

"Gerald McCarthy, Botanist, N.C. Experiment Station."

57. *State* (*The*) (*Columbia, South Carolina*). 1894. Peanuts for food. They are likely to be adopted as rations for the German Army. April 24. p. 5.

• ***Summary:*** "Rene Bache in Washington Star. The humble and slightly esteemed peanut is beginning to assume importance in the world. It is likely to be adopted for rations by the army of Germany, the Department of State is informed. In that country the oppressive cost of a gigantic military establishment makes demand for the cheapest possible food for soldiers. This requirement is met by the 'goober,' which is more nutritious than the best beefsteak and highly digestible when properly prepared.

"Such, at all events, are the conclusions arrived at by Dr. Nordlinger and other German savants who have been investigating the subject. They have found that peanut 'cake'–the residue after oil has been expressed from the nuts–is a highly concentrated food and suitable for human beings. It is calculated to be of great value to the peasant and industrial classes of Europe, which have suffered from a long and nearly exclusive diet of bread and potatoes. Hitherto it has only been employed as forage for cattle, sheep and horses." Peanut flour and grits are good for use as human food; they are "especially recommended for the use of persons afflicted with diabetes. Also a fairly acceptable substitute for coffee is made from peanuts.

"Roasted: One interesting fact ascertained by the German savants is that peanuts, raw or roasted, are not nutritious at all, for the reason that the digestive functions refuse to assimilate them. The chewed particles pass through and out of the body almost unaltered. It is the same way with almonds and with nuts in general." However boiled peanut grits are perfectly digestible, even by sick people.

"The German military authorities,... have been making experiments with peanut meal and grits, served to the garrisons at Frankfurt and elsewhere. They have reported favorably to the ministry of war at Berlin, and, if new trials are equally satisfactory, the new food will be adopted as an element of the rations and 'field sausage' of the army. It is also likely to find acceptance in the navy. One important quality is its sustaining power, enabling the consumer to endure much fatigue. In this particular it surpasses the hitherto unequaled 'soja bean' of China and Japan."

Concerning nutritive value, "soja beans are more nutritious than white peas, peanuts are more nutritious than soja beans... Peanut meal only costs 4 cents a pound in bulk.

"Manufactured products: At present the most important use of peanuts is in the manufacture of oil. The American 'goobers' are larger, sweeter and better flavored than any grown in the world, but they are not so rich in oil as the African, the finest of which comes from Senegambia and the east coast. In East Africa and India great quantities of peanuts are thrashed out by machinery, only the seeds being exported, so as to save bulk. At the oil mills, the kernels are ground and then pressed. The best of the product is used for salad oil, the poorer quality is employed in making soap and as an ingredient of oleomargarine." Much of the so-called "olive oil" sold in the United States is actually peanut oil, which costs only $1 a gallon.

"The finest goobers: This country depends for supplies of peanuts chiefly upon Virginia. In that State 3,000,000 bushels of them are grown annually–more probably than the crops of all the other states put together. Tennessee comes next with 500,000 bushels. North Carolina, Georgia, Michigan and California also raise peanuts largely, but the Virginia 'goobers' are the finest of all and fetch the highest price."

"The greatest peanut market in the United States is Norfolk. Petersburg comes second and Smithfield third. In these towns [all in Virginia] there are many big factories employed in the business of rendering marketable the nuts that are sent in by farmers." They are winnowed and screened, sorted, the bad ones picked out by young girls, then "packed in bags of 100 pounds each and shipped to jobbers in various cities. The jobbers sell them, raw or roasted, the latter to grocers mostly. They do the cooking in great cylinders that will hold twenty or thirty bushels at a time."

"A generation ago most of the peanuts consumed in this country were imported from Africa. The African 'goober' is small and round, the shell containing only one kernel usually. The American 'Ground nut' is simply the African nut modified by conditions of soil and climate in the United States. Plant our peanut in Africa and before long it reverts to the original African type from which it was produced. It is said that peanuts brought the first peanuts hither.

"Now the American nuts have driven the African nut out of our markets altogether, and the latter are regarded as a curiosity here. Most of the peanuts grown in the dark

continent are sent to France through the port of Marseilles to be pressed for oil. The finest of all 'goobers' are the Spanish, which are considered a fancy article and are mostly consumed by confectioners. They cost 20 cents a pound, retail, and are about one-third the size of ordinary ones. The big nuts are never so well flavored as the little ones."

Note: The soja bean is also mentioned.

58. *Rock Hill Herald* (*South Carolina*). 1894. Distribution of soy or soja beans. May 16. p. 1.
• ***Summary:*** The N.C. [North Carolina] Agricultural Experiment Station, desiring to extend the cultivation of Soy Beans, proposes to distribute a quantity of seed to careful planters desiring to test their merits. The only condition is that each applicant send 10 cents in postage stamps to pay cost of transportation by mail. Enough seed will be sent to each application to plant 1/10 acre. The first 400 applicants will be filled in the order received.

"The station regards this as a very valuable forage plant." "It is also a good table bean, but requires a long time to cook."

59. *North Carolina Agricultural Experiment Station, Bulletin.* 1894. Miscellaneous agricultural topics contained in press service bulletins of January to June, 1894. No. 103. p. 237-59. Aug. 17. See p. 240-41, 254. This Bulletin is also published in the Annual Report.
• ***Summary:*** The section titled "Soy (Soja) beans ought to be planted" (p. 240-41), by F.E. Emery, Agriculturist at the North Carolina Experiment Station (released 27 Jan. 1894), is an answer to many questions in a letter from a correspondent. Emery discusses the best time to sow or plant soy beans, the kind of soil in which they should be planted and how it should be prepared, and how they compare with black peas as a feed and as a land improver.

"As a food for stock, the soy bean is one of the richest legumes that can be grown... This is a most desirable plant to raise for stock. It is also a good table bean, but requires a long time in cooking, and most people will have to learn to like its flavor."

The section titled "Distribution of Soy (Soja) Beans" (p. 254, released 25 May 1894) notes that the North Carolina "Agricultural Experiment Station at Raleigh, desiring to extend the cultivation of Soy Beans," will distribute enough soy bean seeds to plant "1-10 acre" to the first 400 applicants who send 10 cents in postage stamps to pay the cost of transportation by mail. "The Station regards this as a very valuable forage plant... It is also a good table bean but requires a long time to cook. The beans parched similar to coffee, has been used as an acceptable substitute, for it, and at far less cost. It has not the exact aroma of coffee, but is recommended as a cheap substitute probably just as good and in some cases better than the low grades of coffee after being adulterated with peas of beans with a value less than the soy bean. The Station urges a careful trial of this crop.

The section titled "Directions for Cooking Soy Beans or Peas" (also p. 254) is the same as that printed in the Station's Bulletin No. 98 (1 March 1894, p. 142). It contains a recipe from Dr. J.H. Mills of the Baptist Orphanage at Thomasville, North Carolina. Address: Agriculturist, North Carolina Experiment Station, Raleigh, North Carolina.

60. *Farmers' Review* (*The*) (*Illinois*). 1895. Planting soy beans. June 5. p. 256, col. 1.
• ***Summary:*** "The North Carolina experiment station says: Do not sow soy beans broadcast, but plant in hills or drills 2½ or 3½ feet apart, according to the richness of soil. If in hills, 15 to 24 inches is far enough apart in the row. They will doubtlessly grow on any soil suitable for corn. and may be planted at the same time as corn, which gives a long season from March to July. It is a good plan to plant in the corn between the hills or stalks of corn. If corn is grown for silage, the beans can be cut with the corn and will add greatly to its value. The upright growth of soy beans leaves room for cultivation, and this should be accorded to check the growth of weeds. As food for stock the soy bean is one of the richest legumes that can be grown. In chemical composition the dry matter of silage and black pea vine hay differ more in fat and other carbohydrates than protein. The roots bear numerous tubercles, which aid it by gathering nitrogen from the air the same as those of the pea vine or clover roots.

"There are no spreading by running vines to shade the ground, which is one of the potent factors in soil improvement, hence soy beans must be planted near enough for shade. On poor soil there should be one plant every 2 x 1 feet and from that up to 2 x 3½ feet. It is usual to plant 2 to 4 beans in a hill, as it makes the stems finer, and they are hard and woody at best. To save the seed the stalks should be pulled or cut and stacked up loosely as soon as leaves and pods have changed from green to a golden hue, and when dry threshed out. The pods should not be hand picked, because there are too many and with only one to three beans in a pod it will not pay. They will beat out very easily when ripe and dry, as he who leaves them too long will learn to his cost, for the pods will open and the beans scatter upon the ground. This is a most desirable plant to raise for stock. It is also a good table bean, but requires a long time in cooking, and most people have to learn to like its flavor."

61. Hopkins, Cyril G. 1896. Composition and digestibility of corn ensilage, cow pea ensilage, soja bean ensilage, and corn-fodder. *Illinois Agricultural Experiment Station, Bulletin* No. 43. p. 181-208. April. See p. 181-82, 192-95, 201.
• ***Summary:*** Soja is mentioned 11 times in this bulletin.

"Digestibility of soja bean ensilage (p. 192): The soja bean is a leguminous plant, which has been introduced into this country from Japan. Like clover, it is a 'nitrogen

gatherer,' and it contains a high percentage of protein. It has already been grown as a forage plant to some extent in the United States. The data and results obtained from the digestion experiments with soja bean ensilage are given in Tables 7, 8, and 9."

Tables: (7) Number of pounds (both fresh and dry) of soja bean ensilage fed, of refuse, and of dung, for each steer; and also the percentage composition of the dry matter.

(8) Number of pounds of each nutrient in the soja bean ensilage fed, in the refuse, and in the dung, during a period of six days; and also the digestion coefficients.

(9) Digestion coefficients of soja bean ensilage as obtained from each steer, and also the average of the four determinations. "The only other determinations which have been made of the digestibility of soja bean ensilage are those reported by the North Carolina Station in Bulletin 87d. The determinations were made with goats, and the results of the experiments are given below" [in an unnumbered table, p. 195].

The author began feeding soja bean ensilage and other fodders to steers in February 1895. The "ensilage from soja beans was eaten by the steers much less readily than that from cow peas..." (p. 195).

Summary: "Soja bean ensilage resembles clover hay both in composition and digestibility [they are analyzed in detail]. It furnishes an equal amount of protein, more fat, but less total energy than clover hay."

"As compared with cow peas and soja beans, the corn-fodder and corn ensilage have a much higher value for energy or fat production, but the cow pea ensilage and soja bean ensilage are far more valuable for animal growth or the production of milk."

Note: This is the earliest publication seen (April 2017) concerning research on soybeans at the University of Illinois or its Agricultural Experiment Station. Address: M.S., Chemist.

62. *Western Rural* (*The*) (*Chicago, Illinois*). 1896. Relative value of hays (Letter to the editor). 54(24):778, col. 1-2. June 11.

• ***Summary:*** A letter from A.J. Greenville, North Carolina. "'Discussing the relative merits of hay with a merchant, who is also a planter and owner, he very much doubted my assertion that crab grass hay ranked higher than timothy in nutriment and that peavine hay, cut at the proper time and cured properly, outranked either. Will you be so kind as to publish or at least give me the benefit of your information on the relative merits of timothy, orchard grass, Bermuda, crab grass, peavine hay, peanut hay, oat straw, pea hulls, shucks, soy beans, crimson clover and red clover? Our farmers are just beginning to find out that oat straw, shucks and pea hulls are worth saving. I have been preaching such economy for 20 years and have only succeeded in advancing the wonderful utility of cowpeas as a hay, grain and renovating crop. I trust I am not asking too much of you. The information sought would be very valuable to many of us.'"

"Answered by F.E. Emery, Agriculturist, North Carolina Experiment Station. 'Your queries are in the line where most farmers need information. There are men who haul wood to this city at $2 to $ 2.50 per cord and buy timothy hay at $20 per ton to feed their teams. Cornstalks are left to fall down in the field by them and their neighbors. It is fairly capable of demonstration that the wasted stalks if fed with a meal ration can replace the hay at a lower cost for feed. You asked for commercial value when it seems comparative feeding value is what is desired. Commercially, timothy hay outranks all others. That is the kind to raise to sell, but to feed at home would be a different question.'"

Note 1. Soy beans are not mentioned in the reply, or in the large table titled "Comparison of cattle foods" which gives digestible constituents for 14 different types of hay, straw, hulls, clover and lucerne (including peavine hay and peanut hay).

Note 2. This periodical was later renamed *Western Rural and Livestock Weekly.*

63. McBryde, J.B. 1896. A contribution to the study of Southern feeding stuffs: Some Tennessee feeding stuffs. *Tennessee Agricultural Experiment Station, Bulletin* 9(3):51-164. Sept. See p. 116, 119, 156, 157.

• ***Summary:*** Pages 116-19: A table titled "Analysis of southern feeding stuffs" has 13 columns: Plant. Fresh or air-dry material: Water, protein, fat, nitrogen-free extract, fiber, ash. Water free substance: Protein, fat, nitrogen-free extract, fiber, ash. References.

The values for "Soja Bean (Soja hispida)" on p. 119 are as follows:

"Cut Aug. 21, in bloom...

"Cut Sept. 1, just in pod...

"Cut Sept. 11, pods developed...

"No description...

"Hay, no description...

"Cut Aug. 5, in bloom...

"All analyses (7) Maximum, minimum average." For protein, the maximum value for the whole fresh or air-dry plant is 17.5%, the minimum is 11.56%, and the average is 14.41%. The source of these values are North Carolina, Georgia, and South Carolina Agricultural Experiment Station publications.

Page 156: "Tables of the digestibility of American Feed Stuffs–Continued." Values are given for "Soja-bean ensilage."

Page 157: Values are given for "Soja-bean meal, Gluten Meal, Chicago gluten meal, King gluten meal, Average gluten meal, Buffalo gluten feed, etc." Address: Chemist, the Agric. Exp. Station, Knoxville, Tennessee.

64. *Progressive Farmer* (*The*) (*Winston-Salem, North*

Carolina). 1897. A new fodder crop. May 25. p. 1, col. 3.
• ***Summary:*** "The soja bean is one of the newer fodder plants that are not sufficiently appreciated, according to the American Agriculturalist, authority for the following: The soja bean is a leguminous or cloverlike plant, which seems to possess great facility for getting its nitrogen from the air. The dry matter in either the green fodder or straw of the soja bean contains twice as much fat and protein as in fodder corn, while the grain is hardly exceeded in richness by cottonseed meal. Indeed, it is probably true that 'these beans are the richest known vegetable substance,' and as they can be raised in any climate or soil that will mature corn, this crop enables the northern farmer to raise concentrated feed instead of buying it.

"The medium green variety is best for forage, being leafy and succulent. In fairly fertile soil it will produce 10 to 12 tons of green fodder per acre. It should be sown in drill 2½ feet apart, using 1 to 1½ bushels of seed per acre. Sow about corn planting time and cultivate freely early in the season. It will produce a valuable fodder for stall feeding in August or early September to be fed green or put into the silo in the proportion of one part soja bean to two parts of corn. Such silage is a balanced feed for milk cows. The black variety is a good fodder plant but not equal to the green. Both kinds will ripen seed wherever the larger kinds of corn mature. Owing to the wonderful root development of the medium green variety, it has an admirable effect on the soil when the stubble is plowed under. Like the action of alfalfa on land adapted to that crop, the soja bean brings to the upper stratta [sic, strata] of soil plant food from below." Address: Belhaven, North Carolina.

65. Langworthy, C.F. 1897. Soy beans as food for man. *Farmers' Bulletin* (*USDA*) No. 58. p. 20-23. July 7. Revised (very slightly) in 1899. [1 ref]
• ***Summary:*** Describes and gives the nutritional composition of various Japanese soyfoods, including natto, miso (white, red, or Swiss), tofu, frozen tofu, yuba, shoyu. Many of his descriptions of soyfoods are based on Trimble (1896).

"Tofu, or bean cheese, is prepared as follows: The beans are soaked in water for about twelve hours, and crushed between millstones until of a uniform consistency. The ground material is then boiled with about three times its bulk of water for about an hour, and filtered through cloth. The filtrate is white and opaque, having somewhat the appearance of milk. It has, however, the taste and smell of malt. This milky liquid, to some extent, resembles cow's milk in composition, as is shown by the following table:" The table, titled "Comparison of the composition of soy-bean milk and cows' milk," shows that the two liquids (soy / cow) have the following composition: Water 92.53% / 86.08%, albuminoids 3.02% / 4.00%, fat 2.13% / 3.05%, etc.

"The protein in soy-bean milk is precipitated by adding the mother liquor obtained in the manufacture of salt from sea water, which contains considerable magnesium chloride. The precipitate is filtered off and formed into cakes with the hands. It is eaten in the fresh state or frozen. In the latter case it loses part of its water."

"Though these soy-bean products are prepared chiefly in Japan and other eastern countries, their manufacture has been attempted to some extent in Switzerland and elsewhere..."

"Bean sausages in considerable variety are prepared in Germany, and formed part of the ration of the German soldier in the Franco-Prussian war. So far as can be learned, these are always made from ordinary varieties of beans and not from soy beans...

"Under the name of coffee beans, soy beans are eaten to some extent in Switzerland as a vegetable, and dried and roasted are also used as a coffee substitute. Their use for this latter purpose is not unknown in America. The attempt has recently been made by certain dealers to place the soy bean on the market as a new substitute for coffee and to sell it under other names at an exorbitant price.

"Bulletin No. 98 of the North Carolina Experiment Station recommends soy beans as a palatable vegetable when prepared as follows: Soak the beans until the skins come off and stir in water until the skins rise to the surface and then remove them. Boil the beans with bacon until soft, season with pepper, salt, and butter, and serve hot. If the beans are green the preliminary soaking may be omitted. No other references to the use of soy beans for human food in the United States have been found."

Note 1. This is the earliest English-language document seen (Aug. 2013) that contains the term "soy-bean milk." It is also the earliest U.S. government document or USDA document seen (Aug. 2013) that uses the term "soy-bean milk" (or any other term containing the word "milk") to refer to soymilk.

Note 2. This is the earliest document seen (Nov. 2016) concerning the work of the USDA with nutrition (or home economics) and soybeans.

Note 3. According to Roth (2013, p. 106): "Langworthy entered the USDA as an assistant to Wilbur Atwater, then head of the Office of Experiment Stations. Atwater was widely regarded as the founder of nutrition science in America, largely by transmitting ideas that he learned while studying in Germany. Above all, he believed that the value of food was reducible to its constituent nutrients: protein, carbohydrates, fat and minerals (along with bulk to aid digestion). For reasons largely of status, however, Americans spent more money than necessary to obtain these nutrients, although the time would come when, due to an increasing population, they would no longer be able to. Above all, he argued, Americans needed to economize on sources for what he regarded as the most precious of nutrients–protein–as this was "tissue-building," not simply a source of energy." Address: Office of Experiment Stations, USDA, Washington, DC.

66. Emery, F.E. 1897. Feeding experiments, milk records, etc. I. Comparative effect of some rations fed to milch cows. *North Carolina Agricultural Experiment Station, Bulletin* No. 143. p. 157, 161-69. Sept. 30.
• ***Summary:*** Each of the four cows has her own name or number. "Conclusions.–1st. The ration of sweet potatoes, raw cotton-seed, pulled fodder and cowpea meal gave better results for cow Dora McKee than did corn and soy-bean silage and cotton-seed meal, with wheat bran mixed in ratio of one to two, by weight.

"2d. The corn and soy-bean silage, with cotton-seed meal and wheat bran, gave a better result with cow No. 5 than did sweet potatoes and corn shucks..." Address: M.S., Prof. of Agriculture, and Agriculturist [Raleigh].

67. *Hartford Courant* (*Connecticut*). 1899. Timely hints to farmers: Suggestions from the experience of others. Jan. 28. p. 9.
• ***Summary:*** "The North Carolina experiment station recommends the soja or soy bean as a palatable and highly nutritious vegetable when prepared as follows: Soak the beans until the skin comes off, then stir in water until they [the skins] rise to the surface and remove. Boil the beans with bacon until soft, season with pepper, salt and butter, and serve hot. If the beans are green, soaking can be omitted as the skins will be tender."

68. Wood (T.W.) & Sons. 1899. Classified ad: Cow peas. The famous forage crop and soil improvers. *Charlotte Daily Observer* (*North Carolina*). June 3. p. 8.
• ***Summary:*** "We are headquarters for these and all Southern specialties, including Soja Beans, Velvet Beans, Pearl or Cat-tail Millet, Teosinte, Bermuda Grass, Ensilage Corn, Spanish Peanuts, Chufas, Sorghums, etc.

"Write for prices, and our interesting giving full information about these crops." Address: Richmond, Virginia.

69. Langworthy, C.F. 1899. Appendix: Soy beans as food for man. *Farmers' Bulletin* (*USDA*) No. 58 (Revised ed.). p. 20-23. [1 ref]
• ***Summary:*** This part of Bulletin 58 is identical to the original July 1897 edition. It begins: "The soy bean has been used as a food for man in Japan, China, and neighboring countries from the earliest times. In more recent years it has been cultivated for this purpose in Europe. As has been stated, there is a considerable number of cultural varieties. Analyses of the soy bean grown in various countries have been reported by a number of investigators. Some of these are given in the following table:" (titled "Analyses of the soy bean"). Address: Ph.D., Office of Experiment Stations, USDA, Washington, DC.

70. F.E.E. 1900. Soy-bean silage (Letter to the editor). *Rural New-Yorker* 59(2623):317. May 5. Oversize.
• ***Summary:*** "I was glad to see the notes of J.M.E., on Soy Beans in Silo. The crop from which the silage was made, which gave the coefficients of above table for Soy-bean silage, grew three feet tall or more. It was planted in rows about 40 inches apart, and it grew bushy enough almost to touch across the rows, and was closely crowded in the rows. There were numerous pods. The weight, as I now remember it, was four to five tons per acre. I was not satisfied with the yield, but only recently have compared the digestible food yields per acre of the Soybeans and corn and Crimson-clover hay. The Soy bean takes the season for corn, and can be followed by small grain. The Crimson clover follows corn, and comes off before it. In case of this Soy-bean crop, clover was its successor. The following comparison shows pounds of digestible food per acre from four and five tons of Soy beans, 10 tons of corn silage, and 1½ ton of Crimson-clover hay."

Note: For each of the four rows mentioned above is given the pounds of protein, carbohydrate, and fat. For example: 5 tons of Soy beans per acre gives 307 pounds protein, 892 pounds carbohydrate, and 160 pounds fat.

"These weights are normal for southern farms rich enough to grow either beans or clover, and the clover wins in the comparison, though perhaps harder to raise." Address: Raleigh, North Carolina.

71. Cottrell, H.M.; Otis, D.H.; Haney, J.G. 1900. Soil inoculation for soy beans. *Kansas Agricultural Experiment Station, Bulletin* No. 96. p. 97-116. May.
• ***Summary:*** The study of soil inoculation for soy beans was first made at this Station by D.H. Otis as part of his work for the degree of master of science. Mr. Otis completed his work in 1897 and in 1898 the Farm Department began the work of inoculation on a field scale. Since 1890 soy beans have been grown at the Kansas Experiment Station, but frequent and numerous examinations of the roots fail to reveal the presence of any nodules or tubercles. Knowing that the Hatch Experiment Station, Amherst, Massachusetts, had been successful in producing tubercles on the soy bean, it was proposed that an attempt be made to inoculate the Kansas beans with Massachusetts soil. The soil arrived in a dry, pulverized condition, not unlike the dust in our roads during a dry season. The benefits from inoculation lie largely in the increased fertility of the soil resulting from the decay of the nitrogenous roots, and would not be seen until after the growth of the succeeding crop.

"After the success of inoculating the beans with imported soil was assured, it was thought to be an interesting point to ascertain how far these particular micro-organisms had spread in this country. Accordingly inquiries sent out to all the experiment stations of the United States and the following table constructed from the replies:" (1) States

with soybean micro-organisms indigenous to the soil were Indiana, Louisiana, Massachusetts [Hatch], North Carolina, Rhode Island, and Tennessee; (2) States which obtained the soybean micro-organism through inoculation were Connecticut [Storrs] and Kansas; (3) States in which no tubercles were found on the roots of soybean plants were California, Florida, Iowa, Michigan, and South Dakota; (4) States which consider the climate too cold to successfully grow the soy bean were Minnesota and Washington [because of the next category, this implies that they tried to grow soybeans]; (5) States which have not grown the soy bean were Kentucky, Maine, Montana, Nevada, Pennsylvania, Utah, Virginia, and Wyoming.

The inoculated soil used in this experiment was taken from a plat inoculated in 1896 with soil from the Massachusetts Experiment Station, and on which soy beans had been grown in 1896 and 1897.

Photos (p. 101-103) show the bare roots of soy bean plants: (1) Not inoculated. (2) Inoculated with Massachusetts soil, and (3) Inoculated with extract; these roots contain the most nodules. An illustration (line drawing; p. 110) shows a soy bean plant inoculated at the bottom of a pot (with relatively few nodules). A table (p. 111) summarizes replies on the extent of the soy bean micro-organism and inoculation trials in the United States.

Note 1. This is the earliest document seen (March 2016) concerning soybeans in Florida, or the cultivation of soybeans in Florida. This document contains the earliest date seen for soybeans in Florida, or the cultivation of soybeans in Florida (May 1900). The source of these soybeans is unknown.

Note 2. This is second earliest document seen (June 2007) concerning the cultivation of soybeans in California.

Note 3. This is the earliest English-language document seen (March 2003) that uses the word "nodules" (or "nodule") in connection with soybeans. Address: Manhattan, Kansas.

72. *Washington Progress* (*Washington, Beaufort Co., North Carolina*). 1900. Soy-bean culture. Oct. 11. p. 1.
• ***Summary:*** From Home and Farm: "As yet the soy-bean is comparatively new in America, but judging from ten years' experience at the Kansas Experiment Station, where as much as seventy-five acres have been raised in one season and fed to fattening hogs, cattle, milch cows and young stock, its value is clearly demonstrated, and it promises to rank high in the agriculture of the future. At the special request of Secretary F.D. Coburn, of the State Board of Agriculture, the most approved methods of culture and use are related by Prof. Haney, as follows:

"The soy-bean responds readily to good soil and plenty of moisture, but will thrive and produce on land too poor, or in a season too dry for ordinary crops. It 's not molested by chinch bugs, and there are no insect enemies or blights which materially affect it. The root system of the soy-bean is very extensive, striking deeply into hard subsoil and spreading widely near the surface. Not only are they supported by their extensive root system, but, being a legume, the nodule-forming micro-organism on the roots enables the crops to get part of its nitrogen food directly from the air, and leave in the soil a store of nitrogen which benefits succeeding crops. Nitrogen is the most expensive and easily depleted element of fertility in our soil, and one of the strong points in favor of soy-beans is that they fit perfectly in the short rotations where clover and alfalfa are not practicable, giving a rational rotation, and at the same time a paying crop.

"The land for soy-beans should be prepared the same as for corn. Listing is not advisable, as the pods grow close to the surface of the ground and would be covered in cultivating. However, good results have been obtained by listing the ground and then nearly tilling the ditches before planting. The ground should not he plowed until time to plant, and the planting done immediately after plowing. Late plowing and immediate planting give the beans opportunity to keep ahead of the weeds, which always bother such a crop. Bean planting comes properly after corn and Kaffir corn planting. By this time the soil is well warmed, which insures prompt germination and rapid growth. After plowing it is essential that the soil be compacted so as to hold the moisture, as the beans require a relatively large quantity to insure prompt germination.

"We get the best results by drilling in rows thirty inches apart and three to four inches apart in the rows. The beans grow upright, never falling down except on very rich land, so they do not require more space. Planted at this distance they shade the ground, which is desirable to prevent evaporation and also to keep weeds down. Thirty pounds to one half bushel of seed are required per acre to plant at this distance. The best satisfactions [sic] comes from planting in the spring, after the soil is well warmed. The last week of May or first of June is not too late, depending on the season. It takes from eighty to one hundred days for the beans to mature, and they do best if this is during the most favorable part of the season. They continue to grow and will mature seed regardless of how dry the weather may be, although the yield may be much reduced. Seed that is over two years old is risky, and should not be trusted if new seed is to be had. Seed should not be kept in close-woven sacks nor in deep bins in quantity. It may heat enough to destroy the germinating powers and not be previously noticed.

"If a dashing rain comes up after planting and forms a crust the beans may 'break their necks' trying to push through. If the crust has formed run a light harrow crosswise of the rows. A few plants will be broken off, but not so many as if harrowed lengthwise, and it will be much better than leaving the crust intact.

"One of great objections to soybeans has been the lack of an easy means of harvesting.

"The bean pod grows so close to the ground that no sort of grain harvester can be employed in harvesting them without losing some beans. If hogs or sheep can be put on to glean the field a self-rake may be used very satisfactorily. A mower will shatter the beans and crush them into the earth, and does not give satisfaction. The stems being hard, any knife cutter should run slightly below the surface of the ground to cut them satisfactorily. When more than ten or fifteen acres are to be handled it will pay to use a bean harvester.

"After the beans are cut they can be raked with a hay rake, and should be put in small shocks until dry, when they can be threshed or stacked. Thrashing is done with an ordinary separator, using all blank concaves, and running as slowly as the machine will permit and not clog in the shake.

"Those Who have grown them for hay are loud in their praises, and some think this is the most satisfactory way of getting the benefit to the crop, especially where alfalfa or clover are difficult to grow. For hay the seed should be drilled or sown broadcast, and will require one and one-half bushels per acre. They should be cut when the beans are well formed but soft; the leaves will all be on at this stage, and a large quantity of superior feed will be secured. The cutting may be done with an ordinary mower, and the hay cured as any other crop.

"As a soiling crop for cows, there is nothing better to produce a high yield of milk. Shoats averaging about sixty pounds per head, turned into a patch of soy-beans just as the beans was forming, made a superior growth, without any grain to speak of. They ate beans, leaves, stalk and all, leaving only short stubs where the beans had been two feet high.

"The soy-bean is richer than linseed meal, and nearly as rich as cotton seed or gluten meal. The early varieties should be insisted on, and some seed houses have sent out the late sorts when an early variety was expected, with the result that those who grew them were much dissatisfied. We advise that the bean be tried in fields of not less two or three acres, as smaller planting seldom gives satisfaction."

73. U.S. Department of the Interior, Census Office. 1902. Twelfth census of the United States taken in the year 1900. William R. Merriam, Director. Vol. 6. Agriculture–Part II: Crops and irrigation. Washington, DC: Government Printing Office. 880 p. See p. 514-15 for peanuts.

• ***Summary:*** The section titled "Peanuts" (p. 514-15) discusses the history and gives general statistics. "History. It is not definitely known of what country the peanut is a native, but the weight of authority favors Brazil. The date of its introduction in the United States is uncertain, although it is known to have been cultivated here for many years prior to 1865, at which date, however, its cultivation was limited to a small portion of eastern Virginia.

"During the five years immediately following the Civil War the cultivation of the peanut increased and developed wonderfully, not only in Virginia but in the other Southern states where the climate and soil were adapted to its successful culture. This is accounted for by the fact that during the five years of the war almost every army in the field occupied, at some time or other, that portion of Virginia in which peanuts were grown. The knowledge of the culture and value of the crop, thus acquired by individual soldiers, was utilized by many of them when they reached their homes, and resulted in a marked extension of the industry and a rapid increase in the quantity produced."

"General statistics. The statistics of this crop are found in Tables 8 [p. 539], 10 [p. 542-574, etc.], and 18 [p. 592] of this section, the latter table being a summary for the years in which reports of the product have been received. The total area devoted to the cultivation of peanuts in the United States in 1899 was 516,658 acres, and the total number of bushels produced was 11,964,957, or an average of 23.2 bushels per acre. The total value of the crop was $7,271,230, an average of $0.61 per bushel, or $14.07 per acre. The total area under this crop in 1889 was 203,946 of 17.6 bushels per acre. A comparison of these figures shows an increase in ten years of 312,712 acres, or 153.3 per cent, in area, and of 8,376,814 bushels, or 233.5 per cent, in production."

Table XV, titled "Principal peanut producing states in 1899, with the acreage and quantity produced and per cent increase from 1889 to 1899, arranged in descending order of production." The states are: Virginia, North Carolina, Georgia, Alabama, Florida, Texas, South Carolina. For Virginia: Acres in 1899 / 1889: 116,914 / 58,962. Per cent of increase: 98.3%. Bushels produced in 1899 / 1889: 3,713,347 / 1,171,624. Per cent of increase: 216.9%.

Bushels produced in 1899 and per cent of increase in production for other states: North Carolina: 3,460,439 / 721.7%. Georgia: 1,435,775 / 129.9%. Alabama: 1,021,708 / 267.0%. Florida: 967,927 / 169.2%. Tennessee: 747,668 / 42.9%. Texas: 184,860 / 320.5%. South Carolina: 131,710 / 208.0%.

Note that the states with the largest percentage gain in production during the past decade were North Carolina (721.7%) followed by Texas (320.5%), then Alabama (267.0%). These are huge percentage gains.

"The average yield per acre for the United States in 1889 was 17.6 bushels, and in 1899, 23.2 bushels. The largest average yield was in Tennessee, where 38.3 bushels were produced."

The soy bean, which was a new crop commercially, is mentioned only once in this census. The section on "Conditions affecting the production and acreage of hay and forage" states (p. 206): "The great expansion, however, in the acreage devoted in the course of crop rotations to the leguminous plants–alfalfa, clover, cowpeas, soy beans, etc.– which fertilize the soil by drawing nitrogen, the most costly element of commercial fertilizers, from the air, and furnish

a most excellent forage crop at the same time, has had an important effect upon the hay tonnage, and in many sections revolutionized the system previously used." Address: Washington, DC.

74. Wood (T.W.) & Sons. 1902. Descriptive catalogue and guide for the farm & garden (with order form; Mail-order catalog). Richmond, Virginia. 76 p. 25 cm.

• ***Summary:*** In the section on "General List of Agricultural Seeds," page 70 contains a greatly expanded (3/4 page) entry for Soja Beans: two brief descriptions, four testimonials from customers, and an enlarged illustration. "Soja Beans–Unquestionably the richest and most nutritious forage and feed crop grown, making the 'balanced feed' for hogs, dairy cows, and fattening stock. Also makes a splendid soil improver, and is unequalled as a drought-resisting crop.

"We give below extracts of letters from our customers, calling attention to some of the principal points of value in our Yellow Soja Beans. This crop withstands drought better than any other forage crop, and seems capable of making its growth in spite of more adverse conditions than any other crop which we have ever grown. In point of nutritive value it is unequaled, and makes in connection with corn as a number of our customers states, a 'balanced ration' grown upon the farm, saving the farmer from paying out cash for oil meals, bran, etc.

"Our Yellow Soja Beans should unquestionably be one of the staple crops with every farmer.

"'Far superior to cotton seed to make milk and butter'–Spartanburg County, South Carolina, Nov. 25, 1901–'I bought of you a peck of Soja Beans; planted on one acre of common cotton land, rows 2½ feet apart. I made eleven large one-horse loads. I threshed out two loads, got five bushels, or 27½ bushels on the acre of beans, besides eleven loads of hay, far superior to cow pea hay. My horses quit eating corn to eat them in the chaff. I feed to my cows, and they are far superior to cotton seed meal to make milk and butter. My chickens eat them like eating corn; hogs also go for them. I consider them the finest thing a farmer can plant, and all farmers should by all means plant them- from one to twenty acres. I expect to rent ten acres to plant them on next year. I used 200 pounds guano; hoed one time; plowed twice.–Charles Moore.'

"'Far superior to the cow pea as a crop bearer, as they will produce double the quantity of peas, and equally as much, if not more litter'–Nansemond County, Virginia, Jan. 18, 1901–'The Soja Beans bought of you turned out very well. I consider them far superior to the Cow Pea as a crop bearer, as they will produce double the quantity of peas, and equally as much if not more litter. For fattening hogs they are very good, lasting for such a long time. They will keep in the field until after Christmas without spoiling; hence they fill the place of acorns or meat for stock or hogs. They ripen all at once, making it possible to turn stock on them without damaging the crop at all. As a soil improver they are the equal if not the superior of the Cow Pea, as they produce more foliage, and when they are done shedding the land is covered with leaves, pods, and stems.'–J.O. Cutchins.'

"'The richest green food I have ever grown for cattle'–Forsyth County, North Carolina, Nov. 20, 1900–'In feeding value, Soja Beans are far superior to Cow Peas. As a green feed for dairy cattle. I consider them the riches green food I have ever grown for cattle. I believe, planted in connection with, or separate from, ensilage corn, and put into silo at the same time, in proportion of one ton of Soja Beans to two tons of corn, that they would in a great measure make a 'balanced ration' grown on the farm, which, as you know, is the crying need of the hour in dairy circles.–Elliot Warren.'

"'All kinds of stock will eat Soja Beans in preference to Corn Fodder'–York Country, Virginia, Feb. 7, 1901–'All kinds of stock will eat Soja Beans in preference to corn fodder. Once tried, always tried, as they are the surest crop a man can plant. Never too dry nor too hot for this grand old forage plant. Just give them a chance and they will surprise you with a big crop.–D.W. Morris.'

"When sown broadcast for forage and soil-improving crops, the Soja Beans should be sown at the rate of one bushel per acre. Sowing them thickly will prevent the stalk from growing too coarse, and enable them to be cut and turned under to better advantage. Sowing for ensilage, it is better to sow drills with corn, at the rate of about one peck to the acre. Or they can be sown by themselves in drills three feet apart, at the rate of 1 to 1½ pecks per acre, and cultivated. They will make their largest yield of beans put in this way.

"Remember that there are different varieties and strains of Yellow Soja, which we have been supplying to our customers for several years past.

Large pkt 10c.; peck, 60c.; bus. $1.60. Price fluctuates. Special price on large lots."

An illustration shows soja bean pods and a plant in full leaf. On the front cover is a gold medal awarded to the company at the Paris Exposition of 1900.

This catalog is owned by the Smithsonian Horticulture Branch Library in Washington, DC. Call number: #010098. Address: Richmond, Virginia.

75. Holms, George K. 1903. Practices in crop rotation. *Yearbook of the United States Department of Agriculture* p. 519-32. For the year 1902. See p. 525-26, 528.

• ***Summary:*** In the section titled "Multiple cropping," the subsection on "Practices in selected states" notes that peanuts are used in rotations with cotton in North Carolina and Florida. They are the main crop in the rotation in Virginia and North Carolina (p. 524-25).

In Kentucky rotations include: "Rye and millet, soy beans, clover, or cowpeas with rape." Address: Div. of Statistics, USDA.

76. Mammoth Yellow: New U.S. domestic soybean variety. Synonyms: Southern, Yellow (Morse 1927). Large Yellow, Late Yellow, Mammoth (Morse 1927). Late, Yellow (Morse 1948). 1904. Seed color: Yellow (straw).
• ***Summary:*** Sources: Soule, Andrew M.; Fain, John R. 1904. "Crops for the silo." *Tennessee Agric. Exp. Station, Bulletin* 17(1):1-24. Jan. See p. 24. "Conclusions:... 14. The Mammoth Yellow soy beans have been made into silage for two years. The average yield was 7.5 tons. About a half bushel of seed should be used per acre and the crop will require 138 days to mature. The cost of a ton of silage was $2.83. It was black, strong in odor and not palatable to cattle. Our experience does not favor the making of silage from soy beans alone. If the crop can be satisfactorily mixed with corn or sorghum it would make an excellent quality of silage. The difficulty is to mix it economically."

Perkins, W.R. 1904. "Chemical work." *Mississippi Agric. Exp. Station / Agricultural & Mechanical College of Mississippi, Annual Report* 17:35-39. For the fiscal year ending June 30, 1904. See p. 38. Seven soja bean varieties were grown including "the Mammoth Yellow variety procured from seedmen. The latter variety produced 4.5 tons of hay per acre...

"Evans Seed Co., Inc. 1904. "1904 retail price list: Northern grown legume, forage plant, grain and grass seeds." West Branch, Michigan. 24 p. Mail order catalog. See p. 5. "Scores of seedsmen catalogue soys with southern seed, generally the Mammoth Yellow. Such seed can be bought for $1.00 to $1.25 a bushel, but is absolutely worthless north of the Ohio river."

Wood, T.W. & Sons. 1905. Descriptive catalogue for the farm & garden (with order form). Richmond, Virginia. In the section on "Seeds For the Farm" (p. 68), "Mammoth Yellow Soja Beans" are mentioned.

Piper, Charles V.; Morse, William J. 1923. *The soybean.* New York, NY: McGraw-Hill Book Co. xv + 329 p. March. See p. 42, 166. Page 42 states: "Mammoth.–The Mammoth is at present the most important soybean grown in the United States. It has also been known as Late, Yellow, Late Yellow, Southern, and Mammoth Yellow. The date of introduction of this variety is very obscure, and nothing definite is known regarding its origin." Page 166 states: "Nothing definite is known regarding the origin of this variety. Plants stout, erect, bushy, maturing in about 145 days; pubescence gray; flowers white; 85 to 90 days to flower; pods straw, 35 to 45 mm. long, 9 to 10 mm. wide, 7 to 8 mm. thick, 2-3 seeded; seed straw yellow, 7 to 8 mm. long, 6 to 7 mm. wide, 5 to 6 mm. thick; hilum tawny; germ yellow; oil 18.6%' 128,700 to the bushel." Note: This is the first USDA list of soybean varieties to give an entry for Mammoth Yellow. The previous four lists all gave Mammoth as the variety. Only Ball (1907, p. 27) listed Mammoth Yellow as a synonym for Mammoth.

Morse, W.J. 1927. "Soy beans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520. 34 p. April. See p. 8, 10. "Large Yellow.–The same as Mammoth Yellow." "Late Yellow.–The same as Mammoth Yellow." "Mammoth.–The same as Mammoth Yellow." "Southern.–The same as Mammoth Yellow."

Morse, W.J.; Cartter, J.L. 1939. "Soybeans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520 (Revised ed.) 39 p. Nov. See p. 10. "Mammoth Yellow–Nothing definite is known regarding the origin of this variety. It is said to have been grown in North Carolina since about 1880. Maturity, about 135 days;... seeds, straw yellow with brown hilum, about 2,150 to the pound; germ, yellow; oil, 19.57 percent; protein, 45.83 percent."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 12-13. Mammoth Yellow is in the USDA Germplasm Collection. Maturity group: VII. Year named or released: by 1895. Developer or sponsor: Unknown. Literature: 01, 02, 03. Source and other information: Unknown origin, probably from Japan. Grown in North Carolina since 1882. Also called 'Mammoth'. Prior designation: None. Address: USA.

77. Stewart, John F. 1904. Farm correspondence: Soja. A soy bean. *Atlanta Constitution* (*Georgia*). Dec. 26. p. 10.
• ***Summary:*** The writer would "like information of the nutritive value of soy or soja beans. Is there any danger of their killing cattle, horses, hogs, etc., and the best way to feed to cows and hogs? They seem to stimulate some, and would the bean be good for coffee."

"Answer–The soy or soja bean ranks very high on the scale of nutritiveness standing about the head of the list of legumes, in this respect. The seeds are exceedingly nutritious and are quite oily, but are not particularly relished by live stock. There is probably no more danger in feeding soja beans to stock than in feeding cowpeas, sorghum and other plants and seeds. The plants make a very good hay, yielding about as much per acre as cowpeas, but the soja does not succeed so well on this land as does the cowpea.

The beans are used by some people as a substitute for coffee and are perhaps as good a substitute (if any substitute can be good) as any other... The seeds are sold in market only for planting purposes and generally fetch from $1 to $1.50 per bushel, the latter price in the hands of seedsmen.

"The soja bean is not so much cultivated in the south as it was ten or more years ago. It does not seem to take the place of cowpea for any purpose." Address: Greenback, North Carolina.

78. Burkett, Charles William. 1904. Report of the Agricultural Division. *North Carolina Agricultural Experiment Station, Annual Report* 26:11-12. For the year ending June 30, 1903.
• ***Summary:*** Section 5 titled "Soja beans" (p. 11) states:

"Experiments with soja beans include fertilizer tests, varieties, quantity of seed, methods of planting, effect of liming, etc. This work was begun this year." No variety names are given. Address: Agriculturist, Raleigh, North Carolina.

79. Moore, George T. 1905. Soil inoculation for legumes; with reports upon the successful use of artificial cultures by practical farmers. *USDA Bureau of Plant Industry, Bulletin* No. 71. 72 p. Jan. 23. See p. 1-46, 67-68, 71-72 + 10 plates. [65 ref]

• ***Summary:*** From the earliest days of agriculture it has been recognized that all plants belonging to the Leguminosae had a decidedly beneficial effect upon the soil. Pliny (A.D. 23-79), the Roman scholar, wrote: "The bean ranks first among the legumes. It fertilizes the ground in which it has been sown as well as any manure" (p. 12). From the early 1800s on there was a great diversity of opinion concerning both the cause and the effect of root nodules of legumes.

Nobbe in Germany isolated a pure culture of nodule forming bacteria from the nodules and grew them in tubes or bottles containing nutrient agar. This culture was given the trade name Nitragin. Seventeen different kinds of Nitragin were prepared from the nodules of as many different plants, and marketed by a well known German firm of manufacturing chemists. Experiments with Nitragin in Germany met with varying degrees of success. In this country the results obtained by Prof. J.F. Duggar using hairy vetch at the Alabama Experiment Station in 1896 and 1897 were very satisfactory, but certain other investigators were not able to secure inoculation.

W.M. Munson at the Maine Agricultural Experiment Station reported in 1897 and 1898 of having fair success in inoculating soybeans with Nitragin, but he failed to get satisfactory results with other legumes. His results did not warrant the recommendation of the use of Nitragin for a leguminous crop. A major problem with Nitragin was that it lost its viability quickly (p. 21). "The percentage of failures in its usage was so great that its manufacture was given up, and it is no longer for sale under that name... For this reason the Laboratory of Plant Physiology of the [U.S.] Department of Agriculture undertook a scientific investigation of the root-nodule organism, and as a result it is believed that a thoroughly practical and satisfactory method of bringing about artificial inoculation has been devised" (p. 22).

Table 1, titled "Number of packages of inoculating material (or inoculated seed) distributed from November, 1902, to November, 1904..." (p. 42-43), lists the following under "Bean, Soy": Alabama 10, Alaska 0, Arizona 0, Arkansas 2, California 3, Colorado 0, Connecticut 4, Delaware 0, District of Columbia 0, Florida 1, Georgia 4, Hawaii 2, Idaho 1, Illinois 36, Indiana 16, Indian Territory 0, Iowa 9, Kansas 10, Kentucky 9, Louisiana 0, Maine 1, Maryland 7, Massachusetts 11, Michigan 10, Minnesota 1, Mississippi 1, Missouri 13, Montana 0, Nebraska 3, Nevada 0, New Hampshire 2, New Jersey 2, New Mexico 0, New York 30, North Carolina 11, North Dakota 0, Ohio 25, Oklahoma 4, Oregon 3, Pennsylvania 17, Philippine Islands 0, Porto Rico 1, Rhode Island 3, South Carolina 1, South Dakota 2, Tennessee 5, Texas 2, Utah 0, Vermont 2, Virginia 48, Washington (state) 3, West Virginia 6, Wisconsin 11, Wyoming 0. Foreign countries: Australia 2, British Guiana 0, Canada 1, Costa Rica 1, Cuba 2,... South Africa 2. Total: 391.

The next section, titled "Reports" (p. 44), begins: "While it has been impossible to receive reports from all experimenters, the percentage of replies has been unusually large and is quite sufficient to enable the formation of a fair opinion as to the value of the cultures distributed. Table II, "Reports of experiments with principal crops" (p. 45), shows the following for soy bean: Total reports: 129. Inoculation resulting in definite increase of crop: 54. Failures definitely ascribed to bad season, poor seed, weed growth, etc.: 22. No increase in crop; organisms already present in the soil: 11. No evident advantage from inoculation; nodules not formed: 42. Percentage of failure: 43%.

After discussing the nature of the organism, the author lists farmers in the following areas who have used the "artificial culture" successfully to inoculate soybeans: Rash, Alabama; Gainesville, Georgia; Napoopoo, Hawaii (Gordon Glore–Inoculation successful. Increased growth of plant and abundance of root nodules); Winchester, Kentucky; Bynum, Maryland; Marionville, Missouri; Dome, North Carolina; Guys Mills, Pennsylvania; Spring City, Tennessee; and seven towns in Virginia (p. 67).

The author states that alkaline nitrates in the proportion of 1 to 10,000 are sufficient to prevent the formation of nodules. Photos show: (1) Package of inoculating material for sufficient for four acres of alfalfa, with a letter titled "Directions for using inoculating material," from the U.S. Department of Agriculture, Bureau of Plant Industry. (2) Effect of rich nitrogenous soil upon formation of nodules of soy beans; few nodules. Same culture and seed used as in Plates 3 and 4. (3) Effect of poor sandy soil upon formation of nodules of soy beans; more nodules. (4) Effect of poor clay soil upon formation of nodules of soy beans; many nodules. Conclusion: Soybeans grown in a poor sandy soil or in a poor clay soil have a greater number of nodules than plants grown in a rich nitrogenous soil. He states also that fully as striking differences might be shown in a soil in which the moisture or the acidity or the air supply varies, and that the application of calcium or magnesium will act differently on nodule production depending on whether the plant grows under acid or alkaline conditions.

Note 1. This is the earliest document seen (March 2016) that clearly refers to the cultivation of soybeans in Hawaii. They may have been grown there in 1900, at which time one variety was introduced to the USA from Hawaii. By about 1904-05 the Yamajo Soy Co. had introduced soybeans to

Kona, a district on the Big Island of Hawaii, where it was growing them among the rows of coffee trees and using the mature soybeans to make Japanese-style soy sauce (shoyu).

Note: 2. This is the earliest document seen (June 2016) concerning soybeans in connection with West Virginia. Since 6 packages of soybean inoculating material (or inoculated seed) were sent to West Virginia from November, 1902, to November, 1904, its seems very likely that soybeans were in West Virginia and being cultivated there by 1905–but we cannot be sure.

Note: 3. This is the earliest document seen (May 2016) concerning soybeans in connection with Oregon. Since 3 packages of soybean inoculating material (or inoculated seed) were sent to Oregon from November, 1902, to November, 1904, its seems likely that soybeans were in Oregon and being cultivated there by 1905–but we cannot be sure.

Note: 4. This is the earliest document seen (Dec. 2008) concerning soybeans in connection with Cuba. Since 2 packages of soybean inoculating material (or inoculated seed) were sent to Cuba from November, 1902, to November, 1904, its seems likely that soybeans were in Cuba and being cultivated there by 1905–but we cannot be sure.

Note: 5. This is the earliest document seen (Feb. 2009) concerning soybeans in connection with Costa Rica, or with Central America. Since 1 package of soybean inoculating material (or inoculated seed) was sent to Costa Rica from November, 1902, to November, 1904, its seems likely that soybeans were in Costa Rica and being cultivated there by 1905–but we cannot be sure. Address: Physiologist in Charge of Lab. of Plant Physiology.

80. 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.

81. Wood (T.W.) & Sons. 1905. Descriptive catalogue and guide for the farm & garden (Mail order, with order form). Richmond, Virginia. 81 p. 26 cm.
• ***Summary:*** This is the company's 25th anniversary catalog. In the section on "New and Desirable Varieties" (p. 7) is a large entry for "Hollybrook Early Soja Beans," including a long testimonial letter from Mr. V.E. Barksdale of Halifax County, Virginia. He "grew both the Mammoth Yellow and the Hollybrook Early Soja on an extensive scale last year." He believes that the latter has clear advantages over the former. Because it "matures early, and at the same time makes a large yield, the crop is bound to become more popular than ever before. Price, per pkt. 10c.; qt. 20c.; peck, 75c.; bus. $2.50."

A photo shows a field of Hollybrook Early Sojas. An illustration of the "Hollybrook Early Soja Bean" also appears on the catalog's cover.

In the section titled "Seeds For the Farm" (p. 68), there is a large section on "Mammoth Yellow Soja Beans" and a small one on "Hollybrook Early Soja Beans." There are three testimonial letters for the Mammoth Yellow from: (1) Michael Shea of Charles County, Maryland. (2) E.B. McGinnis & Son from Amherst Co., Virginia. (3) and J.W. Speas from Forsyth Co., North Carolina. A photograph shows "Soja beans grown as a hay crop on our Hollybrook Farm."

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

The 1898-99 catalog is owned by the Smithsonian Horticulture Branch Library in Washington, DC. Call number: #12346. Address: Richmond, Virginia.

82. Hickory Milling Co. 1906. Cow peas (Ad). *Southern Planter* 67(1):54. Jan.
• ***Summary:*** This ad (1/9 page) states that the company also sells "Soja beans–$1.15 per bushel."

A similar ad appeared in the March issue (p. 242) and in the April issue (titled "Seed peas," p. 341). Address: Hickory,

North Carolina.

83. Moore, T.M. 1907. Farm correspondence: Cowpeas and soy beans. *Atlanta Constitution* (*Georgia*). Feb. 11. p. 10.
• ***Summary:*** "I have a one-horse farm that I want to plant in forage crops, as labor is scarce, and I cannot tend it in other crops. I am thinking of sowing part of it in [cow] peas, but can't get peas enough for all of it. Will sojar [sic, soja] beans make as good forage as cow peas? And will they deposit as much ammonia [nitrogen] in the land? What time should they be sown? The land is sandy with black bottoms running through it... When is the right time to sow peas and beans, and how should I prepare the land?"

Contains a long, complex answer, which recommends planting Appler oats (or Burt oats) before soy beans. "Soy beans make a very good hay, being exceedingly nutritious, but not so palatable as cowpea hay." Address: Lumberton, North Carolina.

84. Amherst: New U.S. domestic soybean variety. Synonyms: Bakaziro [Bakajiro], Best White (Morse 1948). 1907. Seed color: Yellow (straw).
• ***Summary:*** Sources: Ball, Carleton R. 1907. "Soy bean varieties." *USDA Bureau of Plant Industry, Bulletin* No 98. 28 p. May 27. See p. 12-13, 25. "Classification–Key to the varieties (p. 11): VI. Yellow seeded: 3B. Low, stocky, somewhat branched, pods large, seeds large, 7 to 9 mm., spherical or slightly flattened, pale yellow, hilum yellow or pale brown. Medium late, 120 to 125 days, a little taller than 20 inches, branches nearly equalling stem = Amherst." "A rather low and stocky well-branched variety... This variety was named for the Massachusetts Agricultural Experiment Station, at Amherst, MA, where soy beans have been cultivated for many years from specially imported seed. Numbers and sources of lots grown: Agrost No. 452, grown from S.P.I. No. 4913; Agrost. No. 1170, S.P.I. No. 9408; Agrost No. 1296, S.P.I. No. 6336 [Bakaziro]; S.P.I. No. 4913, 'Best White;' S.P.I. No. 5765, grown from S.P.I. No. 4913; S.P.I. No. 6336, 'Bakaziro,' Japan; S.P.I. No. 8494, grown from S.P.I. No. 6336 [Bakaziro]; S.P.I. No. 9408, grown from S.P.I. No. 5765; S.P.I. No. 9413, grown from S.P.I. No. 6336 [Bakaziro]; S.P.I. No. 12400, grown from S.P.I. No. 9408; S.P.I. No. 17275, grown from Agrost. 1170-2 and 1296-2."

Piper, Charles V.; Morse, W.J. 1910. "The soy bean: History, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 187. 84 p. Dec. 31. See p. 47. Seed color: Straw yellow. S.P.I. No. 17275. "The united progenies of 4913 from Japan, 1900, and 6336 [Bakaziro] from Tokyo, Japan, 1901... Grown nine seasons." Note: Bakaziro is not listed in the extensive index of this 1910 publication.

Etheridge, W.C. 1912. "Report of Division of Agronomy." *North Carolina Agric. Exp. Station, Annual Report* 34:16-18. For the year ended June 30, 1911. Amherst is one of the earliest maturing varieties. It does not ripen uniformly and because of this it is almost impossible to gather all its seeds because the pods that are more forward in ripening split and shatter before the other pods mature. Address: USA.

85. Ebony: New U.S. domestic soybean variety. Synonym: Black Beauty (Piper & Morse 1910). 1907. Seed color: Black.
• ***Summary:*** Sources: Ball, Carleton R. 1907. "Soy bean varieties." *USDA Bureau of Plant Industry, Bulletin* No 98. 28 p. May 27. See p. 11, 13, 15-16. "Classification–Key to the varieties (p. 11): I. Black seeded: 2B. Seeds small, 4 to 6 or 7 mm long, round or broadly elliptical, pods about 1 inch long. Medium late, 115 to 120, 20 to 26 inches tall, long-branched, seeds elliptical, distinctly flattened = Ebony." "The very small-seeded variety known as Ebony is not to be had on the market, and it has apparently been obtained abroad but once. The original importation was from Ping-yang [Pyongyang / P'yongyang], Korea. In size of seed and pod it is, with the exception of Kingston, the smallest of all the black soy beans and one of the few very small-seeded varieties of any color... The name has reference to the color of the seeds. Numbers and sources of lots grown: Agrost. No. 1193, S.P.I. No. 6386; Agrost. No. 1541, S.P.I. No. 8492; Agrost. No. 1980, Agrost. Nos. 1193 and 1541, united; S.P.I. No. 6386, 'Black," Korea; S.P.I. No. 8492, grown from S.P.I. No. 6386; S.P.I. No. 9414, grown from S.P.I. No. 8492; S.P.I. No. 17254, grown from Agrost. No. 1980."

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

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

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

Piper, Charles V.; Morse, William J. 1923. *The soybean.* New York, NY: McGraw-Hill Book Co. xv + 329 p. March. See p. 163, 164. "Introduced from Pingyang [Pyongyang], China, Chosen (Korea), 1901." "Black Beauty.–The same as

Ebony." Note: This is the earliest document seen (Aug. 2004) which states that "Black Beauty" is a synonym for "Ebony."

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

86. Kingston: New U.S. domestic soybean variety. Synonym: Japanese No. 15 or #15 (Ball 1907). 1907. Seed color: Black.
• ***Summary:*** Sources: Ball, Carleton R. 1907. "Soy bean varieties." *USDA Bureau of Plant Industry, Bulletin* No 98. 28 p. May 27. See p. 11, 13, 15. "Classification–Key to the varieties (p. 11): I. Black seeded: 2A. Seeds small, 4 to 6 or 7 mm long, round or broadly elliptical, pods about 1 inch long. Medium [days to mature], 110 to 115 days, low, 15 to 18 inches tall, scarcely branched, seeds spherical or slightly flattened = Kingston." "Black-seeded group: Kingston. This is a small, medium early variety, with rather slender stems... The seeds are the smallest of any black variety, and are equaled in smallness by Brownie only... This variety is too small and unbranched to have much value for forage. It is likely to prove a fairly good yielder of seed, two tests sown thickly for forage having yielded between 8 and 9 bushels of seed per acre... The name, Kingston, is given in honor of the Rhode Island Experiment Station, located at Kingston, Rhode Island. That station has contributed largely to our knowledge of the soy bean as a crop for northern regions, and this variety was received from that source alone. Numbers and sources of lots grown: Agrost. No. 118, 'Japanese No. 15,' Rhode Island Agric. Expt. Station; S.P.I. No. 17255, grown from Agrost. No. 118-1."

Piper, C.V.; Nielsen, H.T. 1909. "Soy beans." *USDA Farmers' Bulletin* No. 372. 26 p. Oct. 7. See p. 23.

Piper, Charles V.; Morse, W.J. 1910. "The soy bean: History, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 187. 84 p. Dec. 31. See p. 31. "Kingston: The Kingston soy bean was received from the Rhode Island Agricultural Experiment Station in 1903 as "Japanese No. 15." It was obtained by them from Prof. W.P. Brooks, of the Massachusetts Agricultural Experiment Station, who brought a number of soy-bean varieties from Japan in 1889, and is probably the variety which he named 'Medium Black.' It has never been secured from any other source. In all probability this is the variety grown at the Rhode Island Agricultural Experiment Station in 1893 (see their Annual Report, 1893, p. 191) as 'Medium Black.'"

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

Piper, Charles V.; Morse, William J. 1923. *The soybean.* New York, NY: McGraw-Hill Book Co. xv + 329 p. March. See p. 41, 44. Page 41 states: "The early introduced varieties.–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." One of these was Kingston (with black seeds).

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 12-13. Kingston is in the USDA Germplasm Collection. Maturity group: IV. Year named or released: 1907. Developer or sponsor: Rhode Island AES (Agric. Exp. Station) and USDA. Literature: 01, 03. Source and other information: From Japan in 1889 by Prof. W.P. Brooks, Massachusetts AES (Agric. Exp. Station). Prior designation: PI 17255. Address: USA.

87. Williams, C.B. 1907. Re: Looking for seed of varieties of cowpeas and soybeans. Letter to Mr. H.T. Nielsen, Bureau of Plant Industry, Washington, DC, Nov. 26. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: On November 30 we received a letter from you stating that you were glad that we were interested in growing varieties of cowpeas and soy beans in cooperation with the Bureau of Plant Industry. You also stated that you would be glad to supply us with the seed of each of these varieties for our tests. You stated that your supply of soy beans was limited, but that you would be able to supply enough of the leading varieties to plant one-twentieth of an acre of each, and that you would supply sufficient to plant one-tenth of an acre of each if you found that you could spare the seeds. You stated that you would let us know definitely in reference to this matter in the near future. You stated also in your letter that there would be no difficulty in your ability to supply us with enough of the different varieties of cowpeas to plant one-tenth of an acre to each. We shall want to supplement the varieties you supply us by purchases from different sources, so if it is possible for you to supply us a list which we may expect from this source, the favor will be highly appreciated.

"Yours very truly,..."

Note: This is the earliest document seen (May 2017) concerning C.B. Williams of North Carolina 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–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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

88. Mulvany, C.B. 1907. Re: Yes we have varieties of cowpeas and soybeans for testing. Letter to Prof. C.B. Williams, North Carolina Experiment Station, West Raleigh, N.C., Nov. 30. 1 p. Typed, with signature.

• ***Summary:*** "Dear Sir: I have your letter of 26th instant addressed to Mr. H.T. Nielsen. I am very glad to know that you are interested in the matter of cowpeas and soybeans. For the past two years we have been conducting very extensive varietal trials with these and have secured a very large number of new varieties. I take it, however, that you are interested only in growing a few of the best varieties of each. Our supply of seed I regret to say is not very large, especially of the soybeans. It is possible that we will not be able to supply you with more than enough of these for 20th acre plots, but if we can spare sufficient for 10th acre plots will be glad to do so. There will be no difficulty in supplying you with the standard varieties of cowpeas, but some that we have recently secured the amount we can furnish you will probably be small. I shall let you know definitely in regard to these amounts in the near future.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.

89. Nielsen, H.T. 1907. Office report on soybeans: For July, August, September, and October, 1907. Washington, DC: Seed and Plant Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC. 15 p. Dec. 30. Unpublished typescript. 28 cm.

• ***Summary:*** "From the data we had on hand last spring we were certain that the acreage planted to soybeans was on the decrease. It was exceedingly desirable to learn why this crop had so diminished in favor, and if it were possible to increase the acreage by introducing new and better varieties than those which have been commonly grown. With this idea in view, variety trials were conducted at Stillwater, Oklahoma, New Orleans, Louisiana, Gainesville, Florida, Raleigh, North Carolina, and Arlington Farm, Rosslyn, Virginia. In addition to securing notes on the varieties, any other information which would add to an understanding of the decrease in acreage of soybeans was to be secured.

"Our interest in soybeans was aroused by the comparatively large grain yield which a few of the varieties made at Arlington last year, and the relative ease with which the crop can be harvested and threshed in comparison with cowpeas. Inquiry was made at all the Experiment Stations visited, where soybeans had been grown, if any difficulty had been experienced in harvesting and threshing. In only one case, that of the Ohio Station, was any trouble reported. Only a few farmers who were growing soybeans were located, and without exception they are well pleased with them. Nearly all of the southern stations are growing them to a certain extent, and are exceedingly anxious that they come into more general use throughout the South, as they are judged superior to cowpeas in nearly every respect.

"The Ohio, Indiana, Illinois and Kentucky Experiment Stations all have a considerable number of varieties under trial, and all except Ohio are getting good results. In the states north of the Ohio River soybeans are more especially a grain crop, though they also produce a fair amount of hay. At the Ohio station soybean do not do well for some unknown reason. None of the varieties they have under trial are making satisfactory growth, and they have a peculiar tendency to set pods very close to the ground, so the harvesting is very difficult. The only complaint I heard on the threshing of soybeans was by the Ohio Station. In order for soybeans to be a profitable crop the yield must be at least 15 bushels per acre, and there is difficulty in securing that in Ohio. All of the large growing varieties are too late for the conditions prevailing at Wooster [Ohio].

"In Lafayette, Indiana, soybeans do exceptionally well. The Station considers them a very desirable crop. They are there used only for grain production; they are harvested with a mowing machine and handled the same as a hay crop. The yield of seed readily amounts to 25 or 30 bushels per acre, according to the station authorities. They have a trial between seeding with a grain drill and planting in rows. The drilled area seems to give the largest yield, and certainly the best quality of hay or straw. The early or medium maturing varieties give the best results. The late varieties are too late to mature seed satisfactorily at this latitude. Ito San, Brownie, Guelph, and Hollybrook varieties are the best in their trials, Hollybrook giving the best results. Guelph is probably second and the other two are about equal in value. The very early varieties such as Ogemaw and Buckshot are entirely worthless as they do not make not make sufficient plant growth to yield a fair crop or either hay or seed. Soybeans are grown quite extensively in the northern part of the state where they seem to be admirably adapted for the production of seed. It is claimed that the crop is becoming generally grown over the entire state, and that it is an exceedingly valuable one.

"The growing of soybeans in Illinois does not seem to be as successful as in Indiana, though the station at Champaign is very enthusiastic over the crop, Prof. Hume saying that the yield is always above 15 bushels per acre. The forage or hay is considered of very good quality and the grain is excellent as a concentrate. The Station has used a grain binder for harvesting soybeans and report it satisfactory. Of the varieties under trial Ogemaw and Buckshot are considered no god. Ito San is one of the best varieties and Guelph is

thought to be the best, the Station using it as their standard to gauge the value of the other varieties. At the time of my visit, Sept. 20th, Ebony, #9414 secured from us, showed up best, and Prof. Hume was very enthusiastic over it. Brownie makes an exceptionally fine growth, but seems too late to mature seed. Some of the varieties have given considerable difficulty in harvesting as they put on pods very close to the ground. The growing of soybeans in the state is rather limited, although in the southern part Prof. Hume thought they were being grown quite largely. The Station is anxious that the industry become more general as the plant is deemed a valuable addition to Illinois agriculture.

"At the Kentucky station the growing of soybeans has been tried for some time and has given very promising results for the state. Prof. Garman thinks that soybeans are much more valuable for Kentucky than cowpeas, as they are more easily handles, adapt themselves to varying conditions more readily, and give a larger yield. Prof. Garman has done more variety testing and from his results, favors the medium maturing varieties. The early ones he says are too small growing to be valuable and the late ones are in danger of being caught by frost before they mature. Ito San, Brownie, Flat King and Amherst give very good results. Mammoth does exceptionally well when the season is such as to allow its maturing. The harvesting is done with a mower or binder, and no trouble has been experienced in this operation. The [seed] yield is good, being 20 or more bushels per acre. Prof. Garman states that the curing of hay is done simply by raking into windrows, and then cocking. No stakes or poles are used nor is any covering with hay crops considered necessary. They are considered one of the most valuable crops for Kentucky, but, on account of farmers not being familiar with them, their introduction has been rather slow.

"I found Director Morgan, of the Tennessee Experiment Station, very enthusiastic about the growing of soybeans. Prof. Morgan says they can be planted any time from April to August and still make a crop. They yield more grain per acre, and usually a higher quality of hay or straw than cowpeas. Prof. Morgan is doing everything possible to increase the acreage of soybeans in Tennessee, but is making slow progress, as the farmers are not familiar with the crop, and prefer growing cowpeas. A very interesting feeding trial was carried out by the Tennessee Station last winter. This trial consisted of feeding an acre each of corn, cowpeas and soybeans to three lots of steers. The product from each acre was used to feed one of the lots in the trial. The yield of soybeans on the experimental acre was 20 bushels of grain and nearly 1½ tons of straw. The soybeans gave decidedly the best results in this trial, producing the largest amount of gain and making this gain considerably cheaper than either of the other feeds. This trial Prof. Morgan is using as an illustration to induce the farmers to grow more soybeans. Of the varieties tried, Mammoth is considered the best, as it makes the largest growth, matures satisfactorily, and seems able to withstand drought better than any of the others. Varieties of the Amherst type are also considered very valuable, but the very early ones are considered entirely worthless for Tennessee. The harvesting is generally done with a mower. A binder can also be used satisfactorily, and a drop-rake reaper is spoken of quite highly. The curing is the same as for ordinary hay. The harvesting must be done quite early do avoid the danger of shattering seed and losing the leaves. Prof. Morgan insists very strongly that the planting should be in rows as the need in Tennessee is for more clean cultivation, and soybeans in rows is one of the best clean culture crops for the state. It is excellent to grow as a preparation for alfalfa seeding, and it is also easy to prepare the land for wheat seeding after soybeans. The Station has experienced no difficulty in threshing. The Koger [cow] pea thresher gave excellent results last fall on threshing soybeans." Continued. Address: Scientific Assistant [Bureau of Plant Industry, USDA].

90. Nielsen, H.T. 1907. Office report on soybeans: For July, August, September, and October, 1907 (Continued–Part II). Washington, DC: Seed and Plant Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC. 15 p. Dec. 30. Unpublished typescript. 28 cm.
• ***Summary:*** Continued. "Of the remaining varieties, Nos. 19984 and 17862 made fair growth and set a reasonable amount of seed, but are too small growing to be considered valuable. All the others made but a very small growth, though they set seed well considering their size. Practically all but the three good ones were ripe on August 22nd. The entire trial was well inoculated, and Prof. Blouin said the season had been favorable for their growth, so it seems reasonable to suppose that the majority of the varieties are not suited to the conditions prevailing in New Orleans.

"The large list of varieties furnished the Florida Experiment Station and planted at Gainesville, Fla., did not develop anything at all promising. The seed were not inoculated and in a careful search through the field on August 28th I found only a single plant tubercled, and that very sparingly. The trial was on very sandy soil, and the plants made but very small growth. The best of the plants were only 6 to 10 or 12 inches high, and were weak and sickly looking. They also had but a very small number of pods. The soil is badly in need of humus and it may be that if this were incorporated, the soybeans would do better. Prof. Rolfs / Rolfe [?] wishes to try the entire list of varieties again next season and hopes that in the long run he may secure something of value.

"I am exceedingly skeptical about soybeans ever becoming of any material value for Florida on account of the adaptability of the velvet bean to Florida conditions. While there may be found isolated places in the state where soybeans will do well, the crop will never be generally grown in the state. Prof. Rolfe feels that there is but small

promise, but he thinks that trials should be carried far enough to thoroughly demonstrate whether there is any chance of getting anything valuable or not. In the trial at Raleigh, North Carolina, the results are comparable. The varieties were all planted on July 18th on very uniform land. The season was exceptionally dry so the plants made but very small growth, although they were well tubercled and thrifty. Last year soybeans at Raleigh grew waist high while this year only a few of them were as much as 20 inches. The only thing this trial has demonstrated pretty thoroughly is the folly of trying to get anything valuable out of the early varieties. All of these made very small growth and produced only a small amount of seed. The medium maturing varieties did fairly well, but it is in the late ones that the promising varieties are found. These are able to withstand the severe drouth in the middle of the season and when the fall rains come they will start out and make quite a large growth, while other varieties will have set a small amount of seed and matured in the dry hot weather. Of the varieties that seemed of some promise I noted the following: Flat King, Nuttall, Ebony, in the Blacks [black seeded]; Brownie, Meyer, #17852–one of the best in the trial, in the browns; Guelph and Tokio, Nos. 17264 and 17267 in the green, and Hollybrook, Nos. 17278 and 19984, in the yellow. Of these more or less promising varieties, Meyer, Guelph and Hollybrook have shown up the best. Owing to the unfavorable season, it is hard to tell what the varieties will do under average conditions.

"I think the growing of soybeans in North Carolina will be a very profitable business although the trial at Raleigh this year has not been very successful. However, the varieties have shown their ability to withstand drouth, and in a favorable year I think they will make an enormous growth. I learned from the station that in the eastern part of the state, especially Hyde Co., there are many large areas devoted to soybeans, and that they do exceedingly well. I think the entire Coastal Plains region of the state will grow soybeans satisfactorily and profitably. Considerable educational work is necessary to get the crop on a good basis.

"In the large trial at Arlington [Farm, Virginia] quite a number of varieties made very large, and, in some ways, satisfactory growth, but only a few of this large list of varieties are of the type of plants most desirable to make a real successful variety. In this category come Ebony, #17254, Haberlandt, #17263 and #17271, Meyer, #17852, two yellow varieties, Nos. 14954 (Acme) and 19984 (Hollybrook?). These varieties I consider the most promising in the trial at Arlington for the reason that they make relatively large growths, set a lot of seed, hold their leaves well upon ripening, and have rather fine stems. The lower pods and branches on these varieties are also quite well above ground so the harvesting can be readily done.

"After the summer's investigation on soybeans I have come to the conclusion that the very early varieties might as well be permanently discarded, as there seems to be no place for them in our agriculture. North of the Ohio River, wherever soybeans are grown, the medium late varieties are the best, as the late ones will not mature seed, but for all the country south of the Ohio River, and I believe it is here that the soybean will find its greatest usefulness, the late varieties are by far the best. I think the reason for the decrease in acreage of soybeans is due to the lack of knowledge of the crop. In nearly every section where the crop has become known it as found a permanent place on the farms, and is considered very valuable. Heretofore the stations have not devoted much time towards exploiting the soybean, and getting familiar with it, which is accountable for its not being grown more extensively than it is. A systematic plan of education undertaken by southern stations I think would increase the acreage of soybeans by many times the present status in a very few years. One of the principal objections to the crop has been lack of varieties which would yield a sufficient amount of seed to make the crop profitable. New and better varieties which I think we now have on hand will overcome this drawback. The ease with which the crop can be handled and the readiness with which it becomes inoculated and adapted to environments in the Southern States will make it a very desirable crop in southern agriculture. In my opinion all exploitation possible should be given to soybeans as for many conditions they are superior to cowpeas."

Note 1. This is the earliest document seen (June 2013) that mentions the soybean variety Acme.

Note 2. Nielsen fails to realize that the future of the soybean lies in the northern states rather than in the south, and that in the far northern states the short season varieties would be come the most popular because of their high seed yields.

Location: National Archives, 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: Scientific Assistant [Bureau of Plant Industry, USDA].

91. Williams, C.B. 1907. Re: Seed of varieties of cowpeas and soybeans. Letter to Mr. C.V. Piper, Bureau of Plant Industry, Washington, DC, Dec. 31. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: On November 30 we received a letter from you stating that you were glad that we were interested in the growing of varieties of cowpeas and soy beans in cooperation with the Bureau of Plant Industry. You also stated that you would be glad to supply us with seed of each of these varieties for our tests. You stated that your supply of soy beans was limited, but that you would be able to supply enough of the leading varieties to plant one-twentieth of an

acre of each, and that you would supply sufficient to plant one-tenth of an acre of each of you found that you could spare the seeds. You stated that you would let us know definitely in reference to this matter in the near future. We should like to know if we may depend upon you to supply us with enough seed of the leading varieties of soy beans for our test this year. You stated also in your letter that there will be no difficulty in your ability to supply us with enough of the different varieties of cowpeas to plant one-tenth of an acre to each. We shall want to supplement the varieties which you supply us by purchases from different sources, so if it is possible for you to supply us with a list which we may expect from this source, the favor will be highly 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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

92. Wood (T.W.) & Sons. 1907. Descriptive catalogue and guide for the farm & garden (Mail order, with order form). Richmond, Virginia. 81 p. 25½ cm.
• ***Summary:*** In the section on "Seeds For the Farm" (p. 81) three-fourths of the page is devoted to "Mammoth Yellow Soja Beans," "Soja Beans Inoculated" (supplied at an extra cost of 60 cents per bushel), and "Hollybrook Early Soja Beans." There is a long testimonial letter about the Mammoth Yellow from satisfied customer D.L. Clements, McDowell County, North Carolina (Sept. 27, 1906), and another testimonial letter about Hollybrook Early from customer N.E. Scales, Rowan Co., North Carolina (Oct. 22, 1905). Prices of the Mammoth Yellow: "Pkt. 10 cts., postpaid; qt. 20 cts.; pk. [peck] 50 cts. Bushel price quoted on request. Crop short and values not settled at time this catalogue is printed." A photo shows "Soja beans being grown as a hay crop on our Hollybrook Farm."

This catalog is owned by the Smithsonian Horticulture Branch Library in Washington, DC. The call number: #012610. Address: Richmond, Virginia.

93. Nielsen, H.T. 1908. Re: Sending you varieties of cowpeas and soybeans for testing. Letter to Prof. C.B. Williams, West Raleigh, N.C., March 19. 2 p. Typed, with signature.
• ***Summary:*** "Dear Sir: Under date of December 31st, 1907, you wrote to Mr. C.V. Piper concerning work on cowpeas and soybeans. This letter Prof. Piper turned over to me, and I have delayed answering until I could get the variety work on these two crops entirely straightened out to my own satisfaction. This I have now succeeded in doing, and am pleased to send you the following list of varieties:

4 lb #21731 Mammoth soybeans.
4 lb #16790 Cloud soybeans.
4 lb #17253 Nutall soybeans.
4 lb #17266 Kingston soybeans.
8 lb #17334 Groite [sic, Groit] cowpeas.
8 lb #16812 Michigan Favorite.
8 lb #21085 Whippoorwill cowpeas.
4 lb No. 21293 Vigna catjang.
4 lb #21537 India cowpeas.
4 lb #21602 Vigna catjang.
4 lb #17256 Brownie soybeans.
4 lb #17267 Tokio soybeans.
4 lb #17271 Haberlandt soybeans.
4 lb #17852 Meyer soybeans.
4 lb #17861 Ebony (?) soybeans.
4 lb #19186 Guelph (?) soybeans.
4 lb #19982 Hollybrook (?) soybeans.
4 lb #17857 Green soybeans.
4 lb #17261 Guelph soybeans.
4 lb #17252 Flat King soybeans.
4 lb #17254 Ebony [soybeans].
8 lb #21049 Whippoorwill cowpeas.
8 lb #21832 Iron cowpeas.
16 lb #18520 Red Ripper cowpeas.
4 lb #21292 Vigna catjang.
4 lb #21299 Macassar cowpeas.
4 lb #21599 Brabham cowpeas.
4 lb #21603 Vigna catjang.
4 lb #17263 Haberlandt soybeans.
4 lb #17269 Hollybrook soybeans.
4 lb #17275 Amherst soybeans.
4 lb #17278 Hollybrook soybeans.
4 lb #17862 Hollybrook soybeans.
4 lb #19982 Flat King soybeans.
4 lb #19985 Haberlandt soybeans.

"I am sending you enough of the varieties to plant one-tenth of an acre. I am sorry we have not seed of more of the commercial varieties of cowpeas, but they are not available, and I trust it will not inconvenience you in your plans.

"The Vigna catyang [catjang] which I am sending you are importations from India and we are not entirely certain whether these varieties are of any value, but trust you will grow them to learn whether they have any merits for your conditions. The Macassar, #21299, is an importation from Brazil, and is very late. This, and the catyangs, require the longest possible season for maturing, and it will be desirable for you to plant them as early as the season will permit if they are to give you any satisfaction at all. The Brabham cowpea, #21599, is a new variety and is a cross between Whippoorwill and Iron. In our trials at Arlington [Farm, Virginia] last year it gave promise of being the best variety of any of the cowpeas. We are especially anxious that you give

this careful attention and save al the seed of it you possibly can if it proves to be of any more value than the rest of the varieties.

"The varieties of soybeans which I have put up for you are the ones which gave the most promise in the test at Raleigh [!!] last year, judging by my own notes. I judge from your letter to Prof. Piper that you do not care to work with the varieties which have no promise for your conditions, and hence I have eliminated all the early varieties which you had last year. In case you care to grow additional varieties in small plots, kindly let me know and I will try to send you the seed. Trusting this delay will not be any serious inconvenience to you in planning your work, I am,

"Very truly yours..."

Note 1. Soybeans were apparently tested at Raleigh in 1907 (see "!!" above).

Note 2 We learn from C.B. Williams' letter of April 6, 1908 that the Scientific Assistant is H.T. Nielsen.

Location: 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.

94. Williams, C.B. 1908. Re: The cowpeas and soy beans have just arrived. Letter to Mr. H.T. Nielsen, Bureau of Plant Industry, Washington, DC, April 6. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: Your letter of March 19 came just as we were leaving town for a ten days trip on a Corn Special in the Eastern portion of this State, hence our delay in replying to it. The cowpeas and soy beans mentioned in your letter have just been received. These will be put out in one-tenth acre plats with other varieties which we are able to secure in this locality. We appreciate very much your kindness in supplying us these seed. Should you have others that seem to be promising in sufficient quantities to supply us enough to put out one-tenth acre plat of each, we would be glad to secure them also. We will not plant either the cowpeas or the soy beans before the first of May.

"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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

95. Massey, W.F. 1908. The new pea thresher. *Progressive Farmer* (*The*) (*Winston-Salem, North Carolina*). May 21. p. 5.

• ***Summary:*** "A great many have been very anxious to know what pea thresher I have been referring to. Now that the company is advertising their machine in *The Progressive Farmer* I have no objection to saying that the machine I have been writing about, and the machine I went to Tennessee to examine and see at work, is the machine invented by Dr. J.J. Koger, of Hawkins Co., Tennessee, and now advertised by the Koger Pea and Bean Threshing Co., of Morristown, Tenn. Having examined this machine thoroughly, fed pea vines to it, and having seen it run out clean, unbroken peas at the rate of half a bushel per minute from the dry hay, I have no hesitation in saying that it is the machine I have been hoping some one would invent for the last twenty years or more. With one of these machines and a gasoline engine a man can clean out all the peas of a large neighborhood during the leisure time in winter, and leave the hay in the best shape for feeding.

"There have been machines invented that will shell peas well after they are gathered by hand. But the handpicking is where the expense comes in. There are other machines intended to harvest the peas from the vines. But these can only be used in the field and during a short season, and waste feed.

"The problem has been, as I have been saying for years, to get a machine that would thresh the peas from the mown vines and clean them out without breaking them. The Koger machine is the first one I have ever seen that will do this, and it does it well, Hence I have no hesitation in endorsing it." Address: Morristown, Tennessee.

96. Williams, C.B. 1908. Re: The cowpeas and soy beans were all just destroyed in a fire. Letter to Mr. H.T. Nielsen, Bureau of Plant Industry, Washington, DC, June 1. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: On March 19 last, you sent the Experiment Station a goodly number of varieties of cowpeas and soy beans for our variety tests on the Station farm this year. In the misfortune which visited the Station last Monday morning in the shape of a fire, destroying the barn and Manager's house, these and al other seeds which we had were destroyed. Now, we should like to enquire if it will be possible, at this late date, to secure enough seed of all of those which you sent us to put out about one-tenth of an acre of each variety. If this is not possible, then we would like to secure as many as it is possible for your Bureau to supply us.

"Any aid which you may be able to render us at this junction will be highly 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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

97. Nielsen, H.T. 1908. Re: Unable to send you any cowpeas, but can send some soybean varieties for testing. Letter to Prof. C.B. Williams, Agricultural Experiment Station, West Raleigh, N.C., June 3. 1 p. Typed, without signature.

• ***Summary:*** "Dear Sir: In reply to your letter of the first instant, I am very sorry to learn that you had such a serious accident in the shape of a fire at the North Carolina Station.

"I am very sorry to have to inform you that it is impossible for me to supply you any cowpea seed as our supply is entirely exhausted. Quite a number of the soybeans are also exhausted but I have on hand a number of those sent you and am forwarding as many as I have. In some of the lots there is more than four pounds, while in others there is not so much as that. I have not the exact weights and am merely sending you the list and you can then get the weights yourself when you receive the seed: The list is as follows:

#16790 Cloud.
#17253 Nutall.
#17256 Brownie.
#17261 Guelph.
#17267 Tokio.
#17278 Hollybrook.
#17861 Ebony.
#19186 Guelph.
#19982 Flat King.
#19984 (Unnamed).
#19985 Haberlandt.
#21731 Mammoth.

"I trust this seed will reach you in good condition and be of service to you in your work this 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–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.

98. Williams, C.B. 1908. Re: The soy beans just arrived. Letter to Mr. H.T. Nielsen, Bureau of Plant Industry, Washington, DC, June 8. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: The twelve lots of varieties of soy beans which you sent us on June 3 have been received. We appreciate very much your kindness in supplying these the second time. We were exceedingly sorry that it was not possible for you to supply us with extra lots of varieties of 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–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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

99. Morgan, H.A. 1908. Re: Growers of soybeans in Tennessee. Letter to Mr. H.T. Nielsen, Bureau of Plant Industry, U.S. Dept. of Agriculture, Washington, D.C., June 20. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I beg to acknowledge your letter of the 13th, which came during my absence. I should advise you to stop off at Hickory, North Carolina. The Hickory Milling Company handle a great many soy beans, and they could locate a great many growers for you We have a pretty good grower at Columbia, Tennessee, Mr. W.P. Ridley. There is another, Mr. James H. Tolley, at Mulberry, Tenn. The Koger people at Rogersville are growing as much as 50 acres this year.

"Do you know anything about the Farquar peavine thresher, made at York, Pennsylvania?

"We shall be glad to have you visit us on your trip around.

"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. S.C.–Tenn. Box no. 33.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Prof., Tennessee Experiment Station, Knoxville, TN.

100. Itinerary of H.T. Nielsen. 1908. Washington, DC: Bureau of Plant Industry, USDA. 1 p. July 11. Unpublished typescript.

• ***Summary:*** H.T. Nielsen, Scientific Assistant, Bureau of Plant Industry, USDA, will travel (probably by train) in connection with his work on forage crops from July 13 to Aug. 9, visiting the following places in this sequence:

From Washington, DC to Hickory, North Carolina.

Rogersville, Tennessee. Morristown, Tennessee. Knoxville, Tennessee. Nashville, Tennessee. Columbia, Tennessee. Fayetteville, Arkansas. Chattanooga, Tennessee. Cleveland, Tennessee. Atlanta, Georgia. Auburn, Alabama. Mt. Airy, Georgia. Atlanta, Georgia. Bullochville, Georgia. Louisville, Georgia. Blackshear, Georgia. Savannah, Georgia. Augusta, Georgia. Batesburg, South Carolina. Raleigh, North Carolina. Elizabeth City, North Carolina. Tyrell and Hyde, Connecticut. Moyock, North Carolina. Return to Washington, DC.

Location: National Archives, 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.

101. Nielsen, H.T. 1908. Re: Soybeans and cowpeas. Letter to Prof. C.V. Piper, Seed Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC, July 19. 6 p. Handwritten, with signature on hotel letterhead.
• ***Summary:*** Nielsen is writing from The Duncan hotel (L.C. Garrabrant, American plan) in Nashville, Tennessee. “Dear Prof. Piper:... I visited with the Hickory Seed Co. [Hickory, North Carolina] Tuesday and has a very pleasant day as they are good people. They confidently expect to handle 50,000 bushels of soybeans and if season is favorable 100,000 bushels of cowpeas this year. The soys they are having grown by contract in eastern North Carolina and I will visit that section. Mr. Shuford, the manager of the company, is going to accompany me on that trip... Around Hickory there are very few soys grown but lots of peas. That is a general condition in the entire western part of the state. They say there is no trouble in keeping soys for a reasonable length of time if they are thoroly [sic] dried out to begin with. On account of the high oil content Mr. Shuford says (and Dir. Morgan says the same) they will seldom germinate much the second season.

“Mr. John Robinson, a dairyman near Hickory and a good man wants to try some vetch this fall. Kindly write him.

“At Rogersville, Tennessee, there is a greatly increased interest in soybeans over what I found last year. Koger’s people are growing about 50 acres, and many others are growing quite a number. The plants are small yet but looking fine.”

“This is the first year there has [sic] been any soybeans grown around Morristown, Tennessee, and I believe I saw 100 acres around there Friday. O.B.R. Fox has about 20 acres of as fine looking soys as I have ever seen. Mr. S.V. Wheeler has between 40 and 50 acres and with the exception of a poor stand in a few places, a fine looking crop. He is a dairyman and growing the crop for cow feed.”

“At Knoxville I had a very pleasant day with Dir. Morgan. He is more enthusiastic than ever about soybeans and thinks they will eventually largely take the place of cowpeas.

“In his acre test last fall corn produced 200#, peas 400# and soybeans 543# [pounds]. He says one of the drawbacks of soybeans is difficulty in getting a stand, and that Mammoth is about the worst variety is this respect. The difficulty lies in planting too deeply and not using enough seed. He advises using ½ bushel seed per acre in 30 or 36 inch rows. Acme, Shanghai, Edward and Tokio are doing fine, looking much better now than Mammoth, but Morgan says he won’t pass judgment on them yet.” Nielsen.

Note: This is the earliest document seen (Aug. 2013) that mentions the soybean varieties Edward, or Shanghai.

Location: National Archives, 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].

102. *Orange County Observer* (*Hillsborough, North Carolina*). 1908. Science. July 30. p. 1, col. 6.
• ***Summary:*** “’Vegetable milk’ is used in Japan. It is made from the soja bean. The liquid is exactly like cow’s milk in appearance, and in taste can hardly be distinguished from it. To make it the beans are first soaked and then boiled in water. Some sugar and phosphate of potassium are added, and it is boiled down till it has the consistency of Condensed milk.”

103. 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].

104. Wood (T.W.) & Sons. 1908. Descriptive catalogue and guide for the farm & garden (Mail order, with order form). Richmond, Virginia. 88 p. 25 cm.
• ***Summary:*** In the section on "Seeds of Special Value" (p. 8) is a 2-inch section in one column that states: "Ito San Soja Beans. This has been one of the most popular varieties for northern and western growing. It is two weeks earlier to mature than the Hollybrook Sojas, but does not make as large or leafy a growth. It is very productive, however, in yield of beans, and for early crop or for late planting, or for growing in districts where the seasons are shorter than in this section, the Ito San is of considerable value. It is similar in size, shape and color of beans to our Hollybrook Sojas. Price: Per pkt. 10 cts.; quart 20 cts.; peck 90 cts.; bushel $3.00."

In the section on "Seeds for the farm" (p. 81) two thirds of the page is devoted to "Mammoth Yellow Soja Beans," "Soja Beans Inoculated," and "Hollybrook Early Soja Beans." There are two testimonial letters for Mammoth Yellow from: (1) R. Emmett Rogers, Nansemond County, Virginia (25 Oct. 1907). (2) C.A. Coppedge, Northumberland County, Virginia (1 March 1907). And a letter advocating Hollybrook from: N.E. Scales, Rowan County, North Carolina (22 Oct. 1905).

An illustration shows a soybean plant in full leaf, with some pods in the upper left corner.

This catalog is owned by the Smithsonian Horticulture Branch Library in Washington, DC. Call number: #015520. Address: Richmond, Virginia.

105. Williams, C.B. 1909. Re: Request for cowpeas and soy beans for variety tests. Letter to Prof. H.T. Nielsen, Bureau of Plant Industry, Washington, DC, Jan. 23. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: If possible, we should like to secure from you enough seed to plant from one-tenth to one-fifth of an acre of some fifteen or twenty of the leading varieties of cowpeas grown in the South. We should also appreciate securing through you a number of varieties of soy beans for variety tests this year on the Station farm.

"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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

106. Piper, C.V. 1909. Re: Proposed variety trials with cowpeas and soybeans. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., Feb. 13. 2 p. Typed, without signature.
• ***Summary:*** "Dear Sir: I am in receipt of your letter of the 19th ultimo, addressed to Mr. Carleton F. Ball. and also your letter of the 23rd instant, addressed to our Mr. H.T. Nielsen. Both of these letters are in reference to the proposed varietal trials with cowpeas and soybeans. We have seed of a large number of varieties of cowpeas and soybeans, but for the most part in small quantities. Mr. Nielsen informs me, which I have confirmed by looking over our records, that we have supplied your station three times during the past two years with lots of both cowpeas and soybeans, which apparently were not given satisfactory treatment.

"Especially does this seem to have been the case last year. I do not say this in any spirit of criticism whatever, but I would like to be assured that if we supply you with lots of seed again for a varietal trial that they will be put in the hands of some one who will take are of them. Only in the cases of a few varieties could we send you sufficient seed to plant one-tenth of an acre. In the other cases there would perhaps be only a sufficient amount of seed for a row, but if you are interested in getting together a large collection of varieties of cowpeas for breeding or other purposes you could easily multiply the seed.

"In regard to the varieties that you wrote to Mr. Ball about, I may state that we no longer have them under these names. Some of these are identical with other varieties, and of the remainder we have only the records of their trials.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

107. Williams, C.B. 1909. Re: Request for cowpeas and soy beans for variety tests. Letter to Mr. C.V. Piper, Bureau of Plant Industry, Washington, DC, Feb. 16. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I am in receipt of your letter of February 13 in reply to enquiries which I made to Messrs. Ball and Nielson. You are correct in your statement that we have during the past two years secured seed of cowpeas and soybeans at three different times for our variety tests with these legumes. As we wrote you last year, the first lot which you sent us was destroyed in a fire which we had during the latter part of May in which our barn and manager's house were destroyed. The second lot of these which you sent us thereby were gotten into the ground late and after planting we had a long dry spell during which many of the seed rotted of both the cowpeas and soybeans. With some of the varieties we did not secure more than one-tenth of a stand, due to this cause. With the soybeans during the past year for this reason and the depredations of the rabbits, the test with these was a complete failure. It is our purpose this year to run as complete tests as possible with both soybeans and cowpeas. We expect to exert every effort possible this year, as in previous years, to secure a good growth of the different varieties and get fair comparison as to the relative value of the different varieties of each, both for the production of peas and cured hay. We would appreciate, therefore, the reception of any seed of either soybeans or cowpeas which you have in sufficient quantities to put out one-twentieth to one-tenth of an acre of each. In our work we prefer to conduct tests of all kinds on plats of not less than one-twentieth of an acre each. We are especially anxious to secure seed of a few leading varieties of soybeans.

"Any aid which you could render in this connection will be highly 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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

108. Piper, C.V. 1909. Re: Proposed variety trials with cowpeas and soybeans. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., Feb. 17. 2 p. Typed, without signature.

• ***Summary:*** "Dear Sir: I am in receipt of your letter of the 16th instant and am obliged to you for the explanation you have given regarding the failures with the cowpeas and soybeans during the preceding two seasons. I had gotten the impression from Mr. Nielsen, who has resigned from the Department, that the seeds that we had sent had not been given the care which they deserve, and it was on this account that I wrote you as I did.

"In regard to varieties, we have in the neighborhood of 200 varieties of soybeans and perhaps 100 varieties of cowpeas. A good many of these we have practically discarded and have just reserved a very small quantity of seed for a final test with them. The number that I could give you sufficient seed to plant one-tenth or even one-twentieth acre plots of either cowpeas or soybeans is small. Of the cowpeas I could furnish you enough seed of the Groit, Iron and Brabham to plant one-tenth acre plots. Of other varieties I doubt if I can supply you with more than enough for row tests. A good many, of course, can be secured through commercial sources, such as Clay, Black, Unknown, New Era, etc., but we will be unable to purchase any of such this year. Of those which cannot be secured through commercial sources, I shall be very glad to supply you with small packages, the size of which will depend on the amount of seed which we have, but in most cases it will be sufficient only for a row test.

"In the matter of soybean seeds we are better fixed, and can send you enough for one-twentieth acre plots of a considerable number of varieties. I would suggest that it might be wisest for you to grow three or four varieties of each group as regards maturity. We are recognizing groups as follow: extra early, early, medium, medium late, late, and very late. The valuable ones for North Carolina are the medium late and the late, though perhaps the very late ones are worthy of trial.

"Kindly let us know your wishes in this matter, and we will do the best we possibly can for you.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

109. Williams, C.B. 1909. Re: Request for cowpeas and soybeans for variety tests. Letter to Mr. C.V. Piper, Bureau of Plant Industry, Washington, DC, Feb. 20. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I have your letter of February 17 and note what you say in reference to your supply of cowpeas and soybeans for distribution among Station workers. It is our plan to buy upon the local market all the varieties of cowpeas which we can find and then supplement these by those which we can secure from the Bureau of Plant Industry or elsewhere. Therefore, if you can supply us with, enough seed of Groit, Iron, Brabham or any other uncommon varieties of cowpeas to plant one-tenth of an acre of each, we would be glad to receive them. In securing soybeans from the local markets we are not so fortunate usually as with cowpeas in securing any great number of varieties, therefore, we would appreciate receiving seed of fifteen or twenty of your leading varieties in sufficient quantities to plant at least one-twentieth of an acre to each variety. We should like to secure some of the extra early, early, medium, medium late, late and very late 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–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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

110. Piper, C.V. 1909. Re: Are you interested in soybeans? Letter to Prof. B.W. Kilgore, State Chemist. Experiment Station, Raleigh, N.C., March 24. 1 p. Typed, without signature.

• ***Summary:*** "Dear Professor Kilgore: Are you interested in soybeans? I am taking pleasure in sending you a list of 186 varieties that we grew at Arlington Farm [Virginia] last year, together with some notes regarding the same. In case you would be interested in trying out some of these varieties, I can furnish you seed of most of them for small plots. I regard it as an important matter to determine the best of these varieties for each section of the country so that only the best varieties may become introduced. There is, in my opinion, considerable danger involved in introducing any considerable number of varieties which I feel it important to keep down to the minimum, otherwise considerable confusion and loss is sure to result.

"I should be glad to know your wishes in this matter.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

111. Kilgore, B.W. 1909. Re: Thank you for offering to send soy bean varieties. Letter to Prof. C.V. Piper, Bureau of Plant Industry, Washington, DC, March 26. 1 p. Typed, with signature on letterhead.

• ***Summary:*** See letterhead above. "Dear Sir: I have your favor of the 24th in regard to soy beans. We are interested in these and if you will send us the varieties we shall be glad to make tests of them. If you have sufficient seed we could put them out in two places, one in the eastern and the other in the piedmont section of the State.

"With kind regards, 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: State Chemist, North Carolina Dep. of Agriculture, Raleigh.

112. Jet: New U.S. domestic soybean variety. 1909. Seed color: Black.

• ***Summary:*** Sources: Hopkins, C.G. 1909. Re: Request for soybean varieties. Letter to C.V. Piper, Bureau of Plant Industry, Washington, DC, March 31. 1 p. Hopkins (at the

Agric. Exp. Station, Urbana, Illinois), in response to a letter from Piper dated March 24, is writing to request soybean varieties. "I would like especially to try varieties with pods borne high enough so as to permit harvesting with a machine." Handwritten on the bottom of Hopkins's letter (probably by Piper) is "8 Jet 17861"–which probably means to send Hopkins (or O.D. Center) 8 packets, lots, or seeds of the variety Jet, to which Piper and co-workers have given the number 17861 for use in identification.

Center, O.D. 1909. Re: Request for soybean varieties. Letter to C.V. Piper, Bureau of Plant Industry, Washington, DC, April 1. 1 p. Center (also at the Agric. Exp. Station, Urbana, Illinois) says: "We are particularly interested also in the 'long legged' varieties of which you speak. We feel that the main reason why the farmers of Illinois have failed to take hold of the growing of soybeans has been because of the difficulty they found in harvesting. The 'long-legged' varieties will certainly aid in this matter." He orders seed of the many varieties including "18761 Jet."

Piper, Charles V.; Morse, W.J. 1910. "The soy bean: History, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 187. 84 p. Dec. 31. See p. 49. Seed color: Black. S.P.I. No. 17861. "From Sachon, Chihli, China, 1906... Grown four seasons. A variety said to be grown for fodder and considered an excellent food for stock."

Etheridge, W.C. 1912. "Report of Division of Agronomy." *North Carolina Agric. Exp. Station, Annual Report* 34:16-18. For the year ended June 30, 1911. Page 17-18 state: Among the varieties of soy beans tested in 1910, Jet was one of the top-yielding varieties, with 19.5 bushels per acre. It is among the earliest maturing varieties. Jet does not ripen uniformly and because of this, it is practically impossible to gather all its seeds because the pods that are more forward in ripening split and shatter their seed before the other pods mature. Jet would make an excellent pasture for hogs; it grows in short, thick, heavily fruited bunches, and if planted with a drill or broadcast would make a very heavy yield of seed.

113. Piper, C.V. 1909. Re: How much soybean seed can you use? Letter to Prof. B.W. Kilgore, State Chemist. Experiment Station, Raleigh, N.C., April 2. 1 p. Typed, without signature.
• ***Summary:*** "Dear Professor Kilgore: I have your letter of the 26th ulto. [ultimo] in regard to the soybeans but you make no mention of the quantity of seed that you can use. I might state that of most of the varieties I can send you a half pound of seed and of many more. Of a considerable number I can send you seed up to any reasonable amount. There is also a portion of the list of which I can only send you an ounce or two of seed; these from the selections as indicated by the lettered numbers.

"Please let me hear from you at once in regard to this matter so that I can have the packages put up so as to reach you by the middle of the month.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

114. Kilgore, B.W. 1909. Re: We could use one pound of each variety of soy beans. Letter to Prof. C.V. Piper, Bureau of Plant Industry, Washington, DC, April 3. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: I have your favor of the 2nd. One pound will be sufficient seed for us of the various varieties of soy beans and where you do not have this quantity, send us what you can.

"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: State Chemist, North Carolina Dep. of Agriculture, Raleigh.

115. Piper, C.V. 1909. Re: Sending you varieties of soybeans. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., April 6. 1 p. Typed, without signature.
• ***Summary:*** "Dear Sir: I am just now arranging for the distribution of varieties of soybeans. I can send you a considerable number of varieties for one-twentieth or one-tenth acre plots and will be glad to learn from you how many varieties you would care to grow in this way. I can send you seed so as to reach you about the 20th.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

116. Piper, C.V. 1909. Re: Sending you 3 pound packages of the soybean varieties you requested. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., April 6. 1 p. Typed, without signature.

• ***Summary:*** "Dear Professor Williams: I have your letter of April 9 in reference to varieties of soybeans. I shall take pleasure in sending you within a few days three pound packages of varieties as follows:

Mammoth #25093
Mammoth #25162
Tokio #17264
Acme #14594
Hollybrook #17278
Ebony #17254
Wilson #19183
Flat King #17252
Morse "19186
Jet "17861
Kingston #17255
Meyer #17852
Haberlandt #17271
Guelph #17261
Amherst #17275
Barchet #23336

"I shall be much interested in your trial of these varieties and hope to have the pleasure of visiting you when they are at their best.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

117. Piper, C.V. 1909. Re: Adsuki beans. Letter to Prof. B.W. Kilgore, State Chemist. Experiment Station, Raleigh, N.C., April 7. 1 p. Typed, without signature.

• ***Summary:*** "Dear Professor Kilgore: For several years we have been conducting investigations on the adsuki bean (*Phaseolus angularis*) of which there are many varieties. At Arlington Farm [Virginia] last year the six best yielded at the following rates per acre:

"#9419–27.3 bushels.
"16791–22.9 bushels.
"17323–21.1 bushels.
"17324A–24.6 bushels.
"17847–26.4 bushels.
"17851–24.8 bushels.

The stands on the last two numbers were imperfect. Allowing for this the yield of #17847 would have been 10 per-cent greater and of #17851 15 per-cent greater. The seeds of these adsuki beans are smaller and much harder than the soybeans so that they would undoubtedly have to be ground in feeding. I am in considerable doubt as to whether this can compete with the soybean as a grain crop but the showing they make is such that it is well worthy of trial. I am wondering if you can arrange to grow 1/10 or 1/20 acre plots of each of these six numbers? If you can do so, or even smaller plots, I shall be very glad to send you the seed.

"Yours very truly,..."

Note: Did Prof. Piper not realize that adsuki [azuki] beans are almost always used as human food in East Asia (especially Japan) and almost never used as animal feed?

Location: 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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

118. Piper, C.V. 1909. Re: Adsuki beans. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., April 7. 1 p. Typed, without signature.

• ***Summary:*** "Dear Professor Williams: For several years we have been conducting investigations on the adsuki bean (*Phaseolus angularis*) of which there are many varieties. At Arlington Farm [Virginia] last year the six best yielded at the following rates per acre:

"#9419–27.3 bushels.
"16791–22.9 bushels.
"17323–21.1 bushels.
"17324A–24.6 bushels.
"17847–26.4 bushels.
"17851–24.8 bushels.

The stands on the last two numbers were imperfect. Allowing for this the yield of #17847 would have been 10 per-cent greater and of #17851 15 per-cent greater. The seeds of these adsuki beans are smaller and much harder than the soybeans so that they would undoubtedly have to be ground in feeding. I am in considerable doubt as to whether this can compete with the soybean as a grain crop but the showing they make is such that it is well worthy of trial. I am wondering if you can arrange to grow 1/10 or 1/20 acre plots of each of these six numbers? If you can do so, or even smaller plots, I shall be very glad to send you the seed.

"Yours very truly,..."

Note 1. Did Prof. Piper not realize that adsuki [azuki] beans are almost always used as human food in East Asia (especially Japan) and almost never used as animal feed?

Note 2. Prof. Piper sent an identical letter to Prof. Kilgore at the same place, on the same 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 Agricultural

Experiment Stations, 1899-1928. North Carolina. Box 26. P.I. 66, Entry 68.

Sent to Soyinfo Center by Matthew Roth, Dec. 2016. Address: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

119. Piper, C.V. 1909. Re: Mammoth soy beans. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, April 8. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Mooers: This year we purchased two lots of Mammoth soy beans, one from the Hickory Seed Co., Hickory, North Carolina, and the other from W.P. Ridley, Columbia, Tennessee. The seed of these two lots looks quite different, in fact, all of the Tennessee seed I have seen is smaller and greener in color than that of the North Carolian seed or that which we have grown here in Arlington. It will be interesting to determine whether these are differences in variety or simply due to differences in climate. I am anxious that you grow both of these strains this season and will supply you with seed of both of them to any reasonable amount. The point may be one of some importance.

"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.

120. Williams, C.B. 1909. Re: Request for soybeans for variety tests. Letter to Mr. C.V. Piper, Bureau of Plant Industry, Washington, DC, April 9. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: Of the varieties of soybeans which you now have for distribution we will not care to have forwarded to us more than 12 to 15 of the leading varieties. We should like to have these in sufficient quantities so that we might put out one-tenth [double underlined] of an acre plat to each variety.

"Yours very truly,..."

Note 1. Below Williams' signature, filling the bottom half of the letter, in two columns, in large and rather hard-to-read handwriting, is written:

3 # [pounds] each
Mammoth 25093
Mammoth 25162
Tokio 17264
Acme 14594
Hollybrook 17278
Ebony 17254
Wilson 19183
Flat King 17252
Morse 19186
Jet 17861
Kingston 17255
Meyer 17852
Haberlandt 17271
Guelph 17261
Amherst 17275
Barchet 23336

Note 2. These names and numbers were probably written by Piper or an associate of his–not by Williams.

Location: 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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

121. Piper, C.V. 1909. Re: Sending you soybean varieties. Letter to Prof. B.W. Kilgore, State Chemist. Experiment Station, Raleigh, N.C., April 13. 1 p. Typed, without signature.

• ***Summary:*** "Dear Professor Kilgore: We are shipping you today from the office a list of varieties of soybeans mostly in one pound packages. In some cases the packages are larger and in quite a number of instances we are only able to send you one quarter of a pound.

"I shall be much interested in your trial of these and hope to have the pleasure of seeing them when they are at their best.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

122. Newman, C.L. 1909. Re: Thank you for kudzu seed. Request for soybean seed. Letter to Dr. C.V. Piper, Agrostologist, Dept. of Agr. [USDA], Washington, DC, April 16. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "My dear Dr. Piper: Your letter of the 10th inst. and package of Kudzu seed are received for which I thank you. As regards the soy beans, will say that one half a pint of seed of each variety will answer my purpose, since I am growing them primarily for class work. As to the number of

varieties I believe that six or eight or ten at the outside will be sufficient. I would like to have these as widely different as possible and would prefer having two or three of the varieties that have generally succeeded best in the south including Ito San and Hollybrook. Thanking you for these, I am,

"Yours very truly,..."

Note: Below Prof. Newman's signature the following list of soybean varieties is handwritten. It seems likely that Dr. Piper wrote this, then crossed out Tashing and Morse.

1/4 # each
Tashing 20854
Nuttall 17253
Cloud 16790
Guelph 17261
Ito San 17268
Mammoth 17280
Amherst 17225
Morse 19186
Acme 14594

Location: 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: M.S., Prof. of Agriculture, School of Agriculture, North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

123. Williams, C.B. 1909. Re: Thank you for the packages of soybeans. Letter to Prof. C.V. Piper, Bureau of Plant Industry, Washington, DC, April 24. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: The three-pound packages of 16 varieties of soybeans which you sent us recently have been received for which please accept our thanks. We will to glad to have you visit us later in the year to see what the different varieties are doing on our experimental grounds.

"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: Director, Agric. Exp. Station of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh [North Carolina].

124. Piper, C.V. 1909. Re: Sending you quarter-pound packages of the soybean varieties you requested. Letter to Prof. C.L. Newman, Experiment Station, West Raleigh, N.C., April 26. 1 p. Typed, without signature.
• ***Summary:*** "Dear Professor Newman: I have your letter of the 16th instant relative to the soybeans you desire. I am taking pleasure in sending you a quarter-pound package of the following varieties:

#17253. Nuttall.
16790. Cloud.
17261. Guelph.
17268. Ito San.
17280. Mammoth.
17275. Amherst.
14954. Acme.

"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: Agrostologist [Bureau of Plant Industry, Washington, D.C.].

125. Hall, G.H. 1909. Farm and farmers: Farm correspondence. Replanting cotton with peas. *Atlanta Constitution* (*Georgia*). May 31. p. 10.
• ***Summary:*** "I have read your remarks in the last *Constitution* regarding replanting the missing hills with cowpeas... I now replant all my missing hills with soy beans. These grow upright and the more manure, in reason, the more beans they make–in fact I find the soy bean the best crop I make and if cut before they mature the seed are equally as good as a soil improver as the cow pea."

Answer: Yes, the soja bean does best when the ground is rich or highly fertilized. "But how does Mr. Hall utilize the soja bean crop–pick off the seeds or cut and cure and thresh out the seed?" Address: Red Springs, Robinson County, North Carolina.

126. Hall, G.H. 1909. Farm correspondence: Soja beans–How to use them. *Atlanta Constitution* (*Georgia*). Aug. 30. p. 10.
• ***Summary:*** "In response to your request, I give my method of gathering Soja beans. When planted in rows for seed, I cut with a mower, when the pods turn yellow, and cure as I do peavine hay. When replanting cotton with them, I use a corn knife. I have so far had no trouble to cure them. After a few days' sun I haul to barn and thrash out with flail when I need them for seed. Don't put off cutting too long, as they shatter out badly when too ripe. I planted between my corn this year, and have them 4 feet high, filled with fruit, and consider them far superior to cowpeas as a forage crop, but not so good for land improvement, unless cut before the fruit matures. They are fine feed for stock, especially for

young growing calves and pigs, making bone and muscle. A fair crop is about 20 to 25 bushels per acre. Next year I shall plant them after oats, and think in this latitude they will easily mature before frost."

Note: This is the earliest English-language document seen (Oct. 2006) that uses term "peavine hay" to refer to the hay of the cowpea plant (*Vigna unguiculata* (L.) Walp.). Address: Red Springs, North Carolina.

127. Piper, Charles V.; Nielsen, H.T. 1909. Soy beans. *Farmers' Bulletin* (*USDA*) No. 372. 26 p. Oct. 7. Revised in 1916. [10 ref]

• ***Summary:*** Contents: Introduction. Climatic and soil requirements of soy beans. Varieties of soy beans (12): Mammoth (yellow); Hollybrook (yellow); Ito San (yellow); Guelph (green); Buckshot (black); Ogemaw (brown); Wisconsin Black; Wilson (black); Meyer (mottled black and brown); Austin (greenish yellow); Haberlandt (yellow); Riceland (black). The culture and planting of soy beans. The inoculation of soy beans. Soy beans for hay: Curing the hay. Soy beans for pasturage. Soy beans in mixture: Soy beans and cowpeas, soy beans and sorgo, soy beans and millet, soy beans and corn. Soy beans for ensilage. Soy beans for grain. Soy beans in rotations. Feeding value of soy beans: Feeding value for sheep, feeding value for dairy cows, feeding value for hogs. Storing soy-bean seed. Comparison of soy-bean grain and cotton-seed meal. Comparison of soy beans and cowpeas. Summary.

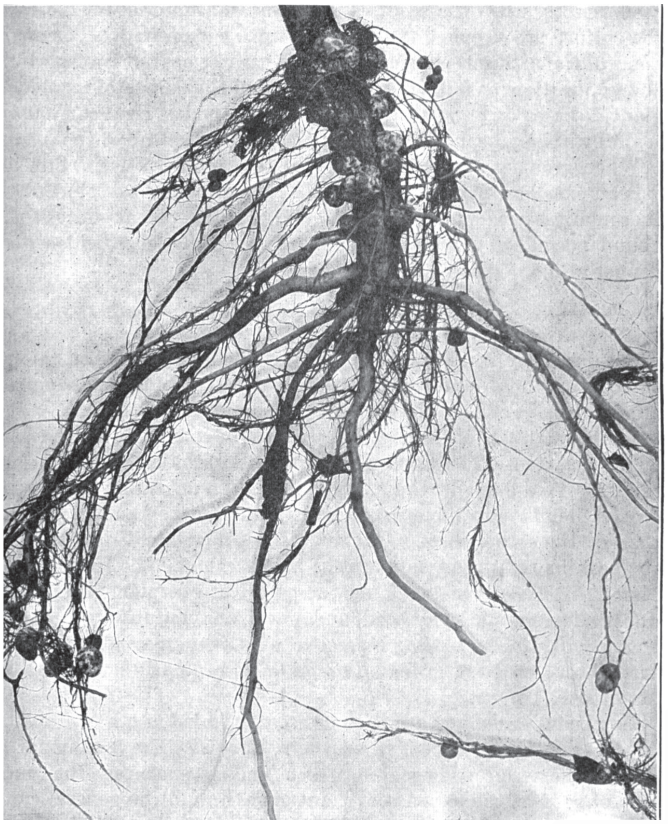
The bulletin begins: "The soy bean, also called the 'soja bean' (fig. 1), is a native of southeastern Asia, and has been extensively cultivated in Japan, China, and India since ancient times. Upward of two hundred varieties are grown in these countries, practically every district of which has its own distinct varieties. The beans are there grown almost entirely for human food, being prepared for consumption in many different ways. Their flavor, however, does not commend them to Caucasian appetites and thus far they have found but small favor as human food in either Europe or America.

"As a forage crop, however, soy beans have become of increasing importance in parts of the United States, especially southward. They have been tested at most of the State agricultural experiment stations, and it is clear that their region of maximum importance will be south of the red clover area and in sections where alfalfa can not be grown successfully. They thus compete principally with cowpeas, but as cultivation is usually required they fill a somewhat different agricultural need. Their culture has greatly increased in recent years, especially in Tennessee, North Carolina, Virginia, Maryland, Kentucky, and the southern parts of Illinois and Indiana [though no statistics are given]. It seems certain that the crop will become one of great importance in the regions mentioned and probably over a much wider area. The earlier varieties mature even in

Minnesota, Ontario [Canada], and Massachusetts."

"Soy beans are also decidedly drought resistant, much more so than cowpeas, and but for the depredations of rabbits would be a valuable crop for the semiarid West. Rabbits are exceedingly fond of the foliage, and where they are numerous it is nearly useless to plant soy beans unless the field can be inclosed [sic] with rabbit-proof fencing."

At the present time seven varieties of soy beans are handled by American seedsmen: Mammoth (yellow seeds), Hollybrook (yellow), Ito San (yellow), Guelph (also called Medium Green, Medium Early Green, Large Medium Green), Buckshot (black; a very early variety handled by northern seedsmen), Ogemaw (brown), and Wisconsin Black. A detailed description, with a photo showing the seeds and pods, is given of each. The best of the new varieties, most of which will be available in 1910, are: Wilson (black), Meyer (mottled black and brown), Austin (yellowish green), Haberlandt (yellow; the seed is considerably larger than that



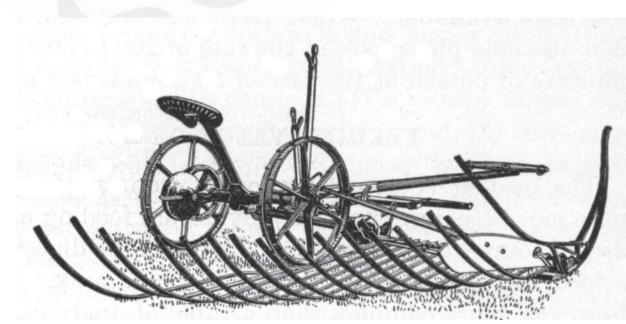
of any of the other yellow-seeded varieties), and Riceland (black).

"During the past three years more than two hundred additional varieties have been introduced from China, Japan, and India, most of which have already been sufficiently tested to give some idea of their value. Many of the new varieties are so superior in various respects that they are certain to replace all of the above-named varieties except Mammoth and, perhaps, Ito San."

A table (p. 23) gives a nutritional analysis of seven varieties of soy beans: Austin, Ito San, Kingston, Mammoth, Guelph, Medium Yellow, Samarow.

Illustrations (line drawings) show: (1) A typical soybean plant with leaves, pods, roots and nodules (p. 5, by Boetcher).

(2) A bunching attachment on an ordinary mower for bean harvesting (p. 19). Photos show: (1) A plant of the Mammoth variety of soy bean (p. 6). (2) Seeds and pods



of seven varieties of soy beans (full size; p. 8). (3) A man standing in a field of the Mammoth variety of soy bean in North Carolina (p. 9).

(4) Roots of a Mammoth variety of soy bean with characteristic nodules (p. 13).

Note 1. This is the earliest document seen (Nov. 2016) stating that USDA has tested nearly 200 soy bean varieties during the past three years.

Note 2. This is the earliest publication seen (April 1917) in which H.T. Nielsen is an author.

Note 3. This is the earliest publication seen about soybeans (April 1917) in which H.T. Nielsen is an author. Address: 1. Agrostologist in Charge; 2. Scientific Asst. Both: Forage Crop Investigations, USDA Bureau of Plant Industry, Washington, DC.

128. Bagley, Dudley Warren. 1909. Personal papers (Archival collection). *
• ***Summary:*** Dudley Warren Bagley lived 1889-1964. His personal papers, No. 3338 stored in 5 cartons, cover the years 1846 to 1964, primarily in the states of North Carolina and Washington, DC. The collection contains extensive papers relating to the growing and marketing of soybeans and the development of new varieties. Part of the Highland Farm Series.

This archival collection is in the Southern Historical Collection, CB #3926, Wilson Library, UNC-Chapel Hill, Chapel Hill, North Carolina 27514-8890. John E. White is the Reference Archivist (June 1997). Address: North Carolina.

129. Ames, A.F. 1910. Corn fodder at the south (Letter to the editor). *Rural New-Yorker* 69(4031):120. Jan. 29. Oversize.
• ***Summary:*** "I am much pleased to see Prof. Massey's change of base on the method of raising corn fodder in the South, as shown by his article Corn Fodder vs. Corn Stover' on page 1102. I am a Northern man who has lived south 22 years. I have followed both methods of saving fodder. I generally find it best for a new comer to copy the local methods at first, and experiment lightly with new methods."

"... the finest crop of peas grown in this country was grown on poor land broadcast, but the land had a good application of barnyard manure. I believe that it is not necessary to inoculate for Soy beans or peanuts on land that has grown cow peas; at least it has not been with me, the roots of both plants being literally covered with nodules, those on the Soy bean often being as large as a Canada pea. I believe for the three above crops basic slag is the best form of phosphoric acid. I grow cover crops everywhere and hope in a few years to get along without buying nitrogen, but cannot do it yet.

"A.F. Ames, North Carolina." Address: North Carolina.

130. Drew, J.W. 1910. Farm correspondence: Soybeans in

corn. *Atlanta Constitution* (*Georgia*). May 2. p. 10.
• ***Summary:*** Drew asks: "(1) About how long will soybeans stay in the pod after maturing if left in field? (2) When planted between corn, do you think they would make more hog feed than cowpeas?

"Answer–(1) The soy bean pods commence to pop open and scatter their contents all about in a very few days after they become fully ripe, which makes it necessary to harvest the crop before all of the pods are ripe. This feature I found to be the principal objection to the crop when I planted the beans forty years ago. But the shelled beans will lie on the ground without rotting a considerable time–much longer than would cowpeas of the common varieties–depending on weather.

"(2) I do not think soybeans will give more hog feed when planted between the corn than will cowpeas. I prefer the latter for so planting." Address: Rose Hill, North Carolina.

131. Gordon (L.S.). 1910. The Gordon Pea Thresher and Harvester (Ad). *Tar Heel* (*Elizabeth City, North Carolina*). Aug. 5. p. 4.

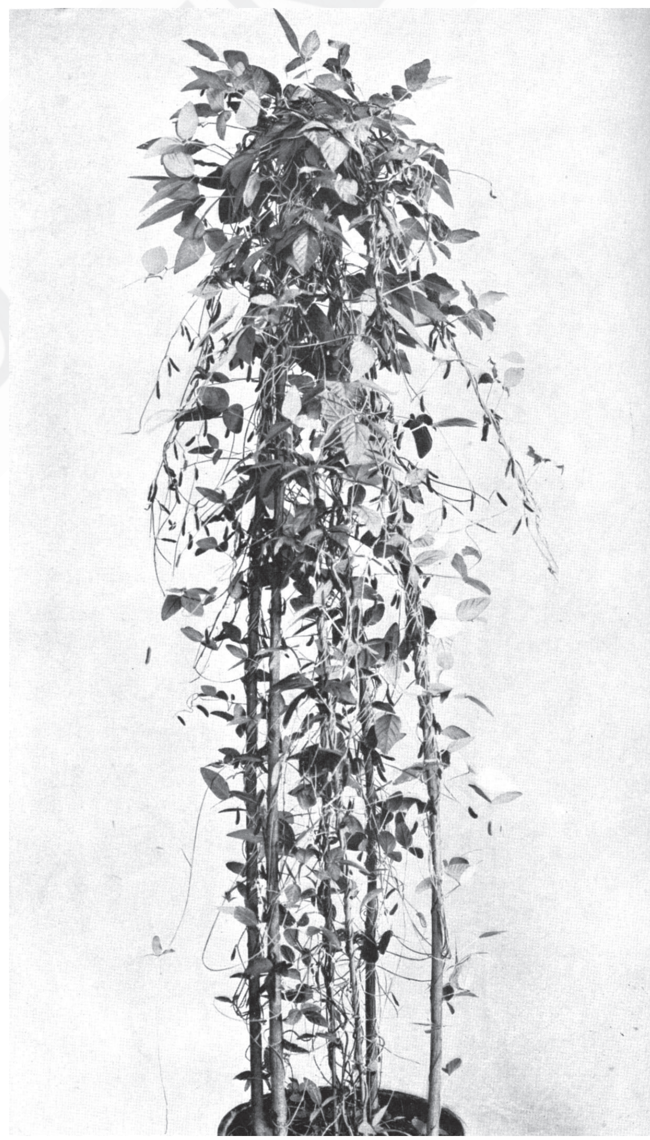

The Gordon Pea Thresher and Harvester
only successful Stock Pea or Soja Bean harvester made.
Sold under a full guaran tee for $100.00 cash or on time by
L. S, Gordon
Elizabeth City, N. C.

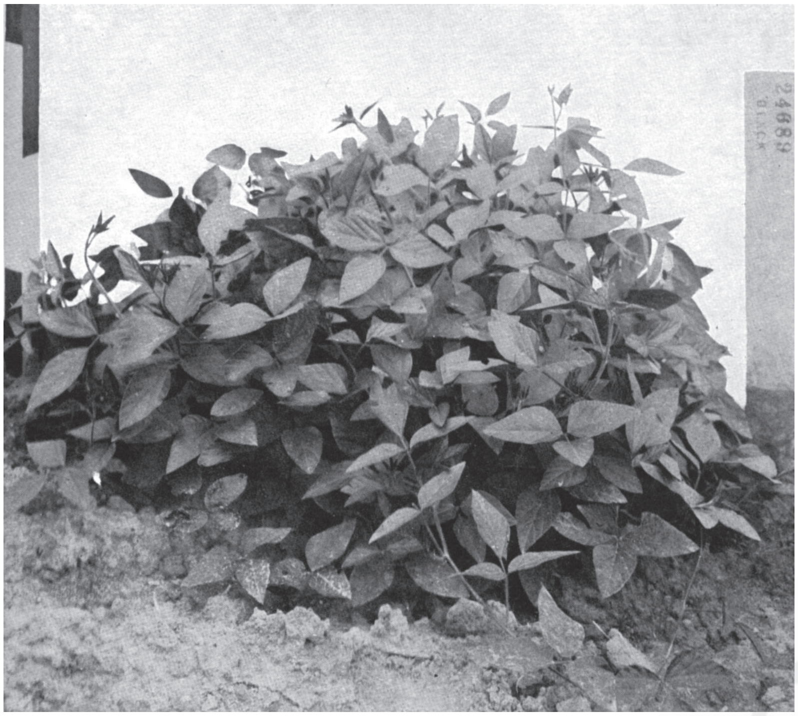
• ***Summary:*** Note: This ad seems to imply that "Stock Pea" could be an alternative name for Soja Bean. Address: Elizabeth City, N.C..

132. Koger Pea & Bean Thresher Company. 1910. Cowpea thresher (Ad). *Progressive Farmer* (*The*) (*Raleigh, North Carolina*). Aug. 27. p. 5.
• ***Summary:*** "Threshes and cleans cowpeas and soy beans from mown vines as perfectly as any up-to-date wheat thresher does its work. Less than 2% of broken peas; leaves vines in fine condition for baling. Endorsed by Prof. Massey, Government Experts, State Experiment Stations. Made in two sizes. Just what Southern farmers have wanted for 20 years.

"Free Catalogue on request." Address: Morristown, Tennessee.

133. 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.

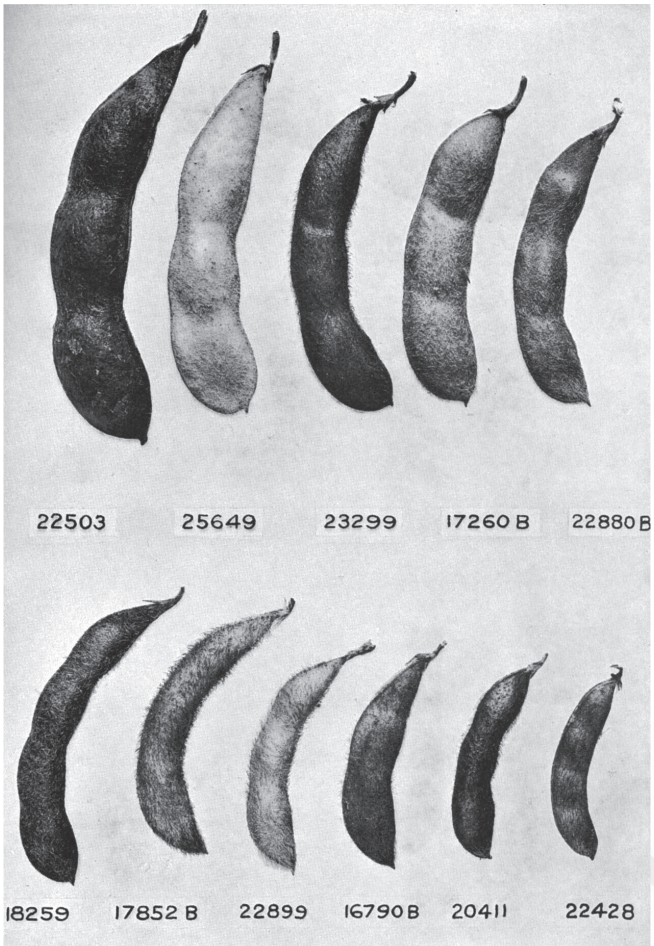
Of the 285 varieties in the five groups, 152 varieties (53.3%) have yellow (straw-yellow or olive-yellow) seeds, 55 varieties (19.3%) have black seeds, 44 varieties (15.4%) have brown seeds, 24 varieties (8.4%) have green seeds, and 10 varieties (3.5%) are bicolored).

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, 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." 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.

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.

134. 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.

135. 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.

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"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.

136. Gray, Dan T.; Ridgway, J.W.; Eudaly, E.R. 1911. Corn, soy bean pastures, tankage, cotton seed meal for fattening hogs. *Alabama Agricultural Experiment Station, Bulletin* No. 154. p. 41-87. Feb.

• ***Summary:*** "This bulletin records a summary of three

years' work in swine production. When corn was fed alone, unsatisfactory results were always secured; when corn was supplemented with a soy bean pasture, satisfactory results were secured." When a three-fourths ration of corn was accompanied by grazing of soy bean pasture, the average daily gains were raised by 1.329 pounds.

"When nothing was fed except corn, each 100 pound of pork cost $7.61. When a fourth, a half, and a three-fourths ration of corn was fed along with a soy bean pasture, the same gains were made for $0.85, $1.73, and $2.19, respectively (corn valued at 70 cents); when the cost of the pasture ($8.00 an acre) was also charged against the gains, each 100 pounds of pork was made at an expense of $2.59, $3.36, and $3.17, respectively." Address: 1. Animal Industry; 2-3. Asst. in Animal Industry.

137. Duggar, J.F. 1911. Re: Request for some soybeans to test. Letter to Prof. C.V. Piper, Dep. of Agriculture, Washington, DC, March 10. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I desire to obtain a number of bushels of soybeans for experimental use in different counties of the State. Are you able to give me the addresses of growers of the Late or Mammoth Southern Yellow? The stock of the Hickory Seed Co., Hickory, North Carolina, is exhausted.

"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 Prof. of Agriculture, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

138. 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.

139. Olson, Harry. 1911. Alfalfa meal for pigs (Letter to the editor). *Prairie Farmer* 83:31. Oct. 15.

• ***Summary:*** "Editor *Prairie Farmer:* The value of alfalfa as an animal food, in view of its high protein content, makes it a most important ingredient in the food of growing animals. An alfalfa mixture made with 75 per cent ground alfalfa meal as a basis, and the balance of different concentrates so blended as to give 20 per cent protein and 5 per cent fat has been found by experience to be a most economical food for young pigs for the first six months."

"With the beginning of the sixth month, the per cent of carbohydrates should be gradually increased until at the beginning of the seventh month the pig is getting all the carbohydrates he can assimilate. These can be added to the alfalfa mixture in the form of corn meal, barley meal, molasses, macaroni wheat flour, or soja bean meal as the market conditions for each will justify." Address: Porter Co., Indiana.

140. Li, Yu-ying; Grandvoinnet, L. 1911. Le soja [The soybean]. *Agriculture Pratique des Pays Chauds* (*Bulletin du Jardin Colonial*) 11(103):270-94. Oct. [43 ref. Fre]

• ***Summary:*** Contents (continued): The needs of the soybean (continued): Fertilizer (influence of fertilizer, organic fertilizer, minerals, nitrate of soda {*nitrate de soude*}, potassium chloride {*chlorure de potassium*}, phosphate fertilizers), preparation of the soil, the place of the soybean in rotations. 3. Sowing soybeans: Study of the seeds (weight of seeds, germinative faculty, selection of seeds), time of planting, spacing of the plants, depth of sowing, quantity of seeds to use per hectare, method of sowing. 4. The soybean during its vegetative stage: Germination, transplanting, types of maintenance, irrigation, flowering and fructification, enemies of the soybean (*Ennemis du soja;* insects [especially the larva of the spring beetle, *Agriotes segetis*], the caterpillar of *la Vannessa Cardue* (*Belle dame*), rabbits or hares, field mice and hamsters).

5. Soybean harvest: Time of harvest (for forage, for seed), practical methods of harvest (for forage, for seed), threshing (and storage of the seed), yields (of forage, seed, reports from various countries and U.S. states, harvesting losses, yield of nutritive elements). 6. Fixation of atmospheric nitrogen by the soybean and improvement of

the soil. 7. The soybean in mixed cultures and intercropping: With corn, cowpeas, rice, sorghum, sugar cane, or millet. Contains various charts and tables from other sources.

Concerning germination: The emergence of soybeans is retarded in soils that are hard, dry, or poorly cultivated. You must then seek to have, in appropriate fashion, a sufficient loosening of the layer that covers the seeds.

Emerging from the soil generally takes place in a week under ordinary circumstances. The plant develops slowly at first then grows quickly.

The growth of the soybean plant is rapid and allows two harvests per year in some climates (such as North Carolina, Tunisia, and certain provinces in China). Address: 1. Counseiller de 1ere classe au Ministère de l'Agriculture de la Chine; 2. Ingénieur agricole (G.).

141. Ward, Artemas. 1911. The grocer's encyclopedia–Encyclopedia of foods and beverages. New York, NY: Published by the author. 748 p. Illust. (color). 29 cm.

• ***Summary:*** Soy-related entries: Bean (p. 49-54): "The bean of European history is the Broad or Windsor variety,..." "The principal beans of United States cultivation are the Kidney and Lima, both of them believed to be native to South America.

"The Kidney Bean is the Haricot of the French and in Great Britain is sometimes called the French bean." The many varieties can be classified into "tough podded" and edible podded." "The 'tough podded' class produces the bulk of the dried beans of commerce, variously known as 'Kidney Beans,' 'Navy Beans,' 'Marrow Beans,' 'Black Beans,' 'Turtle Beans,' etc., in many colors, shapes and sizes." "'Flageolets' are cultivated with special regard to the consumption of the fresh seeds or beans." To the "edible podded" class of kidney beans belong Wax or Butter Beans, the Cranberry Bean or Red Speckled Bean, String Beans, Snap Beans, French Beans. "Pea Beans are the Cowpeas of the agriculturist." "Among numerous other 'special' varieties are the Soy Bean (which see), Asparagus Bean, Frijole, Lab-lab (or Egyptian Kidney), Red Bean [Azuki?], and Scarlet Runner." Asparagus Beans are known as *Tou Kok* by Chinese gardeners in California.

"Catsup, Catchup, Ketchup: a word derived from the name of an East Indian pickle, which was formerly applied specifically to the boiled spiced juice from salted mushrooms, but is now freely attached to various sauces (sold both bottled and in bulk) which consists of the pulp–bottled, strained and seasoned–of various fruits, as tomatoes, green walnuts, etc." Note 1. At "Catchup" and "Ketchup" we are told to see "Catsup."

Locksoy ([Lock Soy], p. 346): "Rice boiled into a paste and drawn into threads, imported from China. It is used to thicken soups."

Nuts (p. 412-13): A table shows the nutritional composition of all major American nuts, including almonds, chincapin [chinquapin] or water chestnut, chufa (earth almond), cocoanut, peanut, and peanut butter. "Many special nut foods, such as malted nuts, meat substitutes, etc., have been devised and extensively advertised by manufacturers for general dietetic use and for the special needs of vegetarians and fruitarians. It is said that some of these products contain soy beans, but apparently the peanut is very important in their composition.

Sauces (p. 552-53): In bottled sauces, vinegar is the most common liquid ingredient. "Commercial sauces of the Worcestershire kind, if of good quality, generally have Soy (which see) as their chief character ingredient. A typical formula of Worcestershire-style includes, in addition to Vinegar and Soy, a considerable percentage of lime juice, onions and tamarinds and small quantities of garlic, fish (as anchovies or pickled herrings), red chilies and spices. The product, after cooking, is strained through fine hair sieves. Leicester Sauce resembles Worcestershire in general characteristics but is less pungent."

Soy (p. 576-577): "A brown sauce, valuable to the commercial sauce market, made from the Soy Bean, a native of Southeastern Asia [sic] and widely grown in China and Japan. The beans are boiled, mixed with ground wheat or other grain, salt, etc., and allowed to ferment for a month or 6 months. The liquid is then strained off and clarified. Molasses is frequently added. In appearance it resembles Worcestershire Sauce, of which it is an important ingredient. It should not be too salt [salty] or too sweet, and although thick and syrupy, should be clear. When shaken in a bottle or glass it should, if it is genuine, leave a bright yellow film on the glass. Being a very desirable article, it is often counterfeited."

Soy bean (p. 577): "Commercial and government circles, both in Europe and this country are devoting increased attention to the cultivation of the Soy Bean as a food product, as it contains a large percentage of protein and a fair amount of fat, thus resembling meat in general nutritive value. The cell-walls of the raw bean are very tough, but thorough cooking makes it readily digestible. Boiled with bacon and other fatty broths until soft and then seasoned, the result is a vegetable dish very pleasing to the average palate. If the beans are dry, a preliminary soaking to remove the skins is necessary.

"The Soy Bean is largely consumed in Japan, China and other parts of Asia as an adjunct to rice and other foods, taking the place of meat in the popular dietary. It is most popular in these countries in fermented form, the best known types being *Shoyu* or Soy Sauce; *Tofu,* a kind of cheese; *Miso,* Soy Bean 'Milk' [sic]; *Yuba,* the evaporated product of 'Miso" [sic], and *Matto* [sic, *Natto*]*,* a product obtained by simple fermentation of the boiled beans. The various degrees and styles of fermentation serve the double purpose of rendering the beans more easily digestible and producing new flavors, just as by the fermentation of milk and cream

we produce the different flavors of cheese.

Note 2. This is the earliest English-language document seen (Aug. 2013) that uses the term "Soy Bean 'Milk'" (regardless of capitalization) in to refer to soy bean milk.

"The plant is an annual, growing chiefly in bush form..." The different varieties are classified principally by the color of the beans: "Black, Yellow, White and Brown,... Types of all these four classes are grown to some extent in Germany, Austria, and Switzerland, and the first three also in this country, in North Carolina and other Southern States. Under favorable conditions a single plant may bear a hundred or more pods.

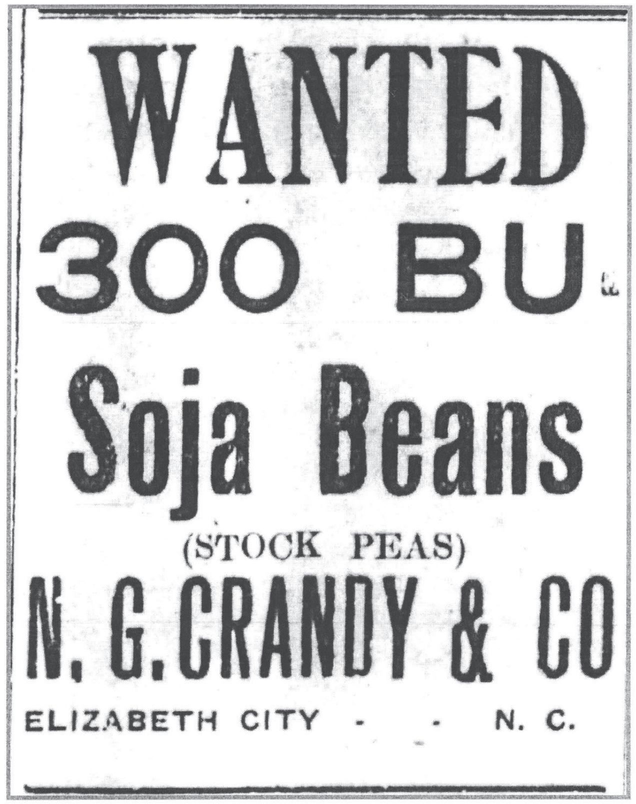
"Because of the fact that the beans contain little if any starch, they have been recommended as a desirable food for diabetics, and Soy Bean Bread and Soy Bean Meal are prepared for that purpose in Paris. The dried beans are also used in Switzerland and elsewhere as a coffee substitute." An illustration shows the top of a soy bean plant, with leaves, pods, and flowers.

Note 3. This book is full of fascinating information about the food system in the USA in 1911, with entries such as cold storage (first attempted in 1860, it has grown to extraordinary proportions), coloring matter (great improvements, no longer harmful), ice and refrigeration (ice manufacture dates from about 1870; today nearly 200 companies produce ice for general sale, mostly using the compressor and anhydrous ammonia). Dictionary of food names in five languages (English, French, German, Italian, and Swedish, p. 710-724) and a dictionary in English of "Culinary and bill-of-fare terms" (p. 741-45). Note: Soy is not mentioned in either the dictionary or the list of terms.

Note 4. The author, Artemas Ward, lived 1848-1925. His father was Henry Dana Ward (1797-1884), his grandfather was Thomas Walter Ward (1758-1835), and his great-grandfather was Artemas Ward (1727-1800), the first Commander-in-Chief of the colonial troops before the arrival of George Washington (a little-known Virginia planter) on 3 July 1775. Thereafter he served as second in command after Gen. Washington and was a Major General in the American Revolutionary War. Address: Formerly (from 1874) founder and editor of *The National Grocer,* 30 Union Square, New York.

142. Grandy (N.G.) & Co. 1912. Wanted 300 bu Soja Beans (Stock Peas) (Ad). *Advance* (*The*) (*Elizabeth City, North Carolina*). Jan. 19. p. 4.
• ***Summary:*** See upper right. Note: This ad strongly implies that "Stock Peas" is an alternative name for Soja Beans. Address: Elizabeth City, N.C..

143. Elizabeth City Oil and Fertilizer Co. 1912. Certificate of incorporation. Pasquotank County, North Carolina. 6 p. Unpublished manuscript.
• ***Summary:*** This certificate of incorporation, No. 10,204



was filed in Raleigh, North Carolina, on 27 June 1912, and recorded on 5 July 1912 by the clerk of the superior court, Pasquotank County.

A second document shows that on 2 Aug. 1912 the Elizabeth City Oil and Fertilizer Co. purchased land in this county for $3,600 dollars from the Foreman-Blades Lumber Co. It was located on Knobb's Creek near Lamb's Ferry Road. An exact surveyor's description of the location is given. Address: Pasquotank County, North Carolina.

144. Etheridge, W.C. 1912. Report of Division of Agronomy. *North Carolina Agricultural Experiment Station, Annual Report* 34:16-21. For the year ended June 30, 1911. See p. 17-18.
• ***Summary:*** Variety testing: Peas and beans. "Among the varieties of soy beans in 1910 Hollybrook, Haberlandt, and Jet were in the lead, 22.9, 22.5, and 19.5 bushels per acre. Jet, Guelph, Ebony, Amherst, Kingston, and Haberlandt are the earliest maturing varieties. Mammoth Yellow is a better variety for hay than any of the others. Jet, Amherst, Kingston, Haberlandt, and Guelph do not ripen uniformly and on this account it is practically impossible to gather all their seed because the pods that are more forward in ripening split and shatter their seed before the other pods mature. These varieties would make an excellent pasture for hogs. They grow in short, thick, heavily fruited bunches, and if planted with a drill or broadcast would make a very heavy yield of seed...

Fertilizer tests were done on corn and cotton with phosphate slag and phosphate rock. "Under test last year were [the commercial products] Solubilized Organic Nitrogen, Potash Manure, Beet Refuse Compound, and Calcium Cyanamid. These were tested in comparison with the better known nitrogenous materials, Dried Blood, Sulphate of Ammonia, and Nitrate of Soda." Peruvian Guano was also used.

Etheridge was later a soybean pioneer in Missouri.

Note: This is the earliest English-language document seen (Oct. 1999) that mentions the application of slag or phosphate slag, as a fertilizer, to soy beans. Address: Assoc. Agronomist [West Raleigh, North Carolina].

145. Tracy, S.M. 1912. Forage crops for the cotton region. *Farmers' Bulletin* (*USDA*) No. 509. 47 p. Oct. 11. See p. 29, 43-44.

• ***Summary:*** Forage crops include grasses, legumes, and miscellaneous (such as chufas), hay crops, pastures, silage crops, and soiling crops. In the section on "Legumes" (p. 21-33) are subsections on alfalfa, melilotus, red clover, alsike clover, crimson clover, bur clover, lespedeza or Japan clover, cowpeas, soy beans, velvet beans, vetches, Florida beggarweed, and peanuts (p. 33). In the subsection on "Soy Beans" we read (p. 29): "Although the soy bean has been grown in this country occasionally for a long time it is only within the last 10 years that it has attracted general attention as a forage crop. It has been found to grow well in all the cotton region, as well as farther north. It is strongly drought resistant and makes a hay similar in quality to that from cowpeas, though usually with a larger proportion of seeds and somewhat more woody stems. There are many varieties which differ greatly in time of growth, some ripening within 90 days from sowing the seeds, while others require the whole season. The Mammoth, a late variety, is now commonly grown in the South. The Ito San is a good early variety and quite commonly grown. A number of recently introduced varieties are becoming popular, among them the Haberlandt, Acme and Tokyo. For the region near the Gulf coast the Riceland and Barchet varieties have given the best results."

"Inoculation with soil from an old soy-bean field is desirable but not usually necessary in the South. Rabbits are exceedingly fond of the young plants and sometimes cause serious injury to the crop when the field is near woods."

"The yield of seed varies from 10 to 30 bushels per acre. It is not a desirable crop to plant with corn, as it matures too late. As the seeds of many varieties shatter badly, the gathering for seed should not be delayed longer than is necessary for their ripening, and many more seeds will be saved if the cutting is done early in the morning while the pods are still damp with dew."

The section on "Temporary pastures" (p. 42-43) recommends planting soy beans in June and July, August, September and October (along with cowpeas, chufas, corn, and peanuts), and November.

The section titled "Silage crops" notes: "While the silo is of less importance in the cotton region than in the regions of shorter grazing seasons [further north], it is usually a profitable investment for the dairyman." It provides succulent feed through the dry months of late summer. Corn and sorghum are the principal crops for making silage, but the quality of the feed made from them is greatly improved when mixed with even a small portion of some legume, like cowpeas, soy beans, or beggarweed."

The section on "Soiling crops" (p. 44) begins: "Soiling is often more economical than grazing, especially where land is expensive, as it enables one to keep fully three times the number of animals on the same area." "On soils where alfalfa can not be grown it is usually possible to use vetches, cowpeas, or soy beans in its place."

Concerning "Making hay" (p. 44-45): "Legumes like cowpeas and soybeans in which the seed is an important part of the forage, should not be cut until the earliest pods begin to mature."

A table titled "The best forage crops for the Southern States" (p. 46-47) lists 6 types of forage crops in 8 states. The soybean is listed under two of the types: (1) Annual summer crop for hay in North Carolina, South Carolina, Alabama, Mississippi, and Louisiana. The most popular summer crop for hay is cowpeas; sorghums and lespedeza also rank high. Soy beans are typically third or fourth on the list; (2) Annual summer crop for pasture in North Carolina, South Carolina, Alabama, and Mississippi. The most popular summer crop for pasture is cowpeas, followed by lespedeza. Soy beans are typically second or third on the list.

The subsection titled "Chufas" (p. 34-35) states that they are "a profitable crop on sandy soils where winter grazing is wanted for hogs and poultry. They grow best on soils which are very light and sandy and yield well with a moderate amount of cultivation... Many growers claim that the tubers are more fattening than peanuts."

Note: Samuel Mills Tracy lived 1847-1920. Address: Special Agent, Office of Forage-Crop Investigations.

146. *Asheville Citizen-Times* (*Asheville, North Carolina*). 1912. Artificial milk made from the soja bean... Nov. 20. p. 5.

• ***Summary:*** From Argunaut: "... is a testament to the ingenuity of the Japanese and it is said to correspond very closely with ordinary condensed milk. The beans are first soaked then boiled in water. Presently the liquid turns white; sugar and phosphate of potash in proper quantities are added, and the boiling continued until a substance the thickness of molasses is obtained."

Note: Nonsense. The process is completely wrong!

147. Gray, Dan T.; Shook, L.W. 1912. Wintering pregnant ewes in Alabama. *Alabama Agricultural Experiment Station,*

Bulletin No. 167. p. 205-20. Nov.
• ***Summary:*** A ewe is a mature female sheep. Soybeans, peanuts, chufas, and sorghum were compared as pasturage for hogs. 100 lb of pork cost by far the least on soybean pasturage (only $2.74). The average gain of the pigs each day on the soybean pasture was 1.02 lb, on the peanut pasture 1.01 lb, on the chufa pasture 0.72 lb, and on the sorghum 0.37 lb. In this experiment the hogs were turned into the soybeans while the pods were very small so that for 2 weeks they ate only the leaves and young shoots.

The summary states: "Mixed hay (consisting of soy beans, cowpeas, and crab grass) did not maintain the normal health and weight of pregnant ewes."

Note: As of 1995 the scientific name of the chufa is *Cyperus esculentus*. Address: 1. Animal husbandman; 2. Assistant. Both: Auburn, Alabama.

148. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*). 1913. Vegetable-oil industry and trade. 16(35):737-44. Feb. 11. See p. 743.
• ***Summary:*** The section titled "United States" (p. 743) states: "The recent extensive use in Europe of Manchurian soya beans has been one of the most remarkable developments of commerce. In 1911 shipments from that part of China were 818,108 tons of beans, 911,881 tons of bean cake, and 65,993 tons of bean oil, having a total value of $35,000,000, a very large part going to Europe, whereas only a few years ago Europe used none. Neither did the United States purchase these articles from Manchuria until the tariff which went into effect on August 6, 1909, placed soya-bean oil on the free list. Since then imports of the oil, which is used here almost wholly for soap making, have shown the following quantities, the figures being for fiscal years ended June 30:"

A table shows: In 1910 an unknown number of pounds was worth $1,109,842. In 1911 some 41,105,920 lb was worth $2,555,707. In 1912 some 28,019,560 lb was worth $1,576,968.

"For the fiscal year ended June 30, 1909, imports of soya-bean oil were included in 'all other fixed or expressed oils and combinations of,' on which the duty was 25 per cent, the total imports of which were only 220,759 gallons, worth $42,705.

"The North Carolina press recently stated that plans for a soya-bean oil and breakfast-food plant in that State were being worked out, the oil to be used as a base for paint and soap and the protein of the bean to be utilized for a breakfast food, adding: 'Contracts are being made with farmers for the planting of 4,000 acres of beans this season.' Soya beans have been grown through the South to a small extent but not much as a commercial product. The foregoing item would seem to indicate that they will now be produced on a larger scale."

149. *San Francisco Chronicle.* 1913. Manchurian soya beans. March 15. p. 6.
• ***Summary:*** "The recent extensive use in Europe of Manchurian soya beans has been one of the most remarkable developments of commerce. In 1911 shipments from that part of China were 8108,108 tons of beans, 911,881 tons of bean cake and 65,993 tons of bean oil, having a total value of $35,000,000, a very large part going to Europe, whereas only a few years ago Europe used none. Neither did the United States purchase these articles from Manchuria until the tariff, which went into effect on August 6, 1909, placed soya-bean oil on the free list. Since then imports of the oil, which is used here almost wholly for soap making, have shown the following quantities, the figures being for the fiscal years ending June 30th:"

A table shows the following: 1910 not stated, 1911 41,105,920 pounds, 1912 28,019,560 pounds. And: 1910 $1,019,842, 1911 $2,585,707, 1912 $1,576,968.

"For the fiscal year ended June 30, 1909, imports of soya-bean oil were included in 'all other fixed or expressed oils and combinations of,' on which the duty was 25 per cent, the total imports of which were only 220,759 gallons, worth $42,706.

"The North Carolina press recently stated that plans for a soya-bean oil and breakfast-food plant in that State were being worked out, the oil to be used as a base for paint and soap and the protein of the bean to be utilized for a breakfast food, adding: 'Contracts are being made with farmers for the planting of 4000 acres of beans this season.' Soya beans have been grown through the South to a small extent, but not much as a commercial product. The foregoing item would seem to indicate that they will now be produced on a larger scale."

150. *Washington Post.* 1913. Oppose tariff on beans. Cottonseed crushers also ask Congress for free camel's-hair cloth. May 17. p. 3.
• ***Summary:*** Old Point Comfort, Virginia. The third annual session of the North Carolina Cottonseed Crushers' Association "adopted resolutions urging Congress to retain soja beans and camel's-hair press cloth on the free list in the pending Democratic tariff bill." Address: 1009 B St. N.W., Washington, D.C.

151. 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.

152. 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. General report and analysis. Washington, DC: Government Printing Office. 927 p. See p. 626.

Table 53 — DRY BEANS (OTHER THAN EDIBLE).

	Acreage.		Production (bushels).		Value.	
	1909	1899	1909	1899	1909	1899
United States	14,947	....	179,733	....	$241,060	....
Castor beans, total	565	25,738	2,077	143,388	3,432	$134,084
Illinois	....	2,688	....	15,695	....	16,139
Kansas	....	3,338	....	18,108	....	17,391
Missouri	....	5,622	....	31,966	....	31,177
Oklahoma	560	[1] 14,070	2,062	[1] 77,409	3,402	[1] 69,047
All other states	5	20	15	210	30	330
Velvet beans, total	12,560	(2)	154,767	(2)	210,837	(2)
Alabama	3,638	....	34,398	....	44,899	....
Florida	8,363	....	114,404	....	152,479	....
Georgia	435	....	4,224	....	8,572	....
Mississippi	124	....	1,741	....	4,887	....
Soy beans, total	1,629	(2)	16,835	(2)	20,577	(2)
Alabama	29	....	219	....	494	....
North Carolina	1,249	....	13,313	....	14,141	....
Ohio	33	....	424	....	843	....
Tennessee	256	....	2,037	....	3,387	....
Virginia	29	....	415	....	695	....
All other states	33	....	427	....	1,017	....
Other beans, total	193	....	6,054	....	6,214	....
California	150	....	5,534	....	5,659	....
Virginia	43	....	520	....	555	....

[1] Includes Indian Territory. [2] Not reported separately.

• ***Summary:*** Table 53 titled "Dry beans (other than edible)" (p. 626) shows acreage, production in bushels, and value statistics for soy beans in 1909, for five states plus "all other states." In 1909 a total of 16,835 bushels of soy beans were produced on 1,629 acres in the USA. They were worth $20,577. North Carolina was the leading soybean producer with 13,313 bushels (79% of the total).

The following states are listed in descending order of production. For each state is given production in 1909 (in bushels) / acreage / value.

North Carolina: 13,313 bu / 1,249 acres / $14,141.
Tennessee: 2,037 bu / 256 acres / $3,387.
Ohio: 424 bu / 33 acres / $843.
Virginia: 415 bu / 29 acres / $695.
Alabama: 219 bu / 29 acres / $494.
All other states combined: 427 bu / 33 acres / $1,017.

Note 1. These is the earliest document seen (April 2017) that contains official national production or acreage statistics for soy beans in the United States. The earliest year for which statistics are given is 1909. Statistics for castor beans and velvet beans are also given.

Note 2. 36.75 bushels weigh 1 metric ton. Therefore 16,835 bushels weigh 458.1 metric tons. Address: Washington, DC.

153. Wood (T.W.) & Sons. 1913. Farm and garden guide (Mail order, with order form). Richmond, Virginia. 96 p. 25 cm.

• ***Summary:*** In the section on "Seeds for the Farm" (p. 79) a full page is now devoted to "Soja Beans–The king of summer forage crops." The following varieties are described: "Mammoth Yellow Sojas," "Black Sojas," "Early Dwarf Green Soja Beans," "Brown Sojas," and "Hollybrook Early Sojas." There are four testimonial letters for Mammoth Yellow Sojas from: (1) J.H. Highsmith, Pender County, North Carolina (20 Sept. 1912). (2) J.D. Calton, Wake County, North Carolina (6 Oct. 1909). (3) E.V. Alexander, Morgan County, Tennessee (29 Sept. 1910). (4) C.S. Osmer, Wimico County, Maryland (21 Feb. 1911). Also four testimonial letters for Hollybrook Early Sojas from: (1) C.C. Starcher, Rome County, West Virginia (28 Sept. 1912). (2) Thomas Tobin, Harford County, Maryland (21 Nov. 1908). (3) John Earhart, Butler County, Ohio (1 Feb. 1909). (4) E.G. Mead, Howell County, Missouri (5 Nov. 1910).

The letter from C.C. Starcher of West Virginia states: "I tried three varieties of Soja Beans this season: Mammoth Yellow, Hollybrook and Dwarf Green. The Mammoth Yellow made the largest growth. I think that is the best variety when cut for hay. They also had more nodules on roots. Inoculated all three varieties with Government inoculation. The Hollybrook made a larger growth than the Dwarf Green, but not as large as the Mammoth Yellow. I got more plants from the amount of seed with the Hollybrook. I think that is a very good variety for both hay and grain."

A photo shows a field of soja beans grown in Tennessee. The caption: "Mammoth Yellow Soja Beans, a splendid soil improver and the best of summer forage crops." An illustration shows a Hollybrook Soja Bean plant in full leaf, with a cluster of pods in the upper left corner.

This catalog is owned by the Smithsonian Horticulture Branch Library in Washington, DC. Call number: #015519.

Note: This is the earliest document seen (Aug. 2013)

that mentions the soybean variety Early Dwarf Green. Address: Richmond, Virginia.

154. *Charlotte Observer* (*North Carolina*). 1914. Oil from soy beans: Interesting experiment conducted at Elizabeth City. April 4. p. 9.
• ***Summary:*** "(Special to The Observer). Elizabeth City. April 2.–An experiment of much interest to oil men and one which may eventually result in a big agricultural industry in North Carolina was conducted at the plant of the Elizabeth City Cotton Oil and Fertilizer Company this week. The oil was extracted from five bushels of soy beans by a process which the experimenters are keeping a secret. The experiment is regarded as being very successful and those who watched the process are vary enthusiastic over the prospects of future developments along this line. They honestly believe that discoveries in the manufacture of soy bean products are about to be made which will make them extensively cultivated and for which the farmers will receive thousands of dollars.

"The five bushels of beans in this experiment was separated into two products, oil and meal. An abundance of oil was secured which the experimenters will have analysed. They believe that this oil will prove to be of a very high grade and that it will have great commercial value, while the meal will be capable of being manufactured into many food products useful to both man and beast.

"The success of this experiment in especially gratifying as a similar one was made about two years ago by another oil mill and it was attended with failure as the yield of oil was not satisfactory at all; besides this experiment revealed the fact that there is no waste in the manufacture, the whole bean being converted into either oil or meal.

There are great prospects for a big industry in eastern North Carolina as the soil of this section is especially adapted to the cultivation of the soy bean or stock pea, as they are commonly called. A large acreage is planted each year and five or six counties last year yielded nearly a half million bushels. This crop can be increased until the yield will amount to several million bushels, as the invention of soy bean pickers have made the harvesting of them on a larger scale possible at a small cost. The soy bean was introduced into North Carolina about 25 years ago [i.e., about 1889]. They were first planted on a small scale in an experimental way, as the farmers regarded their food value with a great deal of suspicion. It was soon discovered that they were excellent for livestock and that they fattened hogs and made much pork. Then the acreage was increased but this was fenced off and the soy bean fed to the stock in a green state. The surplus acreage was housed without threshing and was fed to the stock during the Winter. Only the seed required for the next year's planting was saved. This was done by threshing the beans out of the pod by the use of a pole which was a laborious and costly process.

"About five years ago, the price of soy beans began to increase and the farmers found it very profitable to raise them for market; but the laborious and costly process of preparing them, greatly handicapped the farmers and caused the supply to fall far short of the demand. It was then that the inventive genius of L.S. Gordon and George Pritchard, two of Pasquotank County's most progressive farmers got to work end each of them invented a bean picker after his own plan, which solved the problem and made the harvesting of the beans easy and cheap."

155. Chaplin, S, 1914. Experiment with soy beans success: Oil and meal extracted by new process at Elizabeth City this week. May mean millions: These beans thrive especially well in Eastern North Carolina and if oil is of expected value it will bring untold wealth to state–Soy bean principal food in Orient. *Farm and Mechanic* (*North Carolina*). April 7. p. 10
• ***Summary:*** "Elizabeth City, April 4. An experiment of much interest to oil men; and one which may eventually result into a big industry for Eastern North Carolina was conducted at the plant of the Elizabeth City Oil and Fertilizer Company this week..."

Note: This long article is very similar to one that appeared on 4 April 1914 in *The Charlotte Observer.* It contains no new information that was not in the earlier article.

156. *Enterprise* (*The*) (*Williamston, North Carolina*). 1914. Oil from soy beans: Interesting experiment conducted with product at Elizabeth City. Prospects of big industry: North Carolina is especially adapted to cultivation of soy bean and is now producing half million bushels annually. at Elizabeth City this week. May mean millions: These beans thrive especially well in Eastern North Carolina and if oil is of expected value it will bring untold wealth to state–Soy bean principal food in Orient. April 10.
• ***Summary:*** "Elizabeth City.–An experiment of much interest to oil men and one which may eventually result into a big agricultural industry in North Carolina was conducted at the plant of the Elizabeth City Cotton Oil and Fertilizer Company this recently. The oil was extracted from five bushels of soy beans by a process which the experimenters are keeping a secret.

Note 1. This long article is very similar to one that appeared on 4 April 1914 in *The Charlotte Observer.* However, it contains some new information, namely that North Carolina is now producing half a million bushels of soy beans annually. The source of this statistic is not given.

Note 2. This article pushes back the earliest date that domestic soybeans were crushed in the United States to Oct. 1914 from Dec. 1915.

Note 3. On this same date (April 10, 1914), the 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.'

157. Ward, W.F.; Gray, Dan T. 1914. Beef production in the south. *Farmers' Bulletin* (*USDA*) No. 580. 20 p. April 18. See p. 3-4.
• ***Summary:*** The section titled "Forage crops and feeds" states (p. 3-4): Soy beans are sometimes combined with corn for producing silage, and such silage has a higher feeding value than corn silage.

"The most important hay crops of the South are alfalfa, Johnson grass, cowpeas, soy beans, and in some sections lespedeza, crab grass, Bermuda [grass], red clover, melilotus, crimson clover, and prairie grasses. Excellent yields of cowpea hay, soy-bean hay, or sorghum can be secured after one of the small-grain crops or crimson clover has been taken off the land." Address: 1. Senior Animal Husbandman in Beef Cattle Investigations, Animal Husbandry Div.; 2. Chief of the Animal Industry Div. of the North Carolina Exp. Station.

158. 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.

159. *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."

160. 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.

161. Piper, Charles V. 1914. Forage plants and their culture. New York, NY: The Macmillan Co. xxi + 618 p. Aug. See p. 513-38. Illust. Index. 20 cm. Series: The Rural Text-Book Series, ed. by L.H. Bailey. Reprinted with new publication date but no changes in 1916, 1919, and 1921. [9 ref]
• ***Summary:*** Contents: 1. Introduction. 2. Preservation of forage. 3. Choice of forage crops... [chapters an various grasses (incl. Velvet grass {*Holcus lunatus*}), sorghums, and millets]... 6. The statistics of forage crops ("In the same way as the straw of cowpeas, Canada and garden peas, soybeans and other leguminous seed crops has also a considerable value as forage," p. 114)... 15. Alfalfa. 16. Red clover. 17. Other clovers–Alsike, Hungarian, White and Sweet. 18. Crimson clover and other annuals. 19. Peas and pea-like plants (incl. Chick-pea {*Cicer arietinum*} and Grass-pea, vetchling or chickling vetch {*Lathyrus sativus*}). 20. Vetches and vetch-like plants: Common vetch (*Vicia sativa*), hairy vetch (*Vicia villosa*), narrow-leaved vetch (*Vicia angustifolia*), purple vetch (*Vicia atropurpurea*), wooly-pod vetch (*Vicia dasycarpa*), scarlet vetch (*Vicia fulgens*), ervil or black bitter vetch (*Vicia ervilia*), narbonne vetch (*Vicia narbonnensis*), horse bean (*Vicia faba*), bird or tufted vetch (*Vicia cracca*), tangier pea (*Lathyrus tingitanus*), flat-podded vetchling (*Lathyrus cicera*), ochrus (*Lathyrus ochrus*), fenugreek (*Trigonella foenum-græcum*), lupines (*Lupinus* spp.), serradella (*Ornithopus sativus*), square podded pea (*Lotus tetragonolobus*).

21. Cowpeas. 22. Soybeans. 23. Other hot-season annual legumes: Lespedeza or Japan clover, Florida velvet bean (*Stizolobium deeringianum*) [later renamed simply "Velvet bean" (*Mucuna pruriens*)], peanut (*Arachis hypogæa*), Florida beggarweed, the jack bean (*Canavalia ensiformis*. "Owing to confusion with the similar species cultivated in Japan, China, and India, it has also been called the sword bean and the knife bean, but those names properly belong to the Asiatic species {*Canavalia gladiata*}, used principally as a vegetable), mung bean (*Phaseolus aureus*), urd (*Phaseolus mungo*), moth bean (*Phaseolus aconitifolius*), adzuki bean (*Phaseolus angularis*), bonavist or hyacinth bean (*Dolichos lablab*), guar (*Cyamopsis tetragonoloba*).

Note 1. This is the earliest English-language document seen (Aug. 2007) that uses the term "jack bean" to refer to *Canavalia ensiformis*. Note 2. This is the earliest English-language document seen (Aug. 2007) that uses the term "sword bean" or the term "knife bean" to refer to *Canavalia gladiata*.

24. Miscellaneous perennial legumes: Sainfoin (*Onobrychis cicioefolia*), sulla or Spanish sainfoin (*Hedysarum coronarium*), kudzu (*Pueraria thunbergiana*), flat pea (*Lathyrus silvestris* var. *wagneri*), kidney vetch (*Anthyllis vulneraria*), goat's rue (*Galega officinalis*), bird's foot trefoil (*Lotus corniculatus*), *Astragalus falcatus*, furze (*Ulex europoeus*).

25. Miscellaneous herbs used as a forage (incl. Sunflower {*Helianthus annuus*}). 26. Root crops and other comparable forages (incl. rape {*Brassica napus*}, Jerusalem artichoke, chufa {*Cyperus esculentus*}, and cassava).

Contents of Chap. 22–Soybeans (p. 513-538): Introduction. Agricultural history. Botany. Description. Soil adaptations. Climatic adaptations. Importance. Desirable characters in soybean varieties. Commercial varieties. Preparation of soil and cultivation. Rate of seeding. Time of seeding. Method of seeding. Depth of planting. Inoculation. Life period. Time to cut for hay. Hay yields. Fertilizers. Soybean mixtures: Soybeans and corn, soybeans and cowpeas, soybeans and sorghums, soybeans and Johnson-grass, soybeans and millet. Silage. Rotations. Feeding value of soybean hay. Seed-production. Pollination. Seed yield. Seeds. Pests. Breeding. Soybeans and cowpeas compared.

"The soybean is the most productive as regards seed of any legume adapted to temperate climates... The soybean was first cultivated in the United States in 1829, but it apparently attracted but little attention until 1854, when two varieties were brought back from Japan by the Perry expedition. Other varieties were introduced from time to time, among them the Mammoth, which was introduced

previous to 1882. It is largely due to the introduction of this variety that the soybean has become an important crop in the United States, as a very large percentage of the acreage is still planted to this variety. Between the years 1900 and 1910, the United States Department of Agriculture introduced about 250 varieties from all portions of the Orient" (p. 513-14).

"At the present time about fifteen varieties of soybeans are handled commercially by seedsmen, the most important of which are Mammoth, Hollybrook, Haberlandt, Medium Yellow, Guelph, Ito San, Wilson and Peking." A fairly detailed description of each variety is given (p. 519).

Pollination (p. 533): "The soybean flower is completely self-fertile, bagged plants setting pods as perfectly as those exposed. The flowers are much visited by bees, which seek principally the pollen, as the soybean flower secretes but little nectar. Pollination occurs even before the flower opens, but nevertheless occasional cross-pollinations occur where different varieties are grown in close proximity. Such natural hybrids can often be detected by the fact that the seeds of heterozygote plants present queer combinations of color, such as smoky green, smoky yellow, brown and yellow and black banded. In the course of varietal trials at Arlington Farm, Virginia, extending over five years, many such natural hybrids were secured, and similar crosses occurred at the Kansas Experiment Station."

Concerning seed yield (p. 533): "When grown for seed, the best varieties under proper culture yield from 30 to 40 bushels of seed to the acre. A maximum yield of 50 bushels to the acre has been reported from North Carolina." A table (p. 534) shows the yields reported for 10 varieties from Arlington Farm, 7 other U.S. states, and Guelph, Ontario, Canada. The varieties are: Mammoth, Hollybrook, Guelph, Ito San, Haberlandt, Medium Yellow, Wilson, Peking, Ebony, and Chernie. The states are Tennessee, Kentucky, Delaware, Indiana, Ohio, Arkansas, and Virginia.

The section titled seeds (p. 534-35) notes: "Soybean seeds do not retain their viability well, and it is not advisable to sow seed two years old without previously testing. Unless care is exercised in properly curing and storing, soybean seeds are apt to heat and thus quickly have their viability destroyed. A small percentage of the seed will under favorable conditions retain its viability four or five years, and this has been found to vary according to variety, as shown in the table:"

This table gives the viability of the seeds of 12 soybean varieties, grouped by color, in approximately descending order of viability after 4 years. Those with the highest percentage viability are all black in color: Shanghai, Chernie, Baird, Fairchild, Jet, Ebony (these first 6 are black-seeded), Tashing, Guelph (green), Brownie, Ito San, Haberlandt, and Mammoth (these last 3 are straw yellow). For the variety Shanghai, 99.0% of the seeds are viable after 1 year, 93.0% after 2 years, and 43.5% after 4 years. After 1 year, the viability was greater than 90% for most varieties. After 4 years, black-seeded soybeans had by far the best viability, ranging from 4.0% to 46.5%.

Note 3. This is the earliest English-language document seen (March 2003) that uses the term "viability" to refer to germinability or germination rate.

"Pests.–Soybeans are troubled by few serious enemies. On the whole, rabbits are most troublesome, as they are extravagantly fond of the herbage, and where they are abundant soybean culture is practically impossible. At the Tennessee Experimental Substation at Jackson, rabbit injury was much reduced by using scarecrows, to each of which a lantern was hung at night.

"Rootknot caused by a nematode (*Heterodera radicicola*) often injures soybean considerably, but more damage is caused by cowpea wilt, due to *Fusarium.*

"Caterpillars sometimes eat the leaves, but the loss from such insects is seldom serious.

"On the whole it may be said that no insect or fungus pest [disease] has yet assumed any great economic importance in connection with the culture of the soybean." Illustrations (line drawings, both non-original) show: A typical soy bean plant, with a close-up of a cluster of pods (p. 514). Roots of a soybean plant, showing nodules (p. 525). A black-and-white photo (Plate VIII, facing p. 510) shows the seeds of ten soybean varieties. Address: Agrostologist in Charge of Forage Crop Investigations, Bureau of Plant Industry, USDA [Washington, DC].

162. *Farmers' Bulletin* (*USDA*). 1914. The agricultural outlook. No. 641. 40 p. Nov. 23. See p. 36, 38.

• ***Summary:*** Table 31 (p. 36) lists "Prices paid to producers of farm products, by States." The prices paid per bushel of soy beans, during the years 1913 and 1914, are given for the following states: Massachusetts, New York, Pennsylvania, Delaware, Virginia, West Virginia (1914 only; $2.50), North Carolina, South Carolina, Georgia, Florida, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Kentucky, Tennessee, Alabama, and Mississippi. The average price for 1913 was $1.96, and for 1914 it was $2.08 (range $1.55 to $3.00).

Table 33 (p. 38) shows "Averages for the United States of prices paid to producers of farm products." On Oct. 15 the price paid for "Beans, soy" was $1.96 in 1913 and $2.08 in 1914.

Table 1 (p. 2) is titled "Yield per acre, production, quality, and farm price of principal crops: Total for the United States." It includes hemp but not soy beans. Hemp production in 1913 was 5.647 million lb.

Note: This table seems to indicate that soybeans were cultivated in each of these states.

163. 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.

164. 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.

165. *Farmers' Bulletin* (*USDA*). 1914. The agricultural outlook. No. 645. 45 p. Dec. 31. See p. 41, 43.

• ***Summary:*** Table 36 (p. 41) lists "Prices paid to producers of farm products, by States." The prices paid per bushel of soy beans, during the years 1913 and 1914, are given for the following states: Rhode Island (1914 only), New York, New Jersey, Pennsylvania, Delaware, Virginia, West Virginia (1914 only; $2.92), North Carolina, South Carolina, Georgia, Florida, Ohio, Indiana, Illinois, Wisconsin, Minnesota, Missouri, North Dakota (1914 only), Nebraska, Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, and Oklahoma.

Note: This table seems to indicate that soybeans were cultivated in each of these states. If that is true, this would be the earliest document seen (April 2016) concerning soybeans in North Dakota, or the cultivation of soybeans in North Dakota. In 1914 soybean producers in North Dakota were paid $2.25 per bushel for soybeans.

Table 38 (p. 43) shows the average price paid to producers of various farm products in the United States on three different dates during the five years from 1910 to 1914. For soy beans: The average price paid on Nov. 15 was $1.57 in 1913, and $2.15 in 1914. The average price paid on Dec. 15 was $1.72 in 1913. The average price paid on Oct. 15 was $1.96 in 1913 and $2.08 in 1914.

166. Garner, W.W.; Allard, H.A.; Foubert, C.L. 1914. Oil content of seeds as affected by the nutrition of the plant. *J. of Agricultural Research* 3(3):227-49. Dec. [9 ref]

• ***Summary:*** "Summary: Experiments with soy beans have shown that, except for the period immediately following blooming and that directly preceding final maturity, there is a fairly uniform increase in oil content, both relative and absolute, throughout the development of the seed, and no evidence was found that there is a critical period of very intense oil formation at any stage of seed development."

"Some varieties of soy beans show a marked tendency to shorten the time required for reaching maturity when planted late in the season, but no correlation was found between the date of planning and the size of the seed or oil content. These properties appear to be influenced more by the character than by the length of the growing period.

"Different varieties of soy beans grow under the same conditions showed marked differences in oil content and very great differences in size of the seed."

Tables show: (3) Oil content of soy beans as affected by partial defoliation. (4) Oil content of soy beans as affected by partial removal of very young seed pods. (5) Oil content of soy beans of large and small size from the same plant (Ogemaw, Hansen, Buckshot; grown in Pullman, Washington; Amherst, Massachusetts; Wooster, Ohio; Statesville, North Carolina; La Fayette, Indiana; and Kingston, Rhode Island). (6) Oil content of soy beans planted at intervals of two weeks in 1911 (S.P.I. No. 21755, Haberlandt, Buckshot, Medium Yellow). (7) Varietal differences in the oil content of soy beans grown at Arlington Experimental Farm, Virginia, in 1907, 1908, 1910 (Shanghai, Eda, Yosho, Amherst, etc.). (9) Oil content of soy beans grown under different environmental conditions (Hansen, Buckshot, Guelph, Ogemaw; also grown at Auburn, Alabama). Address: 1. Physiologist in Charge; 2. Asst. Physiologist; 3. Scientific Assistant. All: Tobacco and Plant-Nutrition Investigations, Bureau of Plant Industry [Washington, DC].

167. 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.

168. 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.

169. *Farmers' Bulletin* (*USDA*). 1915. The agricultural outlook. No. 651. 29 p. Feb. 6. See p. 23, 27.
• ***Summary:*** Table 16 (p. 23) lists "Prices paid to producers of farm products, by States." The prices paid per bushel of soy beans, during the years 1913 and 1914, are given for the following states: Connecticut, New York, Pennsylvania, Delaware, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Ohio, Indiana, Illinois, Minnesota, Missouri, North Dakota, Nebraska, Kansas, Kentucky, Tennessee, Alabama, and Arkansas. The average price for 1913 was $1.72, and for 1914 it was $2.24 (range $1.00 to $2.65).

Table 20 (p. 27) lists "Averages for the United States of prices paid to producers of farm products" for the years 1910 to 1914. Soy bean prices are given only for the years 1913 and 1914, suggesting that they were not compiled before 1913. For each year, the price is given on three dates. For soy beans in 1914, the prices were: Jan. 15 = $1.96, Nov. 15 = $2.15, and Dec. 15 = $2.24.

170. *Farmers' Bulletin* (*USDA*). 1915. The agricultural outlook. No. 665. 28 p. March 20. See p. 24, 27.
• ***Summary:*** Table 12 (p. 24) lists "Prices paid to producers of farm products, by States." The prices paid per bushel of soy beans, during the years 1914 and 1915, are given for the following states: Pennsylvania, Delaware, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Missouri, Nebraska, Kansas, Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas. The average price for 1914 was $1.80, and for 1915 it was $2.26 (range $1.75 to $3.50).

Table 13 (p. 27) lists "Averages for the United States of prices paid to producers of farm products" for the years 1911 to 1915. Soy bean prices are given only for the years 1914 and 1915. For each year, the price is given on two dates. For soy beans in 1915, the prices were: Jan. 15 = $2.35, and Feb. 15 = $2.26.

171. Gray, Dan T. 1915. Soybean pastures for hogs. *North Carolina Agricultural Experiment Station, Circular* No. 24. 6 p. April. Revised in 1919 as North Carolina State College, Extension Service, Extension Circular No. 85. 8 p.
• ***Summary:*** The value of soybean pasture, carrying capacity of each acre of soybeans, and pounds of pork made on each acre, are discussed. "Until the farmer sees his way clear to make a permanent pasture, or has one already made, he should keep out of the livestock business. It is, in fact, almost impossible to realize a profit upon any kind of stock without good pastures." Unfortunately, southern farmers give all their attention to cotton instead of to pastures. "Soybeans have proven to be exceedingly valuable as a feed for hogs." Address: Chief, Animal Industry Div.

172. Stricker (L.R.). 1915. Classified ad: For sale -. *Washington Post.* June 20. p. A8.
• ***Summary:*** "Mammoth Yellow Soja Beans, recleaned, $1.50 per bushel, f.o.b. shipping station: recleaned Clay peas [cowpeas], $1.75 per bushel." Address: Seedsman, Asheville, North Carolina.

173. Tarheel Black: New U.S. domestic soybean variety. Usually called Shanghai before about 1923. Synonyms: Shanghai (Morse 1918). Mammoth Black, Tarheel (Morse 1927). Also spelled Tar-Heel or Tar Heel (Morse 1948). 1915. Seed color: Black, hilum black.
• ***Summary:*** Sources: Voorhees, John H. 1915. "Variations in soy bean inoculation." *J. of the American Society of Agronomy.* 7(3):139-40. June. See p. 139.

Morse, W.J. 1918. "The soy bean: Its culture and uses." *USDA Farmers' Bulletin* No. 973. 32 p. July. See p. 16. "Shanghai: This variety has been grown in North Carolina under the name of Tarheel Black. It gives a very good yield of seed and forage, but is inferior to many of the other sorts. Plants stout, erect, maturing in about 140 days; pubescence tawny; flowers white; seeds black; with a black seed scar, slightly flattened, medium sized, about 164,000 to the bushel; oil, 18.6%; protein, 35.2%."

USDA Seed Reporter. 1919. "Soybean and cowpea variety information." April 5. p. 7. One of the 7 soybean varieties listed is "Shanghai or 'Tarheel Black.'"

Piper, Charles V.; Morse, William J. 1923. *The soybean.* New York, NY: McGraw-Hill Book Co. xv + 329 p. March. See p. 169. "Tarheel Black.–Introduced from Shanghai, China, 1905."

Morse, W.J. 1927. "Soy beans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520. 34 p. April. See p. 8, 10. "Mammoth Black.–The same as Tarheel Black." "Shanghai.–The same as Tarheel Black." "Tarheel.–The same as Tarheel Black."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 18-19. Tarheel Black is in the USDA Germplasm Collection. Maturity group: VII. Year named or released: 1910. Developer or sponsor: USDA. Literature: 03, 05. Source and other information: From Shanghai, China, in 1905. Called 'Shanghai' from 1910 to 1923. Prior designation: PI 14952. Address: USA.

174. Stabler, Harry Snowden. 1915. Cows and cowpeas: They're building up a run-down North Carolina farm. *Country Gentleman* 80(29):1171, 1180. July 17.
• ***Summary:*** "Year before last this farm, on a valuation of

$100 an acre, yielded Mr. French an income of more than six per cent, plus $1000 for his part of the year's work. The first week in May of this year there were ninety acres in timothy and herd's grass mixed, twelve acres in soy beans, thirty-five acres in wheat, twenty-five acres in winter oats, thirty acres in corn and forty-eight acres in pasture. One third of the land on which these crops are growing was worthless as it stood originally; and there are hundreds of thousands of acres in the South just like it..."

"'Rye and crimson clover make one of the best combinations for soil binding and humus making, especially in the hills. This also makes a fine early spring pasture for stock until the grass of the permanent pasture is right. The rye and clover land can then be plowed and put in early corn and soy beans, which in themselves make a good balanced ration, and can be conveniently fed in the bundle.'

"Mr. French considers the Mammoth Yellow soy beans superior to cowpeas for the reason that they make just as much nitrogen, more hay, more seed, cost less, and they stand dry weather far better. There are twelve acres in soy beans at present on this farm."

175. *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."

176. 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.

177. Williams, C.B. 1915. Soy-bean growing in North Carolina. *North Carolina Agricultural Experiment Station, Circular* No. 31. 8 p. July. Reprint.
• ***Summary:*** Contents: History. The growing plant. Distribution in North Carolina. Suitable varieties (for seed production and for hay production). Selecting and preparing the soil. Inoculation essential. Fertilization. Seeding and cultivation. Soy beans in mixtures (with cowpeas, sweet sorghum, or millet). Harvesting for hay. Soy beans for soil improvement. Soy beans for soiling purposes. Soy beans for pasturage.

"The soy bean is probably a native of tropical Africa

and was introduced into the southeastern part of Asia more than 3,000 years ago by ancient travelers between Zanzibar and India or Ceylon... The bean was carried to England in 1790 and was introduced into the United States from Japan in 1860. It has been successfully cultivated in the Southern States for many years, where it has been grown for soil improvement and as a forage crop. In Japan and China it is grown chiefly as a human food. It is also known as Soja Bean, Coffee Berry and Japan Pea."

In North Carolina, the soy bean "is grown more or less from the seashore to the western boundary, but at the present time is chiefly produced in the northeastern part of the State." Commercial cultures for inoculation may now be secured at very reasonable prices.

Fertilization: If "the soil is poor, it will pay to make an application of barn-yard manure or add sufficient cotton-seed meal, dried blood, fish scrap, or other commercial carriers of nitrogen to give the fertilizer mixture used on the beans 1 to 2 per cent nitrogen. Ordinarily, from 200 to 400 pounds of 16 per cent acid phosphate and 25 to 50 pounds of muriate of potash will supply the necessary amount of phosphoric acid and potash needed by this crop when grown on average soils in the eastern part of the State."

Photos show: (1) Soy beans drilled in corn rows (p. 1). (2) A man standing in a field of soy beans sown broadcast on "black land" for hay (p. 3). (3) A field of soy beans with two barns in the distance (p. 5). Address: Chief, Div. of Agronomy, NCES [North Carolina Experiment Station], Raleigh and West Carolina.

178. Warburton, C.W. 1915. Legumes after grain: Crops to produce fertility, forage, hay or cash. *Country Gentleman* 80(32):1276-77, 1808. Aug. 7.

• ***Summary:*** "Quick-Growing Crops to Plow Under: One of the best methods of using land from which grain has been harvested is to plant it to some quick-growing legume which will add nitrogen to the soil and furnish a plentiful supply of vegetable matter to plow under as green manure or to use as forage for livestock. Cowpeas, soy beans and peanuts are the best of these crops.

"The cowpeas and soy beans may be sown broadcast with a grain drill or with a cotton planter. If the grain drill is used they may be sown with all the holes open or, if the crop is to be cultivated, only from every fourth hole. The usual method is to sow broadcast or with all the holes of the drill open.

"Except in the extreme South, where the grain crops are harvested early and there is a long growing season, the earlier varieties of cowpeas and soy beans should be chosen. The better varieties of cowpeas for growing after grain are the Whippoorwill, Brabham, Iron, New Era and Groit. In the northern portion of the area, only early varieties like New Era and Groit should be grown. Among the better and more common varieties of soy beans are Ito San and Mammoth. The Ito San and Medium Yellow are a month earlier in maturing than the Mammoth. If the crop is to be cut for hay, it is especially desirable to plant early varieties in order that they may reach the proper stage of maturity while the weather is yet good for curing. If the crop is to be pastured off, early varieties are also desirable so that some seed will be produced. If, however, it is to be plowed under for green manure, the varieties should be chosen which will give the heaviest growth. Among these are the Brabham and Iron cowpeas and the Mammoth soy beans.

"The rate of seeding for both soy beans and cowpeas naturally varies with the method of planting. If sown broadcast, one bushel of soy beans or one to two bushels of cowpeas are required to the acre. If sown thickly with the grain drill, one bushel of either crop may be used; while if planted in wide rows and cultivated, two to three pecks of cowpeas or one and a half to two pecks of soy beans are sufficient. Cowpeas and sorghum sown together make a heavy yield of excellent hay or green forage. If sown in close drills, one bushel of cowpeas and half a bushel of sorghum should be used, while if grown in cultivated rows three pecks of cowpeas and one to one and a half pecks of sorghum are needed."

"Another good leguminous crop to follow small grain, particularly in the Carolinas and the Gulf States, is the Spanish peanut. This variety grows quickly and makes good yields of forage and nuts, and at the same time adds nitrogen to the land. It is particularly good for growing on sandy land, where the nuts reach their best development."

179. Williams, C.B. 1915. Soy bean for the North Carolina farmer. *Farmer and Mechanic* (*The*) (*Raleigh, North Carolina*). Aug. 31. p. 12.

• ***Summary:*** "China and Japan are the greatest producers and consumers of soy beans in the world. In this country, particularly so in the South, North Carolina is the state in which this crop is most generally grown. Thousands of bushels are shipped from this State to other parts of the country each year. They grow from the seashore to the Western boundary, but at the present time their growth in a more or less intensive way is confined largely to the northeastern counties of the State. In field trials that have been made by the Division of Agronomy in different parts of the State it has been found that this crop not only makes a satisfactory growth throughout the eastern part of the State but also in the mountain and Piedmont sections. In the upper Piedmont and mountains it has been found by repeated trials as well as by the farmers themselves that the soy bean generally does better than do cowpeas as a summer growing legume. The chief reason for this is that the soy bean is much hardier than the cowpea and will continue growing much later in the fall than will the pea. Again, the plants will stand a light frost in the fall without injury while the cowpea will stop growing when the nights become cool and will be killed

by the first light frost.

"Suitable Varieties: Of the two hundred or more varieties that have been introduced into this country from Japan, China, Manchuria and India, not more than a dozen are commonly grown. In this State, it has been found that where the growing season is short, as in the case of the upper Piedmont and mountain sections, early maturing varieties for seed production like the Wilson and Tar Heel generally do best. While in the eastern portion of the State, Mammoth Yellow, Haberlandt, and Hollybrook are good yielders.

In any portion of the State, for hay production, if the seeding is made early enough, the Mammoth Yellow and Haberlandt varieties are particularly well adapted. Serious faults of many varieties are that they ripen unevenly and the pods burst open when ripe and scatter the seed on the ground. These qualities will have to be chiefly overcome by the skilled plant breeder.

"Selecting and Preparing the Soil: Although this crop will grow on a great variety of soils, it does its best growth generally on mellow, fertile loams and clays. Soy beans do fairly well on sandy soils, especially those containing lime, Swampy and peaty soils after being drained and limed usually produce well. The more favorable the soil the larger the development of the plant will be ordinarily, while the yield of seed frequently is comparatively small, but on poor soils the production of forage will be relatively small in comparison with the seed. This is true, to a considerable extent, however, with most other plants. For their best development they require a well drained soil, but are able to stand more water in the soil than either corn or cowpeas after they have begun to grown. Under no circumstances, however, should the seed be down on soil which is saturated with water for a greater portion of the year, nor on close or other soils that are inclined to bake. Soy beans will grow on soils too port to grow the clovers but will not generally do as well on these as will cowpeas. Thorough preparation of the soils is essential for best results. Breaking of the land should be deep, and should be followed by a thorough disking or harrowing. The seed bed should be fairly compact underneath without being hard and the surface three of four inches should be loose and mellow. All clods should be crushed and weeds and grass destroyed.

"Inoculation Essential: Soy beans like other legumes are characterized by their ability to take free nitrogen from the air, if the soil is inoculated with the proper bacteria for this crop. In growing soy beans on land for the first time, especially in a locality where soy beans have not been grown previously, it will usually pay to inoculate the soil by one of the methods generally recommended, either using soil from an inoculated field, or one of the commercial cultures. The latter may now be secured at very reasonable prices. In some parts of the state, I would say, however, that the bacteria suitable for inoculating the crop seem to be quite widely distributed in the soil. When soy beans are planted on uninoculated soil, the second year, it will usually be found that nodules are present on the roots in large numbers by natural inoculation. Experiments have shown that something like 50 per cent more nitrogen was found in the stems and leaves of soy beans planted on inoculated than in those grown on uninoculated soil.

"Fertilization: As soy beans on inoculated soil will be able to gather their nitrogen from the atmosphere, it will usually not be necessary on fairly good soils to add but little if any commercial nitrogen. However, if the soil is poor, it will pay to make an application of barnyard manure or add sufficient cotton seed meal, dried blood, fish scrap or other carriers of nitrogen to give the fertilizer mixture used on the beans one or two percent of nitrogen. Ordinarily from 200 to 400 pounds of 16 per cent acid phosphate and 25 to 50 pounds of muriate of potash will supply the necessary amount of phosphoric acid and potash needed by this crop when grown on average soils in the eastern part of the State. The acid phosphate alone will generally be sufficient to add on average soils in the Piedmont and mountain sections which are not generally in need of potash.

"Seed and Cultivation: Soy beans may be seeded broadcast with a drill or they may be put in in rows. Where sown for hay, soiling or grazing, they should be broadcast or put in with a grain drill at the rate of one to one and one-half bushels per acre, or if for seed, they should be planted in rows 30 to 40 inches apart, putting about one-third of a bushel of seed per acre and using a corn or bean planter. The plants should average two to four inches apart in the row. In planting, the seed should be covered from one to two inches deep with a planter that does not compact the surface, as soy beans, especially, planted deep are more subject to failure of stand than most any of our other crops. The planting should not take place until the land is fairly warm, a good time being just after corn planting has been finished. The soy bean may, however, be sown earlier than the cowpea. When sown in rows, the cultivation should be shallow, especially after the first one and should be sufficiently thorough and frequent to keep down grass and weeds and to maintain a good dust mulch.

"Soy beans are particularly valuable in short rotations with small grains. The latter is removed in time in the spring for the soy bean to be planted to make a complete growth before frost. Particularly so, is this, in the Piedmont and Coastal Plain section of the State. This crop may be used in place of cowpeas in almost any rotation which the farmer wishes to adopt. The soy bean does not seem to benefit an immediately succeeding crop as much as does a crop of clover or cowpeas. They fit into a rotation for the Central and Eastern parts of this State as would red clover in the mountain section.

"Soy Beans in Mixtures: Experiments have demonstrated that this crop does well when sown in mixtures with cowpeas, sweet sorghum or millet. By sowing with

sorghum or millet, the yield of hay is increased and the protein of the soy bean balances the carbo-hydrates [sic] of the sorghum and millet.

"When sown with corn, the entire crop is either used for silage or else for pasturage of stock. In sowing soybeans or cowpeas, the Clay is a good variety of peas, with the Mammoth Yellow bean, as they will practically reach the haying period at the same time when sown together.

"Harvesting for Hay: The harvesting should take place after the pods have begun to form, but before they are grown. If left until the pods are fully ripe the beans will shatter out badly, the leaves will fall off, and the stems will become too woody for the best hay. There is a rapid decline in the feeding value of the stems as the plants approach maturity. In cutting, an ordinary mowing machine with side delivery attachment or self-rake reaper may generally be used with very satisfactory results. The vines should be cured in the swath, winrow [sic, windrow] and cock as is generally done with cowpeas, exercising care that the vines be exposed to direct sun light as little as possible after they have wilted in the swath, in order to prevent the leaves from falling off. After wilting, rake into winrows and there allow to remain for a day or two after which, if the weather has been favorable, they may go into cocks or piles and be capped. In good weather, they may go into the barn after remaining in the cocks for about a week. In curing, the best results are secured by the use of curing frames. These should be so constructed as to admit of a thorough ventilation of air through the center of the pile. The piles should be relatively high in proportion to their diameter. Every precaution possible should be taken in curing to save the leaves which are the most valuable parts of the plants for feeding purposes. On good land a yield of from one to two tons per acre should be secured" (Continued). Address: Director, North Carolina Experiment Station.

180. Williams, C.B. 1915. Soy bean for the North Carolina farmer (Continued–Document part II). *Farmer and Mechanic* (*The*) (*Raleigh, North Carolina*). Aug. 31. p. 12.
• ***Summary:*** (Continued): "Harvesting for Seed: The best time to harvest for seed is when about three-quarters of the leaves have fallen and most of the pods are ripe, but before they have dried out too much and begun to split [shatter]. If the pods are left to get completely ripe, they will burst open in cutting and the seed will scatter out on the ground. This is assuming that the vines are to be cut and thrashed [threshed]. However if the seed are to be harvested with one of the bean harvesters that are now on the market, the seed will have to be thoroughly ripe before the machine is put into the field. When cutting plants that are to be sent through a thrasher later, it should take place when they are slightly moist with dew. The cutting can usually be done satisfactorily with an ordinary mowing-machine with side-delivery adjustment, or with a self-rake reaper or binder. Where the acreage is small, frequently the plants are pulled out or cut with a scythe. The thrashing may be done with a flail, pea-hullers, or with grain thrashing machines after some simple adjustments have been made. It will be an advantage to have a slight dew on the plants before attempting to handle in thrashing as the splitting of the seed will be materially lessened. Thrashing should be done if possible in the field and with as little handling of the vines as conditions as conditions will permit. Soy beans ordinarily produce more seed per acre than do cowpeas. From 15 to 40 bushels per acre are generally secured, the average ranging from 20 to 30 bushels when the beans are grown under favorable conditions. As the seed spoil easily, they should not be stored in bulk after thrashing, but put in loosely woven bags that will admit a free circulation of air through them, or else be spread in a thin layer over the barn floor. The seed of the soy bean, unlike those of the cowpea, are rarely attacked by the weevil or other grain insects.

"Soy beans possess a very high value for soil improving purposes, but they do not seem to leave the soil in as good condition when removed as do cowpeas and the clovers. It has been estimated that the value of the fertilizing constituents contained in a crop of soy beans applied to the soil as green manure, is $2.44 per ton. As from six to ten tons of green matter will be produced, it will be seen what great value this crop possesses for soil improvement. Soy beans hay, on an average contains 2.48 per cent of nitrogen, 0.40 per cent of phosphoric acid, and 1.32 per cent potash, which at the commercial prices of these constituents usually prevailing in the State would make the fertilizing value of a ton of soybean hay $12.10. Soy-bean seed contain 5.30 per cent nitrogen, 1.87 per cent phosphoric acid, and 1.99 per cent potash. When the same valuations are assigned to these constituents that have to be paid for them in commercial fertilizers each bushel of soybeans will be found to contain 78 cents worth of fertility.

"Soy Beans for Soiling Purposes: The importance of the soy bean as a soiling crop is becoming more generally recognized by stockmen and dairymen. They have high feeding value and generally produce good results when fed properly. By planting at different dates, a succession of green forage would be provided for six to eight weeks during the latter part of the summer and early fall. When the crop has become well established, it grows well during drought and may come on when other crops have wilted and died. They have been found in soiling purposes to be superior to a mixture of oats and some other crops. Planted on good soil, ten tons of green succulent, rich feed should be secured per acre. If desired, this crop may be put into the silo. For this purpose it is generally combined with corn, as it does not seem to do well in the silo alone as it ferments badly, but when mixed with corn this trouble does not seem to develop. For silage, the plant should be cut as soon as the pods are well developed but before they are ripe however. For soiling

purposes the cutting should begin at flowering and may continue until the pods are three-quarters grown. In putting soy beans into the silo, they should be arranged in alternate layers with some crop like corn making the corn layers double thickness.

"Soy Beans for Pasturage: This crop is rich in protein and as particularly suited for pasturing hogs especially when the peas are grown for soil improvement. When the plants are young and tender, the hogs will practically eat the whole of the plant, but after they become mature and hard and woody they will not be eaten so rapidly. By planting the same variety at different dates, or by using different varieties of different dates of maturity the grazing may be extended over a considerable period. The grazing, however, should not ordinarily begin until after the pods have fairly well formed. The chief objection to the soy bean as pasturage crop is that the plant soon after maturity begins to drop its leaves. Although this crop is chiefly used for pasturing hogs, all other kinds of live stock may be pastured on it if desired." Address: Director, North Carolina Experiment Station.

181. 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.

182. Williams, C.B. 1915. Crop rotations for the piedmont: Fertility of the soil may be built up by a proper system. *Country Gentleman* 80(40):1517. Oct. 2.
• ***Summary:*** "From the results of experimental work we are able to recommend methods which, if followed on the main types of soil occurring in the Piedmont region of North Carolina and other states, will come nearer to maintaining their productivity than will the continuation of methods that are now too commonly in practice.

"Such a system of management must, first of all, include the application of phosphoric acid. In addition it must include either the use of large quantities of farm manures or the turning into the soil of leguminous crops, such as cowpeas, clovers, vetches, soy beans, and the like. The organic matter in the case of the greater portion of the cultivated soils of this section must be increased before maximum grain crops can be produced with profit. With this purpose in view the following rotations are recommended:

"First, a three-year rotation. First year, corn, with soy beans or cowpeas in the row at planting, or between the rows before the first or second cultivation, or sown broadcast and covered at the last cultivation; second year, wheat, red clover; third year, red clover.

"This short rotation is admirably adapted to the farms of this section. The corn stover and wheat straw should find their way back to the soil, either green or after being fed to stock. The soy beans or cowpeas should be turned under, as should be the last crop of red clover made in the second year."

"If this plan is followed, within a comparatively short time enough nitrogen should be furnished to the soil by the soy beans or cowpeas, the clover and the roughage, or stable manure, if the crops are fed, so that the application of nitrate or any other form of commercial nitrogen could be entirely dispensed with. Application of the finely ground phosphate rock and lime in such a system as this need not be made more frequently than, every four to six years. Livestock farming in connection with a rotation like this should help materially in improving the productivity of these soils. A good four-year rotation is the same as above, with oats and soy beans or cowpeas following corn the second year. Other four-year rotations that might be adopted in the Piedmont Section are as follows: First year, corn; second year, crimson clover, followed by cowpeas or soy beans; third year, wheat, red clover; fourth year, red clover."

183. 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.

184. *Advance* (*The*) (*Elizabeth City, North Carolina*). 1915. A better day for soy beans. Nov. 30. p. 2.
• ***Summary:*** "Farmers in this section will be glad to know that the Division of Agronomy at Raleigh, of which C.B. Williams is the head, is very much interested in the future of the soy bean crop, which is being more extensively grown now every year in this country.

"It is not strange that the State Department of Agriculture should be interested in soy beans, for the soy bean crop in North Carolina is larger than in any other state in the union. This year the soy bean acreage in nearly every county in this section was increased and it is said that Hyde County alone this year has harvested no less than 200,000 bushels.

"With a million bushels of soy beans now on their hands, Eastern Carolina farmers are wondering what they are going to do with them.

"In central New York, according to Mr. Williams, a factory has been established for the manufacture of soy bean milk and soy bean flour. The Kellogg Toasted Corn Flake Company of [Battle Creek] Michigan have conducted experiments with soy beans, and have expressed a desire to get in touch with growers of the product. Mr. Williams has recently visited this section and has obtained the promise of the Elizabeth City Oil and Fertilizer Company and of the Eastern Cotton Oil Company of Hertford [15 miles southwest of Elizabeth City] to conduct experiments with view to utilizing the soy bean to keep their mills running after the close of the cotton season. Also inquires have been received from the owners of factories which handle the soy bean and are able to use its by-products for information about factory sites in this section."

Note: This is the earliest document seen (June 2003) that mentions the Elizabeth City Oil and Fertilizer Company (or Elizabeth City, North Carolina) in connection with soybeans.

185. *Advance* (*The*) (*Elizabeth City, North Carolina*). 1915. Growing demand for soy bean: chief Williams believes great opportunity is presented in manufacturing by-products. Dec. 3. p. 1, 5.
• ***Summary:*** Raleigh–November 27–Mr. C.B. Williams Chief of the Division of Agronomy is particularly interested in the better utilization of the soy bean crop of this State. He feels that for the progressive manufacturer there is a great opportunity in the manufacture of by-products that are not yet being handled in this country to any extent. It was only a few years ago when cotton seeds were piled up on the farms of the Southern States to rot. When it is realized what has taken place during this interval in the utilization of the cotton seed and what it has added in a financial way to the wealth of the South, it would certainly seem that the land owners could bestir themselves to a better utilization of the soy bean. The soy bean contains on an average about the same amount of oil as is contained in cotton seed. The percentage of protein is a little higher. It seems feasible for a plan to be worked out by which cotton oil mills might use this product to materially increase the length of their working period.

"What Other Countries are Doing: During the past few years many mills have been constructed in Manchuria and Japan, as well as in England and other continental countries, for securing the oil from the soy bean. There were at the end of 1914 three modern bean oil mills in Northern Manchuria. The full capacity of these mills was about six tons of oil a day. In fact at present it is an important industry of these Oriental countries. During the past three years Manchuria has shipped the following amounts of soy bean oil into this country.

"In 1912 more than 28,000,000 lbs.

"In 1913 about 12,340,000 lbs.

"In 1914 about 16,360,00 lbs.

'The dropping off in importance of soy bean oil in the United States in 191? was due to the low price of linseed oil prevailing during that year. The oil from the soy bean is used to a considerable extent to replace the linseed. The oil which was imported was valued at [??] cents per pound. This was equivalent to 38.3 to 42 cents per gallon.

"The vice consul at Dalny, Manchuria, reported to the Department of Commerce that the mills crushing soy beans at that place had kept a record as to the amount of oil and meal consumed as well as to the cost of the operation. These figures show that the cost of crushing the beans at one of the mills at Dalny ranged from $1.54 to $1.96 per ton and the quantity ranged during three years from 25,00 to 44,000 tons annually. The amount of soy bean cake secured during these years from a ton of seed ranged on an average from 1,802 pounds to 1,817 pounds per ton. As a gallon of oil weighs seven and one half pounds approximately, it will be seen that from a ton of seed 24.4 to 26.4 gallons of oil were secured.

"It might be interesting in this connection to know that much of the oil in Manchuria is secured by rather primitive methods. The natives soak the beans in water over night then crush the seed and boil with a little water so as to burst the

oil cells of the seed. After this oil is pressed from the seed in a most primitive way, but owing to the long time the cake is allowed to remain in the presses the yield of oil is higher than is generally secured from presses of oil mills. The amount generally runs as high as 13 per cent. whereas from the best modern machinery it is seldom possible to secure more than 10 per cent. of oil. The meal secured in this way is made by the natives in the Far East into bean cake and bean cheese. This latter product constitutes an important staple food for that country and is exported too to a large extent to other parts of the world.

"It might be interesting to know too in Hong Kong, China, Chinese sauce is manufactured from the soy bean on quite an extensive scale. This sauce [soy sauce] is the basis of most modern table sauces. In 1913 $50,000 dollars worth of this sauce was imported to the United States from Hong Kong in addition to what was imported from Japan. The process used in the manufacture of this sauce is simply to grind the beans and mix the meal with water and Chinese yeast [sic, koji]. The mixture is then allowed to stand for three to four months, the liquor resulting from this being the soy sauce."

186. *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.

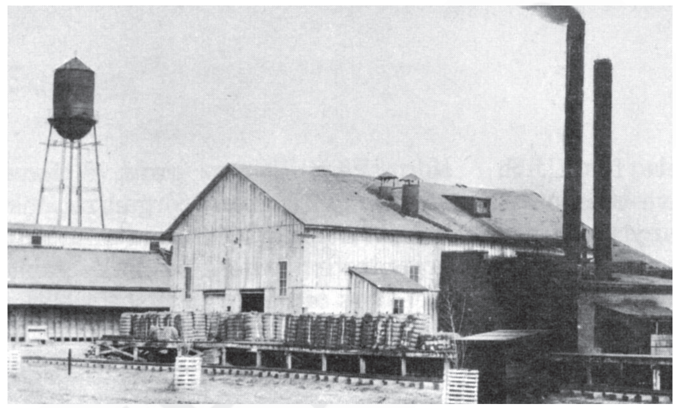
• ***Summary:*** J.M. [sic, J.W.] Morse of the United States Department of Agriculture and C.B. Williams of the Experiment Station at Raleigh will be in the city on next Thursday, December 16th as the guests of the Elizabeth City Oil and Fertilizer Company.

"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."

187. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Elizabeth City Oil and Fertilizer Company.
Manufacturer's Address: Elizabeth City, Pasquotank Co., North Carolina.
Date of Introduction: 1915 December.
Ingredients: Soybeans.



New Product–Documentation: *Advance* (*The*) (Elizabeth City, North Carolina). 1915. "A better day for soy beans." Nov. 30. p. 2. "Mr. Williams has recently visited this section and has obtained the promise of the Elizabeth City Oil and Fertilizer Company and of the Eastern Cotton Oil Company of Hertford [15 miles southwest of Elizabeth City] to conduct experiments with view to utilizing the soy bean to keep their mills running after the close of the cotton season."

Hoard's Dairyman. 1916. "A new use for soy beans." 51(3):94. Feb. 11. "The first extensive manufacture of soy bean oil and meal with domestic beans in the United States has just begun in Elizabeth City, N.C. Last year the production of soy beans in North Carolina reached the point where all demands for the seed were filled... As a result of investigations by the Division of Agronomy, the manufacture of the beans into oil and meal has now been begun. For the past ten days the oil mill at Elizabeth City has been running night and day using about twenty tons of soy beans per day. This change from the manufacture of cottonseed oil to soy bean oil was made without any great expense as the machinery had to be adjusted but little to handle the beans... The meal runs something like 10 per cent higher in protein than does cottonseed meal. The percentage of oil left in the meal ranges from 4 to 5 per cent where the oil has been extracted by Anderson expellers.–North Carolina Extension Farm News."

Note: A photo of this early soybean crushing plant is found in *Soybean Digest,* Aug. 1970, p. 58.

Nemzek, L.P. 1916. The soya bean and soya oil. *Paint Manufacturers' Association of the U.S., Educational Bureau, Science Section, Circular.* No. 37. 8 p. June 10. See p. 5. "During the past six or seven months there has been

produced in this country in the neighborhood of one hundred thousand gallons of soya oil. The largest part of this quantity has been produced by the Elizabeth City Oil & Fertilizer Co., Winterville Cotton Oil Co. and the New Bern Cotton Oil & Fertilizer Mills."

Williams, C.B. 1916. "Soy-bean products and their uses." *North Carolina Agric. Exp. Station, Circular* No. 34. p. 1-7. Dec. See p. 2-3. "The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina. From the start this mill operated night and day solely on soy beans until it had crushed it supply of about 20,000 bushels. This mill was able to crush about twenty tons during each twenty-four hours." "Other oil mills in North Carolina that crushed more or less soy beans during the past season were those located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

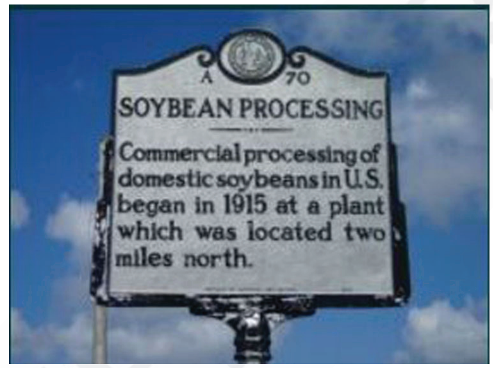
Sweeney, O.R.; Arnold, L.K.; Arnold, J.H. 1929. "Processing the soybean." *Iowa State College of Agriculture and Mechanical Arts, Official Publication* 28(7):1-46. July 17. See p. 43.

Dies, Edward J. 1942. *Soybeans: Gold from the Soil.* New York, NY: The Macmillan Co. 122 p. See p. 14. "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."

Markley, Klare S.; Goss, Warren H. 1944. *Soybean Chemistry and Technology.* Brooklyn, New York: Chemical Publishing Co., Inc. See p. 138. "The earliest recorded crushing of American-grown soybeans took place at the cottonseed oil mill of the Elizabeth City Oil and Fertilizer Company in Elizabeth City, North Carolina. This mill was later operated by the Eastern Cotton Oil Company, but its operation were discontinued in the early 1930's. The first soybean crush was largely a test run, extending from December 13 to 20, 1915. During that time, 10,000 bushels of local soybeans were pressed in the six expellers with which the mill was equipped, and the resulting meal was reported to be of excellent quality, containing 5.0 to 5.5% oil. The test was conducted by Mr. W.T. Culpeper [sic, Culpepper], manager of the firm, as part of his activities toward encouraging local soybean production. The experiment was so successful that the company continued to process local soybeans, as supplies became available, and they reportedly offered production contracts with the growers in advance in order to induce farmers to grow more of this crop. In spite of their efforts to develop the production of soybeans sufficiently to assure regular operations, difficulties were encountered, from time to time, in obtaining enough beans to warrant crushing them."

Note: This is the earliest known commercial soy product made in North Carolina (one of two products).

188. North Carolina Highway Historical Marker Program. 1915. Soybean Processing: Commercial processing of domestic soybeans in U.S. began in 1915 at a plant which was located two miles north (Sign). Elizabeth City, Pasquotank County, North Carolina.



• ***Summary:*** "Essay (on website): With the boll weevil taking its toll on North Carolina's cotton industry, the Elizabeth City Oil and Fertilizer Company, incorporated to manufacture cottonseed oil and other cotton by-products, tried its hand at a new commodity on December 13, 1915. At that time, under the management of William Thomas Culpepper, the company crushed approximately 20,000 bushels of soybeans, generating the first commercially produced domestic soybean oil in the country. The manufacture of the soybean oil was completed without a single alteration in existing equipment. Both the oil and the residual "cake," usually ground into meal, were highly marketable. Other oil mills, in towns such as Winterville, New Bern, Farmville, and Wilson, began working with soybean oil shortly thereafter. The advent of domestic soybean processing made the easily grown plant popular throughout North Carolina.

"The soybean was first planted in America in the late 1800s as forage for livestock. In 1904, George Washington Carver discovered that the soybean was a good source of protein and oil. He also learned, in experimenting with crop rotation, that planting soybeans for two years actually helped improve the soil conditions for later cotton crops. Following such research, soybean production increased. The plants flourish in North Carolina's hot, humid summers, and as of 2002, the state ranks fifteenth in the nation in soybean yields. At the time of the first processing in Elizabeth City, North Carolina was the leading producer of the legume.

"The oil processing plant was located on property at the juncture of Ehringhaus and McMorrine Streets in Elizabeth City. It is no longer standing.

"References:

"Biennial Report of the North Carolina Department of Agriculture, 1914-1916

"United States Department of Agriculture, Yearbook (1917) (Elizabeth City) The Advance, November 30 and December 17, 1915

"R.W. Judd and A.H. Probst, Soybeans: Improvement, Production, and Uses (1973)

North Carolina Soybean Producers Association website: http://www.ncsoy.or

Note: The website of this marker (No. A-70) is: http://www.ncmarkers.com/Markers.aspx?MarkerId=A-70 Address: Elizabeth City, North Carolina..

189. *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."

190. *Advance* (*The*) (*Elizabeth City, North Carolina*). 1915. Farmers attend demonstration. And much interest is manifest in cotton oil mill's new venture. Dec. 17. p. 1.

• ***Summary:*** "About thirty farmers saw yesterday the public demonstration of soy bean oil and meal manufacture at the plant of the Elizabeth City Oil and Fertilizer Company and listened to the explanation of government experts as to the possibilities of this new industry in this country.

"The soy bean was substituted for cotton seed without any change of machinery whatever, and the steps of the process of manufacture are fairly familiar to every farmer.

"The soy bean was introduced into this country [actually state] in 1882 and since that time the production has steadily increased. North Carolina produces more of these legumes than any other state in the Union, and the bulk of the State's production is grown in this eastern section. The production this year goes far beyond that of any previous year, because in the effort to curtail the cotton acreage last year the farmer's attention naturally turned to the soy bean, which here is regarded as a better crop than corn. It is also more certain, for the yield of sojas is good be the year wet or dry or normal.

"But with greatly increased acreage and production this year there was felt considerable uneasiness as to how the crop of hundreds of thousands of bushels was to be marketed. Heretofore the farmers have relied on the seedmen to buy their sojas, but it was evident that there were many times enough beans to supply the demand from that source. Thoughtful, farmers were much concerned over the situation and were asking how it was to be met.

"It was at this crisis that the State and Federal Departments of Agriculture stepped in to the aid of the farmers in this section. Men were sent into the field to look into the situation and gain some idea of the quantity of beans grown this year. The oil mills were induced to take up the manufacture of soy bean products. As a result, whereas a short time saw the price of the soy bean nominal, they are today firm at $1 a bushel...

"In England already the bankers [bakers?] are selling soy bean biscuit and soy bean bread. At Tappan, New York, soy bean flower [sic, flour] is prepared which mixed with condensed milk is recommended as a food for infants; while made into muffins, it is described (being free from starch and having little sugar) as an ideal food for diabetics.

"In short, there seems to be no doubt that there is a market for soy bean products if North Carolina cotton oil men can get in touch with it."

Note 1. This document contains the earliest date seen for the cultivation of soybeans in North Carolina (1882) (one of two documents). Note 2. This is the earliest document seen (March 2000) describing the crushing of soy beans in North Carolina.

191. *Advance* (*The*) (*Elizabeth City, North Carolina*). 1915. Farmers attend demonstration: and much interest is manifest in cotton oil mill's new venture. Dec. 17. p. 1.

• ***Summary:*** About thirty farmers saw yesterday the public demonstration of soy bean oil and meal manufacture at the plant of the Elizabeth City Oil and Fertilizer Company and listened to the explanation of government experts as to the possibilities of this new industry in this country. The number would have been very much larger but for the exceedingly inclement weather and the muddy roads.

"The soy bean was substituted for cotton seed without any change of machinery whatever, and the steps of the process of manufacture are fairly familiar to every farmer. The beans are first put through a cleaning machine after which they are ground, the resulting product resembling sawdust and having about the same texture. This 'meat' has the characteristic soy bean flavor, distinct but rather suggestive of the ordinary field pea.

"This 'meat' is then put in the presses and oil extracted, the yield of oil varying from eighteen to about twenty three per cent. The residue is soy bean 'cake' which in turn is ground into soy bean meal. The meal is more palatable than the meat, suggesting dry malted milk or ground peanuts. It has about the texture of finely ground corn meal.

"The Elizabeth City cotton oil mill has been at work all this week manufacturing both oil and meal, handling about twenty tons of the beans a day. The present outlook for marketing these products is extremely bright, one hundred tons of meal having already been sold and of the oil, all that has been extracted has been disposed of. Up to this time the Elizabeth City Oil and Fertilizer Company is the only concern which has actually begun operations in the manufacture of soy beans on a commercial scale. But other oil mills in this section have been buying sojas extensively and as soon as they clean up their work in cotton seed they will begin the manufacture of soya bean oil and meal. Both the State and the Federal departments of agriculture have been working toward the end of inducing the cotton oil mills to extend their active season by the substitution of the beans for cotton seed. How long the mills will run after the manufacture of soja bean products is undertaken depends on their ability to secure the beans in sufficient quantity and at such a price as will make the manufacture of soy bean meal and oil a paying business.

"The soy bean was introduced into this country in 1852 [sic] and since that time the production has steadily increased. North Carolina produces more of these legumes than any other state in the Union, and the bulk of the State's production is grown in this eastern section. The production this year goes far beyond that of any previous year, because in the effort to curtail the cotton acreage last year the farmer's attention naturally turned to the soy bean, which here is regarded as a better crop than corn. It is also more certain, for the yield of sojas is good be the year wet or dry or normal.

But with greatly increased acreage and production this year there was considerable uneasiness as to how the crop of hundreds of thousands of bushels was to be marketed. Heretofore the farmers have relied on the seedmen to buy their sojas, but it was evident that there were many times enough beans to supply the demand from that source. Thoughtful farmers were much concerned over the situation and were asking how it was to be met.

"It was at this crisis that the State and Federal Departments of agriculture stepped to the aid of the farmers in this section. Men were sent into the field to look into the situation and gain some idea of the quantity of beans grown this year. The oil mills were induced to take up the manufacture of soy bean products. As a result, whereas a short time ago the price of the soy bean was nominal, they are today firm at a dollar a bushel.

"When one considers the fact that soy bean is imported into this country in large quantities from Manchuria, when he is told that the product is now used in large quantities by manufacturers of the high grade soaps in the United-States, when he hears that a factory has recently been equipped in New York for the manufacture of soy bean milk and that from this milk a condensed milk and cheese can be manufactured, he begins to see the possibilities of this new industry which is just opening up in North Carolina. Then he hears that it was not until the Russo-Japanese war that the soy bean products were imported into Europe and that at this time there is a big demand for the meal in all the dairying countries of that continent, while in England the oil as a solid is taking the place of fats in the kitchen to such an extent as much of it is now used in all other fats and oils combined, he begins to wonder if the manufacturers of soy bean products in North Carolina may not become as important an industry as is today the manufacture of cotton seed products.

"In England already the bankers are selling soy bean biscuit and soy bean bread. At Tappan, New York, soy bean flower [sic, flour] is prepared which mixed with condensed milk is recommended as a food for infants; while made into muffins it is described (being free from starch and having little sugar) as an ideal food for diabetics.

"In short, there seems to be no doubt that there is a market for soy bean products if North Carolina cotton oil men can get in touch with it."

192. *Morning Star* (*The*) (*Wilmington, North Carolina*). 1915. The soy bean's day coming, Dec. 31. p. 4, cols. 2-3.
• ***Summary:*** "While the production of the soy bean in Eastern North Carolina has been given a boost by the successful demonstration of the practicability of manufacturing oil and meal from these beans in the cotton oil mills so numerous in the South, without the addition of machinery, the Old World is beginning to attach more importance than ever to the merits of the soja, attention to which has been particularly augmented by discussion of the food blockade against Germany during the war, according to a London correspondent of the Associated Press.

"It is hardly too much to contemplate that the soy bean and its products will yet become one of the world's great commercial commodities, staple as cotton seed, oil and meal are today.

"The fact that the soy bean can be manufactured into oil and meal, thus developing a new and important industry that means so much to agriculture without involving great initial expense in providing new machinery is a circumstance that gives the bean industry an advantage rarely if ever enjoyed by any new line of enterprise. This itself ought to prove a tremendous impetus to the soy bean industry in Eastern North Carolina and the South.

"From the standpoint of the cotton oil mills, at present at least, the chief importance of the soy bean is that it provides raw material for the operation of the oil mills after the annual supply of cotton seed is exhausted, thus enabling them to operate profitably during the entire year or a large part of the year, whereas, with cotton seed alone, they are able to operate only a few months in the year, hardly more than half the year, on the average, we should, say. During the balance of the year the cotton mills are idle. It is an economic fact

that idle machinery is a liability and not an asset to its owners.

"At present Manchuria is the world's center of soy bean production, more than 25 per cent of the cultivated area of that country being devoted to these beans. Of course, they are produced on a comparatively small scale in other countries. In the northern portion of Eastern North Carolina, soy bean production has been for years a fairly important part of the farming operations, the beans being shipped to commission houses to be disposed of largely for seeding purposes. However, the production this year in that territory was greater than the demand for this purpose, hence the recent practical investigation for the purpose of finding other uses and markets for them, resulting in their manufacture into oil and meal.

"The soy bean is now the second on the list of China's exports and is well known and highly regarded in Germany and the Scandinavian countries, but it has hitherto achieved small general reputation in the English-speaking countries, and even the latest dictionaries dismiss it with the brief description: 'An Asiatic leguminous herb, Glycine Soja, the seeds of which are used to prepare sauce called soy.'

"Although the Chinese have used the soja bean extensively for at least two thousand years, the first important shipment to Europe was made in 1908, by a British firm. The Germans almost immediately began to experiment with it and five years later were using the major part of an importation estimated at over $200,000,000 a year.

"The secret of the soja bean is its universal usefulness. A British government report gives the following list of soja products: 'Vegetable food (like marrowfat peas [green vegetable soybeans or edamamé]), soups, meat substitute, chocolate substitute, macaroni preparation, flour, artificial milk, cheese, coffee substitute, artificial horn, biscuit and food for diabetic patients, sauce, meal for cattle, oils, oil cake for fodder, fertilizer, bean cake.'

"The same report points out that the oil from the bean is used in the manufacture of the following articles: 'dynamite and high explosives; soaps; linoleum; rubber substitute; margarine; paints; varnishes; toilet powder; waterproof cloth; paper umbrellas and lanterns; salad oil; lubricants; lamp oil; preservative for sardines; substitute for lard.'

"The pod of the soja is about two inches in length and the plant has an erect stem two or three feet high. There are three principal varieties of the bean–yellow or huangtou, green or chingtou, and black or wutou. The yellow contains more nutritive ingredients than the others, and this is the variety almost exclusively used for export. The quantity of oil extracted from the beans runs as high as 29 per cent of the total weight.

"Sweden uses large quantities of the bean cake as food for milch cows; Denmark has a large pressing factory at Copenhagen; France has a factory built in Paris by a Chinese firm; and South Africa has recently begun to grow the bean in competition to the Manchurian farmers. Germany in 1912 rescinded her former import duty and installed reduction [crushing] plants for the Far Eastern vegetable product in all her oil mills, importing the beans directly from Vladivostok by the shipload."

193. Kaupp, B.F. 1915. Proper methods of housing and handling the farm flocks. *North Carolina State College of Agriculture, Extension Circular* No. 6. 15 p. Dec.
• ***Summary:*** This article begins: "In regard to the housing of farm poultry, the most successful and profitable way is to have the poultry house portable. The timbers supporting the building should be four inches thick and six or eight inches broad and dressed like a sled runner, so that horses may be hitched to it and move it from place to place. Corn fields, cotton fields, beet fields, cane fields and orchards make excellent locations for the poultry. They also do well in fields of rape, vetch, cowpeas and soja beans.

"The breeding stock may be allowed to run in a field in one part of the farm and the youngsters in another field. The sitting and brooding coops or the movable colony brooder houses may be located in the corn field or orchard and the chickens allowed the run of the clean grass orchard run or ploughed fields from the time they are baby chicks.

"By this method a greater percentage will be raised. Two crops will be yielded by the same ground, that is, a crop of chickens and a crop of corn or fruit."

Note: At top of p. 1: "Issued from the Office of Poultry Investigations and Pathology, Animal Industry Division, Monthly Circular, No. 12. Dec. 1915." Address: Poultry Investigator and Pathologist.

194. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Eastern Cotton Oil Co.
Manufacturer's Address: Hertford, Hertford Co., North Carolina.
Date of Introduction: 1915.
Ingredients: Soybeans.
New Product–Documentation: *Advance* (*The*) (Elizabeth City, North Carolina). 1915. "A better day for soy beans." Nov. 30. p. 2. "Mr. Williams has recently visited this section and has obtained the promise of the Elizabeth City Oil and Fertilizer Company and of the Eastern Cotton Oil Company of Hertford [15 miles southwest of Elizabeth City] to conduct experiments with view to utilizing the soy bean to keep their mills running after the close of the cotton season."

Williams, C.B. 1916. "Soy-bean products and their uses." *North Carolina Agric. Exp. Station, Circular* No. 34. p. 1-7. Dec. See p. 2-3. "The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina... Other oil mills in North Carolina that crushed more or less soy beans during the past season were those

located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

Gardner, Henry A. 1923. "Examination of commercial American soya bean oil." *Paint Manufacturers' Association of the U.S., Educational Bureau, Science Section, Circular.* No. 165. p. 117-18. Jan. "The following mills are now crushing the bean and selling the oil... Eastern Cotton Oil Co., Elizabeth City, North Carolina."

Sweeney, O.R.; Arnold, L.K.; Arnold, J.H. 1929. "Processing the soybean." *Iowa State College of Agriculture and Mechanical Arts, Official Publication* 28(7):1-46. July 17. See p. 43.

Note: This is the earliest known commercial soy product made in North Carolina (one of two products).

195. Gray, Dan T. 1915. Report of the Division of Animal Industry. *North Carolina Agricultural Experiment Station, Annual Report* 38:28-30. For the year ended June 30, 1915.
• ***Summary:*** The section titled "Swine" (p. 28) states: "To determine the effect of peanuts, soy beans, mast and other softening feeds upon the bodies of hogs and their lard, with a view to developing a plan of feeding to counteract these unfavorable results." The results are not given.

Note: *Merriam-Webster's Collegiate Dictionary* (1998) defines mast, a word first used before the 12th century, as "nuts (as acorns) accumulated on the forest floor and often serving as food for animals (as hogs)." Address: Chief, Animal Industry Div. [Durham, North Carolina].

196. Williams, C.B. 1915. Report of the Division of Agronomy. *North Carolina Agricultural Experiment Station, Annual Report* 38:10-16. For the year ended June 30, 1915. See p. 15-16.
• ***Summary:*** "Much work in the breeding of velvet beans, cowpeas, and soybeans has been carried on at the Central farm with promising results."

"A number of varieties of soybeans, too, have been tested on the farms of F.P. Latham of Belhaven and W.T. Holderness of Tarboro. Both of these gentlemen have shown great interest in the results that are being secured in the tests."

"During the spring arrangements were made for conducting with the Office of Forage Crop Investigations of the Bureau of Plant Industry a series of experiments with cowpeas and soybeans. In these investigations plats were planted which were designed to study the relative value of different varieties; of different methods of culture; of different rates of seeding; and of different times of planting of soybeans and cowpeas. These experiments are being conducted at the Buncombe and Edgecombe farms." Address: Chief, Div. of Agronomy.

197. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Havens Oil Co.
Manufacturer's Address: Washington, Beaufort County, North Carolina.
Date of Introduction: 1916 January.
Ingredients: Soybeans.
New Product–Documentation: Dies, Edward J. 1942. *Soybeans Gold from the Soil.* "Still another mill, operated by Havens Oil Company at Washington, North Carolina, crushed thirty thousand bushels of beans as an experiment in 1916."

Gardner, Henry A. 1923. Examination of commercial American soya bean oil. *Paint Manufacturers' Association of the U.S., Educational Bureau, Scientific Section, Circular* No. 165. p. 117-18. Jan. "As a result of the efforts of the Educational Bureau (Footnote: See Circular No. 155 [Nemzek 1922]), soya oil has now become an important American crop product. The following mills are now crushing the [soy] bean and selling the oil, according to the Secretaries of the Cottonseed Crushers' Associations:... Havens Oil Co. (Washington, North Carolina)."

Smith, Alfred G. 1923. *Country Gentleman.* Feb. 10. p. 8, 42. "New grist for the oil mills: Soys have a great market in Dixie's cottonseed plants." "During the war [World War I] some cotton-oil mills imported soy beans from Manchuria for crushing purposes. I know of at least two North Carolina mills that used over 5,000 tons of Manchurian beans. Jonathan Haven, at Washington, North Carolina, has been crushing soy beans, both local and foreign, in his cotton-oil mill for years."

Sweeney, O.R.; Arnold, L.K.; Arnold, J.H. 1929. "Processing the soybean." *Iowa State College of Agriculture and Mechanical Arts, Official Publication* 28(7):1-46. July 17. See p. 43.

Dies, Edward J. 1942. *Soybeans: Gold from the Soil.* New York, NY: The Macmillan Co. 122 p. See p. 14-15. "Still another mill, operated by Havens Oil Company at Washington, North Carolina, crushed thirty thousand bushels of beans as an experiment in 1916."

Markley, Klare S.; Goss, Warren H. 1944. *Soybean Chemistry and Technology.* Brooklyn, New York: Chemical Publishing Co., Inc. See p. 140. "Others, who engaged in soybean processing during the early twenties, include the Seeds Oil Company in Indianapolis [Indiana] and the Jonathan Havens Oil Company at Washington, North Carolina."

Funk, Gene, Jr. 1949. "The first [soybean] processors." *Soybean Digest.* June. p. 42. "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."

198. *Hoard's Dairyman.* 1916. A new use for soy beans.

51(3):94. Feb. 11. [1 ref]
• ***Summary:*** "The first extensive manufacture of soy bean oil and meal with domestic beans in the United States has just begun in Elizabeth City, N.C. Last year the production of soy beans in North Carolina reached the point where all demands for the seed were filled. This year, due to the fact that there was a great reduction in the acreage devoted to cotton and that the value of soy beans as a forage crop has been amply demonstrated, the supply of soy beans was even greater than that of one year ago. Something had to be done to prevent such a valuable crop from being a drag on the market before the average farmer of the state was acquainted with its use. As a result of investigations by the Division of Agronomy, the manufacture of the beans into oil and meal has now been begun.

"For the past ten days the oil mill at Elizabeth City has been running night and day using about twenty tons of soy beans per day. This change from the manufacture of cottonseed oil to soy bean oil was made without any great expense as the machinery had to be adjusted but little to handle the beans. The superintendent of the mill estimated that the labor expenditure required in making the adjustment was not over $5.00.

"At present, from a ton of 2,000 pounds of the beans, they are securing something like 30 gallons of oil and 1,650 pounds of meal... A good many local farmers in the vicinity of the mill have purchased the meal for fertilizing purposes and for feeding their live stock. Some of them have been using it like corn meal for making muffins...

"The meal runs something like 10 per cent higher in protein than does cottonseed meal. The percentage of oil left in the meal ranges from 4 to 5 per cent where the oil has been extracted by Anderson expellers.–North Carolina Extension Farm News."

Note 1. Note: This is the earliest document seen (Sept. 2016) the mentions the use of a mechanical screw press or expeller for crushing soy beans. Note 2. This is the earliest English-language document seen (Sept. 2016) that contains the word "expellers" (or "expeller") or the term "Anderson expellers" in connection with soy beans. Address: Fort Atkinson, Wisconsin.

199. Latham, F.P. 1916. Soy beans as a cereal: Soy beans a great crop for southern farmer. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(8):254-55. Feb. 19. See also p. 286 (Feb. 26) and p. 342 (March 4).
• ***Summary:*** "The first mention of the soy bean in this country was in the early part of the 19th century; however, it attracted little attention prior to 1854, when 2 varieties were brought to this country from Japan by the Perry expedition. It followed that other varieties were found and introduced, among them that 'old standard,' the Mammoth Yellow, which came to our shores sometime previous to 1882. The success with Mammoth furnished an encouraging lead to our diligent research workers, resulting in the importation into this country by the Department of Agriculture of some 800 distinct varieties."

As a cereal, it is widely produced in Japan, China, Korea, and Manchuria. "By certain processing of the ground beans a milk is extracted which is not such a poor substitute for the real article; from this a cheese [tofu] is made that resembles in texture and nutrient value, our cottage cheese. Another product is a heavy, rich sauce [miso], similar to our peanut butter, which is consumed in large quantities. Soys occupy the place in the diet of these people that navy and lima beans do in our own, and are prepared in a like manner. They furnish the brown man his 'peanut.' By the simple process of soaking in salt water, then roasting they at once become a close competitor of the famous American delicacy."

"So far as I have been able to ascertain there is but one mill in the United States built for and operating exclusively on soy beans. The Pacific Oil mills, of Seattle, Washington, have build up a lucrative business in this line and only get foreign beans for crushing, its output of both oil and meal meeting a ready demand in the West. That such can be done profitably in the South is no longer a question. The fact has already been demonstrated by several cotton oil mills in eastern North Carolina... If these satisfactory results can be obtained in mills not constructed for the purpose of handling beans, it is entirely reasonable to suppose that specially constructed machinery will in time be installed that will further enhance the profits accruing from such operations."

A portrait photo shows F.P. Latham.

Note 1. This is the earliest document seen (Aug. 2011) that mentions Pacific Oil Mills of Seattle, Washington.

Note 2. This is the earliest of many articles seen (Aug. 2011) that likens tofu to cottage cheese, or roasted soybeans to peanuts. Address: Belhaven, North Carolina.

200. Latham, F.P. 1916. Soy beans for southern farmers: Forage crops vs. cotton, and soy beans as a solution–second in a series of three articles. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(9):286. Feb. 26.
• ***Summary:*** "The lack of adequate forage production in the South, of both roughage and grain, is the most serious impediment in our advance to the place to which our soil and climate entitles us." The South needs "provender crops" now that little profit can be made from growing cotton. Legumes assimilate nitrogen from the air and transform it into valuable animal feeds without drawing heavily on nitrogen in the soil.

"I know of no plant that extracts more of its composition from the invisible wealth about us than the soy bean. Nor do I know any other plant that fills the numerous forage requirements of the Southern farmer as perfectly as it does. As a producer of hay its yield per acre of a high-class article is equal to that of any of our recognized hay plants. It possesses the added advantage over many other crops

of being a creditable grain yielder... the hay has proved practically equal to alfalfa, a feed recognized as being in the 'A' class of American provender. The grain contains much higher feeding value than corn; in fact, the digestible contents are higher than cottonseed meal.

"The plant... has the knack of coming back and making good after receiving setbacks that would put a less hardy plant entirely out of business. It is further possessed of a wonderful capacity for adjustment. It can be wedged in all over the farm, once the habit is formed. Drilled or broadcasted after wheat or oats, it gets busy and makes a valuable second crop. Planted in corn in June, it utilizes the time of the land from corn maturity to near frost, without lessening the yield of the latter." The writer has used it as a "catch crop" sowed at the last working of corn and peanuts. The key is to use legumes.

A small oval portrait photo shows F.P. Latham. Note: This periodical is published in Raleigh, North Carolina. Address: Belhaven, North Carolina.

201. Jones, S.A. 1916. Peas and beans. *Monthly Crop Report* (*USDA*) 2(2):18-19. Feb. 29.

• ***Summary:*** "Since the discovery, in the present generation, of the full value of the legumes as soil renovators, through the addition to the soil of nitrogen, the importance of their place in an intelligent system of farming continues to receive increasing recognition by the average farmer." Each of the major types is discussed in this order: Soy beans, common white and colored beans, lima beans, velvet beans, Canadian field peas, and cowpeas.

"Soy beans: The soy bean is to a certain extent a competitor of the clovers, but its principal usefulness is as a substitute for the latter is sections where clovers are not successfully grown. The production of soy beans met first with marked favor in North Carolina and Tennessee, and these two States remain the leaders in the production of this crop, though their area of growth has rapidly extended into other States, particularly to the north and west. They are comparable with cowpeas as a forage crop, but have met with more favor north of the cotton belt than in it, where cowpeas have the preference.

"The relatively greater popularity of the soy bean compared with the cowpea in the northern portion of their range of cultivation, may be in part due to the fact that the former produces relatively better than the latter on rich clay loams, and more poorly on thin and sandy soils. It also does better on lowlands. Conversely, droughty conditions and extreme heat cause the leaves to drop from the plant, making it less valuable for hay, the grain shatters badly, and the crop requires much more skill and attention in handling than cowpeas, which facts, particularly in view of the type of farm labor in much of the cotton belt, makes it less available there than the cowpea.

"Soy beans are not generally used as a human food in this country, although perfectly edible. Its principal use is as a stock food, about 10 per cent being fed as mature grain, mostly in the form of milled feed, 15 per cent as grain in the straw, either cut or pastured, and 52 per cent as hay cut green or siloed. Four per cent is plowed under for fertilizer, about 18 per cent, or over 3 bushels from each acre, is saved as seed. As one bushel out of the normal yield of 18 bushels per acre would suffice to seed an acre, if broadcast, and half a bushel if planted in cultivated rows, it is evident that the acreage of this crop must be increasing rapidly. In dairy sections, the soy bean is often planted with corn, and both crops are harvested together and cut up for silage."

SOY BEANS.

State.	Percentage of crop used for—						Normal yield per acre.		Planting—usual date.	Harvesting—usual date.	Acreage, compared with total acreage of all beans and peas in State.
	Human food (grain).	Stock feed, matured grain.	Stock feed, matured grain fed in the straw or pastured.	Seed.	Cut green for hay.	Plowed under.	Grain.	Plant cut green for hay.			
Va.........	6.0	11	15	12	46	10	20.0	1.9	May 15..	Sept. 15.	3.5
N. C........	1.0	11	14	19	51	4	18.9	2.2	June 5..	Sept. 10.	......
Ohio........	.....	13	15	6	47	19	20.0	2.0	May 25..	Sept. 20.	43.0
Tenn........	.....	3	14	18	61	4	15.0	2.0	June....	Sept....	15.0
Ala.........	.....	25	30	10	30	5	18.0	1.6	May 15..	Sept. 15.	5.0
Miss........	.....	......	47	14	38	1	22.0	3.0	June 15.	...do.....	1.0
All others..	13.0	23	22	14	39	17	18.3	2.1	....	....	1.5
U.S.....	.9	9.9	14.7	18.2	51.9	4.4	18.39	2.16	....	....	......

A table (p. 19) titled "Soy beans" gives statistics on utilization in the following states: Virginia, North Carolina, Ohio, Tennessee, Alabama, Mississippi, and All other. For each state is given (in 11 columns): Percentage of the crop used for: Human food (grain), stock feed (matured grain), stock feed (mature grain fed in the straw or pastured), seed, cut green for hay. Normal yield per acre: Grain, plant cut green for hay. Planting, usual date. Harvesting, usual date. Acreage, compared with total acreage of all beans and peas in State. Virginia has the highest use for human food (6%). Mississippi has the highest yield of grain (22.0 bu/acre) followed by Virginia (20 bu) and Ohio (20 bu). Ohio has the highest percentage of soybean acreage

compared with total acreage of all beans and peas in State (43.0%), followed by Tennessee (15.0%), and Alabama (5.0%). Soybeans are planted from May 15 to June 15 and harvested from Sept. 10 to Sept. 20.

Note: This is the earliest USDA publication seen that gives statistics on soybean utilization (by state) in the United States; however it does not give soybean production or acreage by state, or in the USA as a whole. Address: Bureau of Crop Estimates.

202. *Commercial Fertilizer* (*Atlanta, Georgia*). 1916. Soy beans as oil and feed rival of cottonseed. 12(1):48. Feb. [1 ref]

• ***Summary:*** "This dispatch from Elizabeth City, N.C. [North Carolina], is of unusual milling interest:

"Up to this time the Elizabeth City Oil and Fertilizer Company is the only concern which has actually begun operations in the manufacture of soy beans on a commercial scale. But other oil mills in this section have been buying sojas extensively, and as soon as they clean up their work in cotton seed, they will begin the manufacture of soja bean oil and meal. Both the State and the Federal departments of agriculture have been working toward the end of inducing the cotton oil mills to extend their active season by the substitution of the beans for cotton seed. How long the mills will run after the manufacture of soja bean products is undertaken, depends on their ability to secure the beans in sufficient quantity and at such a price as will make the manufacture of soy bean meal and oil a paying business.

"The soy bean was introduced into this country in 1882 and since that time the production has steadily increased. North Carolina produced more of these legumes than any other state in the union, and the bulk of the state's production is grown in the eastern section. The production this year goes far beyond that of any previous year, because in the effort to curtail the cotton acreage last spring the farmer's attention naturally turned to the soy bean, which here is regarded as a better money crop than corn. It is also more certain, for the yield of sojas is good be the year wet or dry or normal.

"But with greatly increased acreage and production this year there was felt considerable uneasiness as to how the crop of hundreds of thousands of bushels was to be marketed. Heretofore the farmers have relied on the seed men to buy their sojas but it was evident that there were many times enough beans to supply the demand from that source. Thoughtful farmers were much concerned over the situation, and were asking how it was to be met."

203. Latham, F.P. 1916. The soy bean a great soil builder: Third and last of a series of articles on soy beans for southern farmers. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(10):342. March 4.

• ***Summary:*** "Above all others, the problem of paramount importance to the owners of the farms of the Cotton Belt today is the restoration of fertility and the maintenance of productive capacity... The only continued assurance of permanent fertility of soils is the maintenance of humus, and the only practical and economical source of valuable nitrogen-carrying humus open to all farmers is by legume culture."

"One of the most prevalent and economical methods of utilizing the soy bean crop is to feed as forage and use the manure for renovation. Another very popular method that has its strong advocates is that of 'hogging down' the crop. By the latter method the labor of harvesting is eliminated and the whole amount of nitrogen less the small amount going into the composition of the animal body is returned to the soil.

"The practice of storing free nitrogen from the air in the soil is the South's salvation. If soy bean's are the agents to be used, they will pay a substantial revenue to the grower for the privilege of feeding to his hungry soils this invisible necessity to which all plant life owes its vigor. Their character of growth and habits of production both commend them to the. Southern farmer as a renovator. If conditions change after the crop has been planted, making the alteration of plans desirable, the utilization of the crop can be switched to any one of many channels of usefulness. In other words, they constitute the monkey-wrench member of the legume family.

"A renovating plant to be popular with Southern farmer's must be a dual purpose one, able to stand abuse and still make good. Soys fit that angle. My observation and experience have led me to the conclusion that if soys are given their proper place and attention on every farm, the grower's anticipation will be fulfilled with gratifying results."

An oval portrait photo shows F.P. Latham. Address: Belhaven, North Carolina.

204. *Paint Manufacturers' Association of the U.S., Educational Bureau, Scientific Section, Circular.* 1916. The work on miscellaneous oils. No. 34. 4 p. March 20.

• ***Summary:*** "Since certain phases of this work have now reached the stage of practical significance, it has seemed proper to inform the members fully in regard to it:

"Soya beans and soya oil: This year, for the first time, American grown Soya Oil has appeared on the market. This fact is due absolutely and entirely to work of the Bureau through Mr. Nemzek, in introducing the several varieties of Soya Beans through the state experiment stations and in stimulating their interest therein. The results have been most gratifying. The state experiment stations and the United States Department of Agriculture have co-operated liberally to interest farmers in the crops, so that the prediction made in the Bureau's 1912 report, that within a few years American grown Soya Oil would be available, is now fully justified.

"The introduction of the crop was but the first step, if the oil was to be made available for consumption. Fortunately,

the states first and most largely interested in the new crop are those already growing cotton and therefore generally equipped for crushing cotton-seed. The cotton-seed oil mills were, therefore, approached and have generally manifested interest, since the Soya Bean becomes available at a season when cotton-seed crushing is at its lowest ebb.

"It has been stated by an official of the Bureau of Plant Industry that North Carolina alone last year produced about 2,000,000 bushels of the beans and our reports show that the crop is rapidly growing in the favor of farmers in a dozen or more of the States.

"The first mill to produce the oil on a commercial scale was the Elizabeth City (N.C.) Oil and Fertilizer Co. In December last they advised the Bureau that they had on hand about 6,000 gallons. A sample was obtained and, investigation proving it to be at least equal in all respects to the imported oil, an attempt was made to purchase it, with the idea of distributing it to members of the Association as the first lot of American grown Soya. An offer of 69 cents per gallon was made for the entire lot–but, before the negotiations could be concluded, the entire lot was sold to a soap manufacturer at a price considerably above our offer. Doubtless, all that is produced this year will be taken by the same industry. Imported Soya Oil rules at about 70 cents per gallon, but is practically unobtainable at any price. Any vegetable oil can be used for soap-making and consequently it is to the advantage of consumers of one particular oil–linseed, for example, that this industry shall have ample supplies of other oils.

"In ordinary times American grown Soya Oil will probably become available for all the requirements of paint and varnish manufacturers, at a reasonable price.

"Samples of this oil examined by our investigators showed the following constants. The constants of Manchurian oil are given for comparison:"

The constants are: Specific gravity, Iodine number, Acid number, and Saponification number. The two samples of the American soya oil came from the Elizabeth City Oil & Fertilizer Co. and the Winterville Cotton Oil Co. They were compared with values reported by Lewkowitsch for Manchurian soya oil.

"By the time that a regular and adequate supply of the oil is available, facts regarding its use and its limitations will be ready and will be communicated in regular form.

"Meanwhile, we have a chemist of ability and experience conducting for us in one of the leading universities a complete research on the fat-splitting enzymes of this and other oils. The information thus far obtained gives promise of important and far-reaching results for the paint and varnish industry–results which may easily prove to be fundamental and revolutionary.

"It is interesting to note that in Schedule No. 9304, Class No. 33, the United States Navy Department called for bids on 650 gallons Soya Bean Oil for the Mare Island (California) Navy Yard."

Note 1. The Bureau has adopted the name "tung oil" for another oil it is testing; it is also known as "wood oil," "China wood oil," or "Chinese wood oil."

Note 2. At the top of page 1 we read: H.A. Gardner, Director of Scientific Section, Washington [DC]. Circular 35 states that Gardner is Asst. Director, The Institute of Industrial Research, Inc., Washington, DC. L.P. Nemzek, Special Technical Representative, Gibbsboro, New Jersey. G.B. Heckel, Secretary, Philadelphia. Address: Philadelphia, Pennsylvania.

205. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: New Bern Cotton Oil & Fertilizer Mills.
Manufacturer's Address: New Bern, Craven County, North Carolina.
Date of Introduction: 1916 March.
Ingredients: Soybeans.
New Product–Documentation: Nemzek, L.P. 1916. The soya bean and soya oil. *Paint Manufacturers' Association of the U.S., Educational Bureau, Science Section, Circular.* No. 37. 8 p. June 10. See p. 5. "During the past six or seven months there has been produced in this country in the neighborhood of one hundred thousand gallons of soya oil. The largest part of this quantity has been produced by the Elizabeth City Oil & Fertilizer Co., Winterville Cotton Oil Co. and the New Bern Cotton Oil & Fertilizer Mills."

Williams, C.B. 1916. "Soy-bean products and their uses." *North Carolina Agric. Exp. Station, Circular* No. 34. p. 1-7. Dec. See p. 2-3. "The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina... Other oil mills in North Carolina that crushed more or less soy beans during the past season were those located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

Sweeney, O.R.; Arnold, L.K.; Arnold, J.H. 1929. "Processing the soybean." *Iowa State College of Agriculture and Mechanical Arts, Official Publication* 28(7):1-46. July 17. See p. 43.

206. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Winterville Cotton Oil Co.
Manufacturer's Address: Winterville, Pitt Co., North Carolina.
Date of Introduction: 1916 March.
Ingredients: Soybeans.
New Product–Documentation: Nemzek, L.P. 1916. The soya bean and soya oil. *Paint Manufacturers' Association of the U.S., Educational Bureau, Science Section, Circular.* No. 37. 8 p. June 10. See p. 5. "During the past six or seven months there has been produced in this country in the

neighborhood of one hundred thousand gallons of soya oil. The largest part of this quantity has been produced by the Elizabeth City Oil & Fertilizer Co., Winterville Cotton Oil Co. and the New Bern Cotton Oil & Fertilizer Mills."

Williams, C.B. 1916. "Soy-bean products and their uses." *North Carolina Agric. Exp. Station, Circular* No. 34. p. 1-7. Dec. See p. 2-3. "The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina... Other oil mills in North Carolina that crushed more or less soy beans during the past season were those located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

Sweeney, O.R.; Arnold, L.K.; Arnold, J.H. 1929. "Processing the soybean." *Iowa State College of Agriculture and Mechanical Arts, Official Publication* 28(7):1-46. July 17. See p. 43.

Dies, Edward J. 1942. *Soybeans: Gold from the Soil.* New York, NY: The Macmillan Co. 122 p. See p. 14-15. "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."

207. Moss, D.L. 1916. Bacteria, our invisible friends and foes: their relation to agriculture. Article No. 14 on "Farm facts every boy should know." *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(14):450. April 1.
• ***Summary:*** The article begins with a sidebar: Learn What These Words Mean:

"Bacteria (singular, bacterium)–one-celled vegetable organisms occurring nearly everywhere in nature and which profoundly affect the lives of practically all plants and animals.

"Bacilli (singular, bacillus)–rod-shaped bacteria.

"Spirilli (singular, spirillus)–bacteria that are curved or spiral in shape.

"Cocci (singular, coccus)–bacteria that are spherical or ball-like in shape.

"Fission–a process of reproduction by which single cells divide into two cells.

"Saprophytic–a term descriptive of the kind of bacteria that live on dead organic matter.

"Parasitic–a term descriptive of bacteria that live on living animal or plant tissues.

"Inoculation–the process by which bacteria are introduced into any medium not containing them.

"Pathogenic–A term used to describe bacteria that cause disease."

"Still other friendly bacteria that are of vast economic importance to the whole world are those that live on the roots of certain plants called legumes and that have the remarkable power of taking nitrogen from the air and putting it in a form in which it can be used by the plants.

"The great value of this particular kind of bacteria will be better understood when we remember that over each acre we have in the air some 35,000 tons of nitrogen, each pound of which is worth at least 20 cents. The legume crops, such as peas, beans and clovers, have the power, aided by the little nitrogen-fixing bacteria that live on their roots, of drawing on and using some of this immense store of nitrogen.

"It should be remembered that the legumes can only use the nitrogen in the air when the nitrogen-fixing bacteria live on their roots, and when these particular bacteria are not present in the soil they may and should be artificially supplied. This process is called inoculation. Nitrogen-fixing bacteria love a warm, mellow, well drained soil filled with organic matter or humus, and these conditions should be supplied where they are not already present."

Illustrations show: (1) Anthrax bacilli. (2) Three forms of bacteria: coccus, bacillus, and spirillum. (3) Showing how bacteria multiply by cell division.

208. Williams, C.B. 1916. More soy beans for the South. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(14):451. April 1.

PROF. WILLIAMS

• ***Summary:*** Contents: Introduction. Uses of the soy bean on the farm. Commercial uses. Varieties for different sections and purposes (Mammoth Yellow, Virginia, Wilson). The soil and its preparation. Fertilizing soy beans.

"Farmers have found that the soy bean when grown under the same conditions generally produces a larger amount of growth and beans than does the cowpea; particularly is this so if the crop is planted in rows and cultivated once or twice. This does not mean that there is not a place for the growing of cowpeas, for there is ample room for the growing of both of these crops on Southern soils. The soy bean, however, has a much wider range of adaptation than does the cowpea. It will make much better growth on poorly drained soils and will stand cool weather much better than will the cowpea. For this reason chiefly it has been found that it is a much more satisfactory crop for growing in the mountains and the more elevated portions of the Piedmont section than is the cowpea. The cool nights of early fall will not stop the growth of the soy bean but it [sic] will that of the cowpea. Again, a light frost will kill the cowpea

but will not materially injure the soy bean.

"Uses of the soy bean on the farm: The chief uses of the soy bean on the farm will be for soil improvement, seed production and for feed for livestock either green or after being cured as hay. There is no question but that the greatest usefulness of this legume will be for adding humus and nitrogen for the improvement of Southern soils. I take it that no one will question that most of our Southern soils would be greatly benefited by the plowing in to them this crop for the organic matter which contains a liberal supply of nitrogen. It has been estimated that the fertilizing value of a crop of soy beans plowed into the soil green will be about $2.50 for each ton of green matter turned in. If from six to ten tons of this matter should be produced on each acre it will be seen what great value this crop possesses for soil improvement. Soy bean hay on an average will contain about 2.5 per cent of nitrogen; 0.4 per cent of phosphoric acid; and 1.3 per cent of potash which, taken at the average commercial prices of this constituent contained in commercial fertilizers, would make a ton of dried soy bean hay worth as a fertilizing material $12."

"Commercial uses: During the past year in North Carolina and some of the other Southern states a considerable quantity of soy beans have been used by the cotton oil mills. It is probable that this new industry is the beginning of one that will develop in a few years into a large one throughout the South. The oil mills ordinarily have a relatively short operating period, and if they can utilize soy beans for the prolonging of their operating season, although the financial returns should not be so great as with cotton seed, it will tend to reduce the overhead charges."

Photos show: Professor C.B. Williams (small oval portrait). A man standing behind tall soybean plants. Soy beans and by-products: small glass containers of soy beans, soy bean meal, soy bean cake, and soy bean oil. Address: Univ. of North Carolina.

209. Williams, C.B. 1916. Soy beans in North Carolina. *Country Gentleman* 81(14):738. April 1.

• ***Summary:*** A brief summary of the soybean situation in North Carolina, the amount produced, the uses to which it is put, and the value of the crop as imported into this country from East Asia.

"During the past few years soy beans have almost replaced cowpeas as a summer legume in much of the eastern part of North Carolina."

"The soy-bean crop of North Carolina is probably larger than that of any other state in the Union. Last season's production in a few counties in the eastern portion of the state was about 1,000,000 bushels. Hyde County with a total improved area of a little more than 37,000 acres produced from 200,000 to 300,000 bushels, the average yield ranging from thirty to forty bushels an acre.

"Up to now, soy beans grown in the eastern section have been shipped to other sections for seed. At present, however, there is considerable interest in the establishment of factories to convert beans into meal and hulls."

"The meal has a high feeding value for livestock and has also great value as a fertilizing material. In this country the meal has been put up and distributed to a limited extent as a food for diabetics."

"The oil imported is used chiefly in the manufacture of soft soap, lard [lard compounds, later called shortening], and butterine. It has value also in the manufacture of paints and varnishes as a substitute for linseed oil."

Note: This is the earliest document seen (Oct. 2016) stating that soy-bean oil is used in the United States to make butterine [margarine]. This was probably due to the shortage of other oils during World War I. Address: Univ. of North Carolina.

210. Williams, C.B. 1916. Soy beans in rotation. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(15):491. April 8.

• ***Summary:*** The author believes "that the chief value of this crop for Southern farmers will be for soil-improving purposes. In order to use it to best advantage, it will be necessary for farmers to adopt some system of crop rotation in which soy beans come in at least once in the rotation."

He describes two 3-year rotations for Piedmont soils, and two 3-year rotations for the sandy and sandy loam soils of the Coastal Plain section of the South.

Note: In geography, the word "Piedmont" refers to foothills–in this case of the Appalachian Mountains. It is derived from the French word meaning foot (*pied*) of the mountain (*mont*). Address: Univ. of North Carolina.

211. *Los Angeles Times.* 1916. Value of the soy bean. April 17. p. II8.

• ***Summary:*** From the New York Sun: "Indications are that Florida will some day be a great producer of vegetable oil from the soy bean. The United States Department of Agriculture was somewhat alarmed at the fact that the cottonseed production would not be sufficient to meet the demand for cottonseed meal.

"It was noted that the importation of soy bean oil from Manchuria was growing in great proportions, and in South Carolina [North Carolina?] the cotton oil mills began to take the soy bean, and from it they have extracted thirty gallons of oil and 1,650 pounds of meal a ton of soy beans, with a resultant value of $62 a ton.

"Soy beans and cottonseed are the only sources of vegetable oil produced in the south.

"Pound for pound the soy bean meal is the best stock food known, and the plant is a soil builder, being a legume. The soy bean is a splendid fertilizer material, being equal, if not superior, to the cottonseed meal."

212. 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.

213. White, Buxton. 1916. The soy bean industry of eastern North Carolina. *North Carolina State College of Agriculture, Extension Circular* No. 9. 8 p. April.
• ***Summary:*** Contents: Introduction. Environmental requirements. Varieties. Preparation for planting. Fertilization. Inoculation. Time of planting. Seeding and cultivation. Soy beans in rotation. Soy beans in combinations. Seed production. The seed for oil. Soy beans for hay. As a pasture crop. As a soiling crop. For ensilage. Conclusions.

"Introduction: The soy bean, soja bean, or stock pea as known locally, is a crop which is justly playing an important role in eastern North Carolina in the present movement for diversified farming... This bean has various points of superiority which commend it to the farmers of this country. One of its common uses is for hay, which is equal to alfalfa and red clover in feeding value. It is especially suitable as a pasture crop for hogs, and it also makes an excellent ensilage with corn. The soy bean can be utilized to advantage for green manuring, greatly increasing the supply of humus and nitrogen in the soil...

"Varieties: There are at the present time about fifteen varieties of soy beans handled commercially by seedsmen, but in eastern North Carolina, where seed production is the principal purpose for which grown, one variety, Mammoth Yellow, comprises the bulk of the crop. The Mammoth is the largest growing and latest of our present commercial varieties. Under average conditions it grows from 3 to 5 feet high, the height attained depending principally on the character of the soil. Ordinarily it requires from 120 to 150 days to mature a crop of seed. The Mammoth yields well in both grain and roughage, but the character of the latter is rather coarse. Under no circumstances should the seed be planted more than two inches deep, this variety being most exacting in this detail. The habit of growth is such that it can be readily harvested with machinery. The Tar Heel Black is somewhat similar to Mammoth, but matures about a week earlier and makes a slightly better grade of forage, being more branchy. The Haberlandt is a low, bushy bean, about twenty to thirty days earlier than Mammoth and a heavy seed producer. Tokio has a habit of growth similar to Haberlandt, but is later and larger. It holds its foliage longer than Mammoth or Tar Heel and is one of our heaviest yielders. All these latter varieties are well suited to the eastern part of the State and are supplanting the Mammoth on a number of farms."

"Seed Production: For seed production the soy bean has been a very profitable crop, but the industry has been developed mainly in a few sections, of which eastern North Carolina is perhaps the largest in the United States... Under ordinary conditions the best varieties yield from 20 to 30 bushels per acre and sell for $1.25 to $2.50 per bushel to seedsmen or $1 per bushel to oil mills."

"For feeding to farm animals the seeds are ground and mixed with less concentrated feeds. Experiments comparing soy bean meal and cottonseed meal indicate the superiority of soy bean meal for both milk and butter production.

"For harvesting the seed there are two methods in general use in eastern North Carolina. The older and more common practice is that of cutting the vines, curing, and thrashing. The other, which has been rapidly gaining in popularity, is that of gathering the beans from the mature standing vines in the field by means of a patented bean harvester, of which there are several makes [such as the Gordon Harvester].

"For thrashing, the plants may be cut any time from the yellowing of the upper leaves until all of the leaves have fallen. The vines should remain in the field until the seed are thoroughly cured. The thrashing may then be accomplished by an ordinary grain thrasher, with a few adjustments. The cylinder should be run at one-half speed, but at the same time the rest of the separator should be run at the usual speed. In order to avoid splitting the beans, some of the concaves should be removed.

"The bean harvester is a two-wheeled machine which straddles the row and is drawn by two horses. As the

machine moves over the row of plants, four rows of rapidly revolving arms shatter the beans into a receptacle at the rear. For the successful operation of this harvester the crop must be on ridges elevated not less than 6 to 8 inches above the water furrow, and the plants should have shed their leaves. Under favorable conditions, two men and two horses can harvest an acre of soy beans in two hours by this method. While there is a slight waste with this harvester, it is more than compensated for by the saving of time and labor."

"The Seed for Oil: In an effort to reduce the cotton acreage last year more soy beans were grown in eastern North Carolina than ever before. The production was so great that it was impossible to dispose of the crop through seedsmen, as was the general practice previously. However, as a way out of this difficulty, the Division of Agronomy of the State Department of Agriculture induced several cottonseed oil mills to lengthen their running season by the extracting of soy bean oil, which, until now, has been a practically untouched industry in this country. The experiment met with marked success, and a constant market for the seed is now assured...

"Conclusions: The meal from the seed of this legume is now attracting some attention as a human food, and the oil and cake from them have become commercial products... Having once gained an introduction, the soy bean has rapidly grown in popularity as its virtues have been disclosed, until today it holds a permanent place in the cropping systems of the eastern Carolina farms."

Photos show: (1) A close-up of rows of soy beans in eastern North Carolina (front cover). (2) Two people harvesting soy beans grown between corn rows with a bean harvester (p. 6). (3) Two people emptying beans from another type of harvester (p. 6). (4) Soy bean hay being cured (p. 7).

Note: This is the earliest document seen (Dec. 2016) in which the soybean is referred to as the "stock pea." This term was apparently used only in eastern North Carolina to refer to soybeans. Elsewhere it referred to *Vigna catjang.* Address: Asst. Agronomy.

214. 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].

215. Dacy, George H. 1916. New products from soy beans: The crop yields valuable meal and oil. *Country Gentleman* 81(23):1145. June 3.

• ***Summary:*** "Seven North Carolina oil mills converted 100,000 bushels of soy beans into approximately 4,800,000 pounds of meal and 94,500 gallons of oil during the recent milling season. The successful production of soy-bean meal and oil on a commercial scale is notable in that it places on the market a mill feed containing twenty to twenty-five per cent more protein than does cottonseed meal; it affords the soy-bean raisers a new and profitable market outlet for their grain; it provides an oil that is suitable for practically all the purposes for which cottonseed oil is used and that can be sold at a lower price, while it will boom the bean business so that a large acreage of the soil-improving soys will be raised each year.

"Any oil mill equipped to handle the cotton crop can also mill soy beans. In fact, the milling of these two crops will probably become twin operations with the average mill. As soon as the cotton milling season is over soy beans will tackled, so that the average working period of the mill will be lengthened. This will permit the employment of a more permanent labor supply.

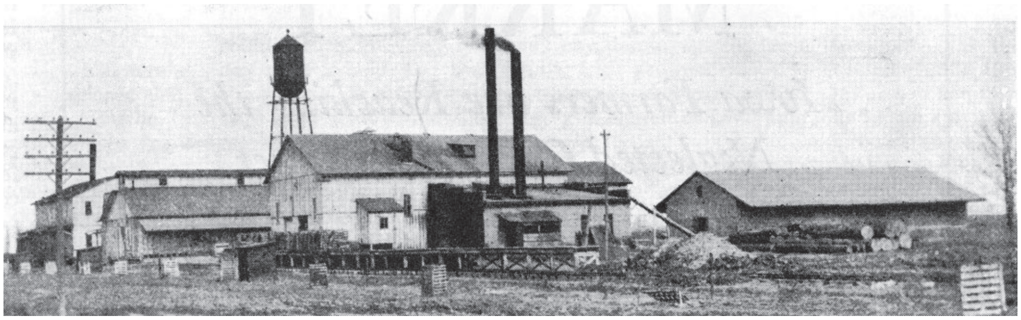
"The average mill will accommodate 45 tons of cottonseed during 24 hours, while it will handle only 15 tons of soy beans during a similar period. One ton of cottonseed usually yields 900 lb of meal and 40 gallons of oil; one ton of beans will produce from 1600 to 1650 lb of meal and 31.5 gallons of oil.

"Soy-bean meal is a valuable dairy and poultry feed because of its high content of protein... When it becomes widely known this meal will be in demand over cottonseed meal. At present there is practically no market for the product, so the current supply was sold to fertilizer companies for use in high-grade fertilizers. The meal brought $40 a ton for this purpose. On the Pacific Coast, where soy-bean meal has been manufactured for several years as a dairy feed, the material has become very popular at $37.50 a ton.

"The soy-bean belt of North Carolina includes Beaufort, Hyde, Tyrrell, Chowan and Pasquotank Counties. In that section nearly every farm grows an annual crop of soys...

"Most of the beans are Mammoth Yellows, as this variety is well adapted to local conditions and has been most popular since its introduction into the state in 1882.

"Formerly the farmers cut their beans with a mower at harvest time. Then they would rake and stack the forage and thresh the seed with an ordinary grain separator, in



which blanks were substituted for some of the concaves. The custom was to pay the machine man one-eighth of the seed for his work. This really meant that the threshing cost about twenty cents a bushel. Some farmers, who grew only a small acreage, flailed the seed out by hand, but this was a slow and expensive method.

Special bean threshers, which sold for $100 to $250, depending on the size and type, have been on the market for some years. They perform good work when the beans are cut with a self-rake reaper or binder and are fed into the thresher in a well-cured, dry condition. However, such a machine involves a large cash outlay unless a number of neighboring farmers own it jointly, and then it is necessary to handle the bean crop several times before the threshing operation is completed."

"Consequently a new type of combination harvester and thresher, which has been in use only two seasons, has met with the glad hand among the Tarheel bean growers. The device has but one adjustment and on this account is adapted for use only in fields where the beans are grown in ridged rows. Such a method of planting is practiced in order to provide a simple system of drainage.

"The machine is pulled by a team of horses or mules, and it requires two men to operate it in order to harvest from 75 to 100 bushels of beans a day. The implement is provided with a number of pickers or fingers which work in centrifugal fashion and shred the bean seed from the pods and stalks, leaving the forage standing in the field. The seed passes through the machine where it is cleaned before it is deposited in sacks at one side.

The machine wastes some beans over the ground during the harvest. The farmers turn hogs and cattle into the bean fields to range on the forage and waste seed after threshing. These bean threshers and harvesters cost ninety dollars, but they measurably lessen the cost of producing soy-bean seed."

"The average yield of seed is from 20 to 25 bushels to the acre. Last year the lowest price paid by the oil mills for seed was $1 a bushel, while the top was $1.20... many of the oil mills are contracting with farmers to raise large acreages of soy beans this season. One farmer has agreed to raise about 1000 acres, while several others will devote from 200 to 500 acres of beans.

"All the farmers are not using their bean fields exclusively for the production of seed to be marketed as a cash crop. Some convert the beans into pork by hogging off, while others make silage or hay from the forage, or feed it as a soiling crop.

"Soy-bean meal merits a trial on every American dairy farm. It contains about 25% more protein than does cottonseed meal...

"Soy bean meal has also been converted into flour, which makes extremely nutritious bread. No doubt 1917 will see some soy-bean breakfast food on the market."

A photo shows a cottonseed-oil mill, with a tall smokestack, that can convert soy beans into meal.

Note 1. This is the earliest document seen (Jan. 1998) that mentions the use of a "combination harvester and thresher" or "harvester and thresher" for soybean production. More advanced models of this machine soon came to be called a "combine."

Note 2. This is the earliest document seen (March 2002) that discusses the use of a early combine-like machine for soybean production.

Note 3. This is the earliest document seen (July 2016) containing the term "soy-bean belt" (or "soy bean belt"), however it is referring to that belt only in the one state of North Carolina.

216. Butler, Tait. 1916. Timely farm suggestions: Soy bean meal and cottonseed meal compared. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(24):751. June 10.
• ***Summary:*** Soy bean meal (which contains a guaranteed 47.8% protein and 6.8% fat) sells for $40 per ton and cottonseed meal (which contains 42.0% protein and 8.5% fat) sells for $38 per ton. For feeding hogs, poultry, and horses, the soy bean meal is worth about $5 per ton more than the cottonseed meal.

217. Butler, Tait. 1916. Timely farm suggestions: Soy beans as a cash crop. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(24):751. June 10.
• ***Summary:*** "The South is searching for a money crop to take the place of some of its cotton, or at least in addition to cotton. In this search soy beans should not be overlooked."

"With the coming of the cotton boll weevil, the oil mills are anxious for another crop that will yield oil."

"There is no longer any excuse for the purchase of high-priced protein feeds for feeding livestock while soy beans can be grown in the same season after a crop of oats or wheat."

218. *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."

219. White, H.M. 1916. Soy beans. *Commonwealth* (*The*) (*Scotland Neck, North Carolina*). July 7. p. 1.
• ***Summary:*** "Most planters with whom I have talked regarding Soy Beans, claim that a crop can be made if they are planted before July 10th, and I thought it a good idea to write this letter suggesting an active campaign by each manager in his local territory, in an effort to induce farmers to start planting soy beans this year, even though in a small way. The results will interest them and they will plant more largely another season.

"The development of this production will be of immense value to the oil mill industry. If we can secure a tonnage of soy beans to work in connection with cotton seed, the oil mills will be benefitted to an incalculable extent by having the length of their season increased and overhead charges reduced proportionately.

"It appears that soy beans are practically about as good a raw product of crush as cotton seed, and I believe that we should do everything in our power to help the development of soy beans. Unquestionably, the boll weevil is making his way towards us, and when he does arrive, if we can judge by the decreased production of cotton in Louisiana we have some conception of what our lot will be. The soy bean may prove to be our salvation.

"I am just in receipt of a letter from one of the large refiners seeking information regarding soy bean oil, and states that they expected to handle a...

"As a matter of information, I beg to advise that Soy Bean Harvestors are manufactured by L.S. Gordon and Geo. E. Pritchard, Elizabeth City, N.C. I understand their prices range from $90, to $100.00, f. o. b. There is also a new harvestor now being manufactured by Mr. R.L. Spikes, Farmville, N.C., which. I understand is very satisfactory because of an attachment that blows the husks and other refuse back into the field, and leaves, the beans thoroughly cleaned. This machine sells for $150.00 without the cleaner $125.00,

"Soy bean acreage in Pitt county has increased wonderfully this year, and they are still planting." Address: Sec. and Treas. [name of organization at bottom of page cut off].

220. Williams, C.B. 1916. Soy beans for seed. *Country Gentleman* 81(35):1592. Aug. 26.
• ***Summary:*** "Although the soy-bean crop will in all probability find its greatest usefulness for soil-improving purposes, and to a less extent for pasturage purposes, there is no question that under average conditions there will be developed a considerable seed industry. It seems to have been established during the past winter and spring that the cottonseed-oil mills may handle these beans in about the same general way they handle cotton seed, if they can secure the seed at a price low enough to justify them in crushing it."

"It should be remembered always by the farmer that in the growing of a leguminous crop, unless the crop itself or the manure carefully saved from the feeding of the crop is returned to the soil, the productivity of his soil cannot be maintained." Address: [North Carolina State College of Agriculture].

221. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Farmers' Cotton Oil Mill.
Manufacturer's Address: Wilson, Wilson County, North Carolina.
Date of Introduction: 1916 September.
Ingredients: Soybeans.
How Stored: Shelf stable.
New Product–Documentation: Williams, C.B. 1916. "Soy-bean products and their uses." *North Carolina Agric. Exp. Station, Circular* No. 34. p. 1-7. Dec. See p. 2-3. "The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina... Other oil mills in North Carolina that crushed more or less soy beans during the past season were those located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

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. "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."

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. "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..."

222. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Farmville Oil and Fertilizer Co.
Manufacturer's Address: Farmville, Pitt Co., North Carolina.
Date of Introduction: 1916 September.
Ingredients: Soybeans.
How Stored: Shelf stable.
New Product–Documentation: Williams, C.B. 1916. "Soy-bean products and their uses." *North Carolina Agric. Exp. Station, Circular* No. 34. p. 1-7. Dec. See p. 2-3. "The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina... Other oil mills in North Carolina that crushed more or less soy beans during the past season were those located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

Nemzek, L.P. 1917. "Soya beans as a oil-seed crop." *Paint Manufacturers' Association of the U.S., Educational Bureau, Science Section, Circular* No. 48. 6 p. May 16. See p. 2. "Only a small quantity of soya beans grown in 1916 were crushed for oil. While the crop was considerably in excess of that of any previous years, the demand for seed purposes was enormous. The situation is very well summed up in the following extract from the Farmville Oil and Fertilizer Company's (N.C.) letter dated 3/23/17:

"'The demand for soya beans for planting is heavier than anybody anticipated this year, and they are selling for two or three dollars per bushel f.o.b. here for shipment to all parts of the South and lower valley.

"'It looks like another year there will be plenty beans in the country, and in a few more years they should be grown in volume sufficient to amount to something from an oil-producing standpoint.'

"This letter is an example of many which I have received during the last three months in reply to an inquiry regarding the crop outlook for 1917."

223. *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."

224. 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.

225. Williams, C.B. 1916. The commercial use of the soybean [for oil]. *North Carolina State College of Agriculture, Extension Circular* No. 29. 16 p. Oct. Revised ed. Oct. 1936.
• ***Summary:*** Extracts of letters from companies using commercial quantities of soybean oil about how they use the oil. Discusses soap, paint, varnish, enamel, Japans, linoleums, oilcloth, asphaltum, and other waterproofing materials. It is most widely used together with linseed oil in industrial non-food products. Also salad oils and other human foods.

Companies that actually use or have used the soybean in commercial products they manufacture are: Larkin Co. (Buffalo, New York; Soap). C.H. Parker Co. (Valparaiso, Indiana; Varnish). Thibaut & Walker Co. (Long Island City, New York; Varnishes and Japans). Eagle Paint and Varnish Co. (Pittsburgh, Pennsylvania; Paints and Varnishes). Burckhardt Co. (Cincinnati, Ohio; Soaps).

Procter & Gamble Co. (Cincinnati, Ohio; Soap). On p. 4 Procter & Gamble Co. writes: "We have used this oil in the manufacture of soap. We understand foreign soybean oil is offered around 7.375 to 7.5 cents per pound f. o. b. Pacific Coast points. There is no question but what there would be a steady demand for soybean oil, but the question of price is

one that would depend entirely on market conditions."

Note 1. This is the earliest document seen (July 2011) that mentions Procter & Gamble Co. in connection with soy.

Note 2. "f.o.b. or FOB stands for Free On Board. A shipping term which indicates that the supplier pays the shipping costs (and usually also the insurance costs).

The O'Brien Varnish Co. (South Bend, Indiana; Varnish). Standard Paint Co. (New York City, NY; Waterproofing compounds). The Kay and Ess Co. (Dayton, Ohio; Paint and varnish).

Glidden Varnish Co. (Cleveland, Ohio; p. 5) "We use soybean oil in place of linseed oil in some of our dryers and paint productions, and it is our opinion that if soybean oil was commercialized in this country to an extent that it would be sold for a price slightly under the linseed oil price, its use would be very extensive... There is no question but that it could be used successfully in all soap factories and similar plants where linseed oil is used."

Note 3. This letter is the earliest document seen (April 2016) concerning The Glidden Co. and soy.

The Cudahy Packing Co. (Glycerine Department, Chicago, Illinois; p. 5). "Glycerine is not manufactured directly from soybean oil, but is recovered from this product as a by-product in the manufacture of soap. We have used and are now using large quantities of soybean oil for soap-making purposes, and find the glycerine recovered therefrom very satisfactory."

H.H. Brunt & Co. (Chicago, Illinois; Selling agents of raw materials) notes: "Some soybean oil is used for edible purposes, Great Britain making a deodorized grade that is used in margarine, and during the past season, on account of the high prices of all oil, we think that soybean oil has been used as an edible oil in this country... We are very large sellers of this oil." Mitsui & Co. (New York City), importers of oils, note (p. 5): "Soybean oil is practically a substitute for cottonseed oil, but is recovered from this product as a by-product in the manufacture of soap. We have used and are now using large quantities of soybean oil for soap-making. Besides, it is used for edible purposes, glycerine extracting, and by some paint and varnish makers, as well as by some oil-cloth makers. There are only two kinds of this oil–cold pressed and extracted." R.A. Becker Varnish Co. (Cincinnati, Ohio; Varnish and Japan makers) notes (p. 6): "We use the bean oil in making certain varnishes and japans. Large quantities are also used in the paint trade... a very fine enamel for mills, etc. is made from 70% blown soybean oil and 30% linseed oil, with required pigment (Lithopone)... I believe its greatest use is in the manufacture of hydrogenated oils for butterine, lard, greases, etc. A large quantity is used for making so-called linseed oil soap. This is a potash soap, used for cleaning cars, automobiles, etc. The soybean oil makes a much more sightly soap, as well as not being changed by age, which linseed oil always does, especially in hot weather." Miller & Schumann Co. (Brooklyn, New York; Varnish makers. Have used soybean oil in the making of paint dryers). Peet Bros. Manufacturing Co. (Kansas City, Kansas; Laundry and toilet soaps. Recover glycerine as a by-product). Larkin Co. (Buffalo, New York; Soap) notes (p. 7): "We find that soybean oil has many qualifications of a good soap-making oil. The principal drawback to its use is in its very low titer, which makes it make a very soft soap, but the sale of soft soap in this country is comparatively small. It cannot be used alone in the manufacture of a hard soap, and must be used in conjunction with harder fats in order to produce a satisfactory soap. For this reason the amount which can be used is limited."

Armitage Varnish Co. (Newark, New Jersey; Varnishes and Japans) notes: "We use soybean oil in limited quantities and we believe that nearly all other varnish and paint manufacturers use some soybean oil in their products. The use of it in the varnish industry is limited as it is a very poor drying oil and can only be used in conjunction with a stronger drying oil, such as China wood oil. In the paint industry, this oil is used more extensively..." Lilly Varnish Co. (Indianapolis, Indiana; Varnish, asphaltum, baking japans). They "have found that it may be used most successfully in the last two items mentioned... We believe the greatest outlet for this oil is through the paint manufacturing trade." Tower Varnish and Dryer Co. (Dayton, Ohio; "We are using a large quantity of soybean oil..."). Sherwin-Williams Paint Co. (Cleveland, Ohio) notes: "The oil is more satisfactory in connection with the manufacture of paints and varnishes than either cotton or corn seed oils... because it is a better drying oil... It appears to have less tendency to yellowing when it is excluded from the light than linseed oil does." A. Robbins Varnish Co. (St. Louis, Missouri; Black baking japans as used on automobile fenders, bed springs, etc.). Sun Varnish Co. (Louisville, Kentucky). The Nairn Linoleum Co. (Newark, New Jersey). National White Lead and Color Works (Brooklyn, New York; used with linseed oil for grinding white lead and white zinc). Boston Varnish Co. (Boston, Massachusetts; "The largest consumers are the oilcloth and paint and varnish industries. D.F. Haverstick & Co. of Trenton, New Jersey, sell large quantities to the oilcloth trade."). The Ohio Butterine Co. (Cincinnati, Ohio; Wants to try some. "Don't see why it could not be [used], if it is pure, sweet and palatable"). The Brininstool Co. (Los Angeles, California; Grinding colors in oil). Oliver Johnson & Co. (Providence, Rhode Island; Grinding oil colors). The Stevens Grease and Oil Co. (Cleveland, Ohio; Soft soap. Purchased 10,000 barrels last year). The Southern Cotton Oil Co. (Charlotte, North Carolina; Refines soybean oil in car lots for use in oleomargarine by other companies).

Observations (p. 16): "During the past fall, winter, and spring a good number of oil mills of the state produced soybean oil. The oil, as might be expected, was put on the market without standardization. Buyers could, therefore, not know definitely what they were securing until the shipment

had arrived... It would seem to us that... it will become necessary that the oil of the soybean be put up in uniform standard grades, be refined when required and be shipped in regular standard commercial containers."

Note 4. This is the earliest document seen (Sept. 2001) that gives statistics concerning industrial utilization of soybeans for individual companies–in this case soybean oil for use as paints and varnishes in the USA.

226. 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.].

227. 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.].

228. 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.].

229. 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.].

230. 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.].

231. 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].

232. 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].

233. 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.].

234. Piper, C.V.; Morse, W.J. 1916. The soy bean, with special reference to its utilization for oil, cake, and other products. *USDA 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.

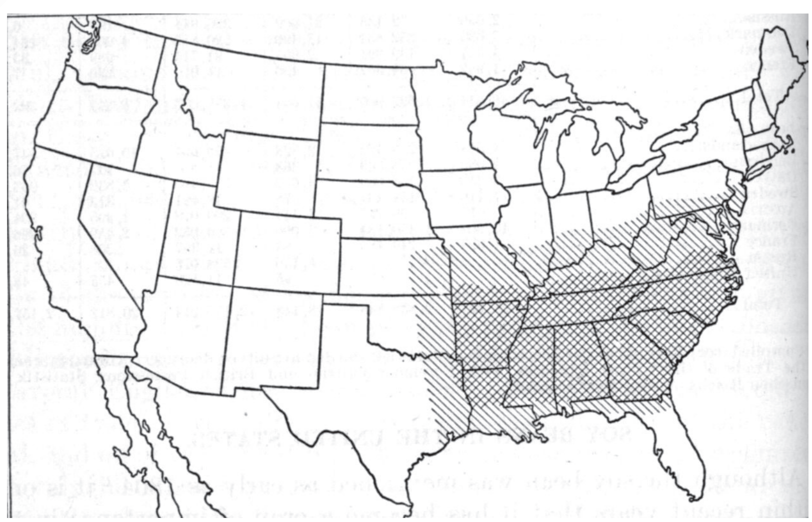
"Environment has been found to be a potent factor in the percentage of oil in the same variety. Considerable differences occur in oil content when soybeans are grown in different localities. The Haberlandt variety grown in Mississippi, North Carolina, Missouri, Virginia, and Ohio gave the following percentages 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.

235. 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). *USDA 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.

236. Williams, C.B. 1916. Soy-bean products and their uses. *North Carolina Agricultural Experiment Station, Circular* No. 34. p. 1-7. Dec.

• ***Summary:*** Contents: Introduction. First commercial crushing from domestic beans (started on 13 Dec. 1915 by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina). Soy-bean oil. Uses for the oil. Soy-bean meal. Composition and exchange value of the meal. Prices paid for beans by the oil mills. Soy-bean oil industry in England, Manchuria, and Japan. Importation of oil. Soy-bean meal as feed. Soy beans and products for human food.

This Circular begins: "In order that any people may maintain their soils in the highest state of productivity in an economical way it will be necessary that proper systems of crop rotation are used, and in these rotations it will be necessary to bring in leguminous crops at as frequent intervals as practicable. For North Carolina conditions one of the crops of this nature that may be used to good advantage in all parts of the State is the soy bean. If properly handled, this crop may be used as the means of adding to the productivity of the soils as well as to increase the net returns from the farm. Recently there has been a marked interest throughout this State and the South in the growing of soy beans." A "new outlet for the beans has developed from the crushing of the seed by a number of oil mills of the State..." The spread of the boll weevil should lead to increased interest in the soy bean.

"This crop was introduced into the State something like thirty-five years ago, yet very little was heard of it, outside of very limited areas, until quite recently, when a campaign was begun to induce the cotton oil mills of the State to use beans for crushing purposes in the same general way that cotton seed had been used for many years before. This campaign not only opened the eyes of the oil crushers to the possibilities of the soy bean in a commercial way, but of the farmers, also, to the great opportunities of this crop.

"During the spring of 1915 farmers, particularly in the Eastern part of the State, were casting about to find a crop or crops that might be substituted, satisfactorily, for cotton, as the price of this latter crop during the previous fall had been, in many cases, below the cost of production. Many farmers increased their acreage of soy beans, and as a result of this increase at least a million bushels or more of beans were produced last year." Something like 80,000 to 100,000 bushels of soy beans were used by the cotton oil mills of the State during the past fall, winter, and spring.

"The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina.

"From the start this mill operated night and day solely on soy beans until it had crushed it supply of about 20,000 bushels. This mill was able to crush about twenty tons during each twenty-four hours...

"It is understood that before the mill had ground a single bean they had contracted their entire output of oil to one of the leading manufacturers of the country at fairly reasonable prices. It, too, had no difficulty in selling its entire output of soy-bean meal, most of it going to a fertilizer manufacturer. From a ton of the beans this mill was able to secure something like 32 to 35 gallons of oil and about 1,650 pounds of meal... Other oil mills in North Carolina that crushed more or less soy beans during the past season were those located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

"Soy-Bean Oil (p. 3): One of the chief products secured in the crushing of the beans is the oil. This oil has wide usefulness at the present time in the commercial world. The amount of oil in the beans amounts to from 17 to 20 per cent. This oil, when expressed from good, sound beans is practically neutral, and about 95 per cent of it is saponifiable.

It consists chiefly of the glycerides of the fatty acids. These acids are made up of about 15 per cent palmitic, 56 per cent oleic, 19 per cent lenolic, and 5 per cent lenolenic acids. The presence of the unsaturated acids (oleic, lenolic, and lenolenic) impart to the oil drying properties. The oil, although more efficient in drying properties than cotton-seed oil, is less so than linseed oil. It is classed among the semi-drying oils.

"In a bushel of Mammoth Yellow soy beans there are ordinarily contained about 11 pounds or 1.42 gallons of oil, weighing 7.72 pounds per gallon. The oil mills at present are able, by expression methods, to get out only 70 to 75 per cent of the total amount of oil contained in the beans. By the use of appropriate solvents, such as gasoline, practically all of the oil might be removed. This latter method has never gained much headway in this country as a means for extracting oil from cotton seed, and it will probably be some time, if ever, before it will generally be used as a commercial method. From an economic standpoint the method most commonly used with cotton seed by Southern oil mills will most likely be the one that will be most generally practiced in soy-bean oil extraction. At present those mills that have apparently been most successful in manufacturing oil and meal from soy beans are those which are equipped with expellers or screw presses.

"Uses for the oil: At the present time the oil is used in this country chiefly in the manufacture of soaps, varnishes, paints, enamels, linoleums, and water-proofing materials. It has entered, also, to some extent in the manufacture of edible salad oil and butter substitutes. The untreated oil may replace linseed oil completely, with quite satisfactory results, in the manufacture of soft soaps; but it can only partially take the place of cotton-seed oil in making hard soaps. This is because the soap made from soy-bean oil is of a somewhat softer nature than that manufactured from cotton-seed oil. After hydrogenation the oil has a wider field of usefulness and may, in some cases entirely replace linseed oil or other drying oils with very satisfactory results. As the untreated oil is of a semi-drying nature, it may be used only when mixed with linseed oil for the manufacture of paints, varnishes, and enamels. In making paints, if the proportion of the soy-bean oil to the total oils present does not exceed 20 to 25 per cent, there does not seem to be any inferior qualities developed in the paint, any more than when linseed oil alone is used. In this respect the soy-bean oil is superior to cotton-seed oil, as it has not been found that the latter oil can be used for this purpose. It is not improbable that with the use of suitable dryers soy-bean oil may in the future find more extended use for this purpose. When the oil is properly refined it will yield about 10 per cent glycerine as a by-product in the manufacture of soaps. This glycerine has been found to be equal in value to that recovered from other soap-making fats, such as tallow, cotton-seed oil, cocoanut oil, etc. It is significant of the possibilities of the use of this oil that more than $5,000,000 worth of it was imported into the United States this year from other countries, chiefly from Asia.

"Soy-bean meal: The meal secured from crushing the beans is the most valuable product and will have the widest usefulness. That secured from the crushing of yellow-colored beans is of a bright yellow color while that produced from the brown and dark colored beans is of a somewhat darker shade. Meal, too, that has been treated with ordinary solvents, employed for this purpose to remove the oil, is of a brighter color than are those meals from which the oil has been removed by heating and pressure. The oil, however, secured by a solvent process would be of a darker color. The soy-bean cake secured by expression methods, has a pleasant taste, not unlike malted milk, and when ground into meal may be used, at the present time, chiefly for feeding to livestock or for fertilizing purposes. The meal as a feed is highly concentrated and nutritious, and all kinds of stock seem to relish it when fed to them properly. It should not be fed in large quantities for any great length of time, because of its highly concentrated nature. As a fertilizer it acts satisfactorily. Much of the meal produced by the oil mills of the State during the past year seems to have been sold, without any difficulty, to manufacturers for the making of mixed fertilizers." Continued. Address: Chief, Div. of Agronomy, North Carolina Agric. Exp. Station.

237. Williams, C.B. 1916. Soy-bean products and their uses (Continued–Document part II). *North Carolina Agricultural Experiment Station, Circular* No. 34. p. 1-7. Dec.

• ***Summary:*** (Continued): "Composition and Exchange Value of the Meal: From the fertilizer standpoint, soy-bean meal is richer in plant-food constituents than is cotton-seed meal. From available analysis, the meal on an average contains 7.48 per cent nitrogen, 1.4 per cent phosphoric acid, and 1.83 per cent potash. All these constituents contained in soy-bean meal should be in about as available form-for use by crops as they are in cotton-seed meal. Based on these percentages, an exchange, purely from the fertilizer standpoint, of about 1,500 pounds of soy-bean meal of average composition for 2,000 pounds (33 1/3 bushels) of beans would be about equal in money value. Where the farmer makes an exchange, he should, however, secure at least enough above this amount to cover well the cost of delivery of the beans to the mill. The meal, being a very concentrated product, should always sell as high, or higher, than cotton-seed meal, as it is usually richer in protein than the latter.

"Prices Paid for Beans by the Oil Mills: The price which the mill men can pay for soy beans will be governed to a large extent by the prices they are able to secure for the soy-bean oil and meal. If these products bring good prices the mills ought to be in a position to pay the farmer a good price for his beans. During the past fall farmers generally were able to secure from the oil mills from $1 to $1.15 per bushel. In some cases as high as $1.25 per bushel was paid.

It may be of interest in this connection to know that during 1913 and 1914 the British Oil Mills, located mainly at Hull, England, paid from $1.00 to $1.17 per bushel for Asiatic beans. During 1915 the price paid at the mills at Hull varied from $1.04 per bushel in January to $1.82 per bushel at the end of the year.

"Soy-Bean Oil Industry in England, Manchuria and Japan: In England, the oil from the soy bean is extracted largely by a secret process owned by an oil extracting company of Hull. By this process the seed are ground finely and are then treated directly by means of a solvent, which is thought to be benzine. Afterwards the oil is removed from the solvent by distilling off the latter, the solvent being used over and over again in the extractive process. The meal after treatment is dried and ground finely. The meal is of a bright color, is sweet in taste, and has a pleasant odor. By this process not more than 1 per cent of oil is left in it, the remaining meal running from 43 to 45 per cent of protein. It has practically the same number of feeding units as has meal derived directly from soy-bean cake, and it sells in Europe for practically the same price per ton. This industry in Manchuria and Japan is one of the most important and profitable. In 1911 more than 1,500,000 tons of oil were exported from these countries. Most of the oil is secured from the bean by processes of expression. Some of these methods are quite crude, especially those used by the natives.

"In the modern mill in Manchuria the soy beans are crushed in large quantities by steam-driven rollers. The crushed seed are then carried down funnels to the oil extracting room, where they are steamed by vapor, which can be regulated at will, the process being rapid, owing to the force at which the steam plays upon the wafers. In some of the mills it has been found to be more satisfactory to discard steam pressure in extracting the oil, and use hand pressure, as it is done in the mills of the natives, the reason for this being that hydraulic pressure is so quickly finished, notwithstanding the fact that a much less flow of oil is secured than by the slower hand process. The bean cake, with as much oil as is left in it after hand pressure, is not in the best condition for fertilizing purposes. By use of gasoline extraction the whole of the oil may be secured, the oil being of a clear, pure color, and hardly bearing any resemblance at all to the dark, muddy oil secured by the old hand-press method.

"The machinery used by the larger operators of England, Continental Europe, as well as of Japan, Korea, Manchuria, and China, is of Anglo-American manufacture, which is the kind ordinarily used in the expression of oil from cotton seed. In 1910 Stewart and Chard secured patents in England for a special machine which was particularly adapted for breaking up the beans. This machine has been very useful in solving some of the difficulties experienced in the soy-bean crushing industry in England.

"In England soy-bean oil for general purposes is not refined, as is cotton-seed oil in America, by the use of caustic soda, but by means of sulphuric acid and fuller's earth.

"Processes of refining soy-bean oil for edible purposes have been devised, but these, like those used for extracting the oil from the seed, have been kept secret; but they are thought in most cases to be by means of superheated steam."

"Importation of oil: In this connection it may be of interest to know that for the five years ending with 1916 there were imported into this country more than 174,000,000 pounds of soy-bean oil, which represented crushings amounting to more than 12,000,000 bushels. Of these, 47.6 per cent came through the port of New York; 36.1 per cent through Seattle [Washington]; 9.6 per cent through San Francisco [California]; 2.2 per cent through Philadelphia [Pennsylvania]; 1.6 per cent through Boston [Massachusetts]; 1.1 per cent through Chicago [Illinois]; and 1.3 per cent through all other ports of the United States. In 1916, 75 per cent of the importations came through the ports of Seattle and of San Francisco, the chief port of entry being Seattle, with 62.9 per cent of the total importation. During 1916 more than 98,000,000 pounds of soy-bean oil came in from other countries, 99.9 per cent of the total coming from Asia. Of the total amount imported from Asia, almost 72 per cent were shipped from Japanese ports. The total importations during 1916 were valued at little more than $5,000,000. It is interesting to note that at this time (October 20), because of the advance in linseed oil and the increased demand for soy-bean oil, strictly prime quality soy-bean oil is bringing 9.75 cents per pound or about 75 cents per gallon f.o.b. New York.

"Soy-Bean Meal as a Feed: The Animal Industry Division of this Station has been conducting considerable experimental work during the past year to determine the feeding value of soy-bean meal when fed to hogs and chickens. From results secured at the Branch Station in Edgecombe County, they conclude that both for rapidity and economy of gains this meal has proven itself as a superior product for part of the ration for hogs.

"In feeding trials with young chicks at the Pender Test Farm they found that when soy-bean meal was fed in equal quantities with wheat shorts and cracked corn mixed with sweet milk, the soy-bean meal proved to be a most valuable feed, and was found to be equal in value in the ration to rolled oats as a growth producer.

"They have found, too, in their experiments this year with pigs, that where one-third of the ration by weight consisted of soy-bean meal, and the other two-thirds of cracked corn, the bodies of the pigs became firmer than was the case with a parallel lot fed a ration made up of two-thirds cracked corn and one-third wheat shorts. From the results thus far secured by them, they have been led to conclude that soy-bean meal when fed properly does not produce soft-bodied hogs, as has been thought by some" (Continued). Address: Chief, Div. of Agronomy, North Carolina Agric. Exp. Station.

238. Williams, C.B. 1916. Soy-bean products and their uses (Continued–Document part III). *North Carolina Agricultural Experiment Station, Circular* No. 34. p. 1-7. Dec.
• ***Summary:*** (Continued): "Soy Beans and Products for Human Food: "Soy beans, before crushing, and the meal secured by crushing, seem to have great possibilities in the way of different human foods. They are not only rich in food nutrients, but when properly prepared make very appetizing products.

"From the soy beans themselves, or from meal after the oil has been largely removed, macaroni, milk, cheese, a coffee substitute, and flour for making biscuits and muffins may be secured. The soy-bean flour gives best results when mixed in the proportion of 1 to 3 with wheat flour or corn meal.

"In China and Japan the soy bean has been largely used for human consumption from the earliest times. In Europe and America it has been used to some extent, in recent years, for this purpose. In this country some enterprising manufacturers are putting out prepared pork and beans, part of all of the beans being soy beans. A regular preparation of these which the writer has tried proved to be of as high grade as could be desired.

"In Eastern countries the beans are used largely to take the place of beef in the diet of the people. Because of their richness in protein they are used to supplement rice, which is deficient in this nutrient. Tofu (vegetable cheese), Natto, yuba, and miso are staple foods made from soy beans.

"Muffins made from soy-bean flour have been found to be very palatable. To make these, take about ½ cupful of soy-bean flour, about 1½ cupfuls of wheat flour, ½ teaspoonful of salt, 2 eggs, 1 teacupful of sweet milk, two rounded teaspoonfuls of baking powder, and 1½ tablespoonfuls of melted (but not hot) butter. These should be beaten well together, adding the melted butter last. Then bake in gem pans placed in a hot oven. This quantity will make about twelve muffins.

"The chief value of the flour lies in its high content of protein (muscle-forming material) and mineral matter, one pound of it containing as much protein as two pounds of meat. Bread made from the soy-bean flour in Germany, where it is being largely used at the present time, secures about the same amount of food value as six dollars spent for meat. The flour seems to have especial value in the preparation of foods for delicate infants which have difficulty with digesting cows' milk, and for persons suffering with diabetic troubles."

A diagram (p. 7) shows "Products secured from the crushing of a ton of soy beans by the oil mill, and the material made from these products." One ton yields 1,650 lb of meal, 32 gallons of oil, and 120 lb of trash and moisture. From the meal one can make food (human and animal), fertilizer, and celluloid. The human food can be macaroni, flour, sauce, milk, cheese, coffee, and lard. From the oil one can make food (cooking oils, butter [margarine?]), paints, enamels, blown oil (linoleum, India rubber substitutes, varnishes), and soap stock (soaps, glycerine).

Note: This is the earliest English-language document seen (Aug. 2016) that contains a diagram of this type. Address: Chief, Div. of Agronomy, North Carolina Agric. Exp. Station.

239. Hostetter, S.E. 1916. My experience with soy beans. In: Harry D. Wilson. 1916? Soy Beans. Baton Rouge, Louisiana? 7 p. See p. 4-7. Undated.
• ***Summary:*** Soy beans are a good crop to partially replace cotton in the South. The writer grows the Mammoth Yellow variety; he prefers soy beans to cow peas, and he prefers to plant soy beans alone ("single-crop system") rather than with corn. Soy bean straw makes very good forage. Details of planting, harvesting (for hay or seeds), and thrashing are given. "We use a regular grain thrasher, but reduce the speed of the cylinder to just one-half the speed used to thrash oats. The speed of the separator should not be changed." Address: Roseland, Louisiana.

240. *SoyaScan Notes.* 1916. Chronology of Procter & Gamble and Buckeye's work with soybeans. 8 July 1993. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** 1901–Procter & Gamble (P&G) establishes and incorporates the Buckeye Cotton Oil Co. They leased an oil mill and put it under the Buckeye Cotton Oil Company name. The buckeye is the official Ohio state tree. During its early years, Buckeye crushed cottonseeds.

1911–P&G introduces Crisco shortening–a revolutionary new product. "The name Crisco was derived from the words CRYStalized Cottonseed Oil. P&G needed the oil for Crisco, Ivory Soap, and other products. Then they had to find a market for all the cotton linters (the fuzz of short fibers) stuck to the cottonseeds. So P&G started selling cotton linters (cellulose) to many different companies.

1916–By this year P&G was using soybean oil in soap.

1929–Buckeye Cotton Oil Co. purchases a mill at Louisville, Kentucky, and in the spring of 1931 Buckeye crushes Procter & Gamble's first soybeans, using expellers, at this mill in Louisville.

1935 Oct.–Buckeye starts crushing soybeans at the Binghampton mill in Memphis, Tennessee.

1939–P&G orders a solvent extraction unit for processing soybeans from Hansa-Muehle in Germany. But it was sitting at the docks in Hamburg, Germany, when World War II broke out in 1939. Because of the blockade it never left Germany. So P&G went to the French Oil Mill Machinery Company in Piqua, Ohio, to have a similar unit designed and built to Buckeye's specifications.

1941 Feb.–Buckeye finally begins processing soybeans at Louisville, Kentucky, using solvent extraction, after a

year's experimental work. Then during World War II, when the cotton crop declined, there was still enough demand for cellulose, that P&G bought large acreages of southern wood pine to use for its pulp. But since Buckeye's primary job was crushing oilseeds, P&G decided to have Buckeye switch from crushing cottonseeds to crushing soybeans, primarily to supply Procter & Gamble with soybean oil for food products such as Crisco.

1946–P&G introduces Tide, the most successful of its new line of detergents. Research on detergents increases.

1948–Buckeye starts solvent extraction of soybeans at New Madrid, Missouri.

1949 Sept.–Buckeye is crushing soybeans at Raleigh, North Carolina. During the 1950s the company continued studying cleaning compounds and detergents.

1946-47–Procter & Gamble starts using industrial-grade soy protein isolate, made at their Louisville plant, in the wall cleaner named Spic and Span. Spic and Span was launched in the 1930s by the Spic and Span Co. of Saginaw, Michigan. It was operated by two ladies who developed the recipe (which contained glue) in their kitchen and patented the process. P&G bought the company in 1945, right after World War II. At that time the front panel of the box read: "The perfect cleaner for all painted and varnished surfaces. No rinsing. No wiping. P&G introduced a new, improved formula in about 1950–"Cleans extra fast yet extra kind to hands"–but no ingredients were listed on the box. In the fall of 1946, Procter & Gamble needed a raw material to use in the new formula of Spic and Span. It was found that a protein product that could be made from soybeans at Louisville would supply this demand. As a result, a unit for making industrial-grade isolated soy protein was erected at the Louisville mill. This adequately took care of Procter & Gamble needs. "After a few years, the Spic and Span formula was changed again so there was less need for this protein product and it was necessary to develop outside markets where it was used largely as a substitute for casein in the paper trade."

1952–1953. Two technical bulletins dated from these two years state that this isolated soy protein is now named Buckeye Protein. It is used for paper coatings, sizings, fire-fighting foam, adhesives, water-dispersible paints, etc.

1958 July.–The name Buckeye Cellulose Corp. starts to be used in place of the previous Buckeye Cotton Oil Co. in connection with P&G's soybean processing activities.

1958 Dec. 10–Ralston Purina Co. finalizes the purchase of mills (located in Louisville, Kentucky; New Madrid, Missouri; Memphis, Tennessee; and Raleigh, North Carolina) from P&G/Buckeye. Ralston Purina wanted to expand its mixed feed operations. By 1958 the increasing importance of soybean meal for animal feed has made it desirable for soybean crushers to enter the mixed animal feed business. That was not Buckeye's or P&G's kind of business, so it became sound business policy P&G to buy soybean oil on the open market and to dispose of the facilities for crushing soybean seeds.

Note 1. In Oct. 1962 Ralston Purina produced its first commercial edible isolated soy proteins (under the Edi-Pro brand) in this Louisville plant using technology largely developed by Frank Calvert and Robert Boyer when they worked as researchers for Henry Ford. By 1976 Ralston Purina was the world's leading manufacturer of edible isolated soy proteins–and this plant, purchased from Buckeye/P&G, was their flagship plant in America. 1955 Sept.–Buckeye is crushing soybeans at Little Rock, Arkansas; Wilson, Arkansas; and Greenwood, Mississippi.

1958.–Buckeye is crushing soybeans at Memphis, Tennessee (Hollywood mill) and Augusta, Georgia.

1978 Sept.–Buckeye Cellulose Corporation is still a member of the National Soybean Processors Association; it crushes soybeans in its mills at Little Rock, Arkansas; Augusta, Georgia; and Memphis, Tennessee (Hollywood mill at 1355 Lynnfield Road).

1992–P&G sells the Buckeye Cotton Oil Co., dividing it into several parts. Several of the cellulose processing operations (P&G Cellulose) are sold to Weyerhauser, and Bob Cannon, a retired P&G executive who used to run Buckeye, sets up a group that buys the Memphis operation. Bob, who lives in Memphis, has been with Buckeye for about 30 years.

The company's files in Memphis (Phone: 901-320-8100) are probably much more complete on soybean operations than those in Cincinnati. Another good person to contact would be Walter L. Lingle, Jr., who was president of Buckeye in 1958 at the time it sold 4 mills to Ralston Purina. He lives in Cincinnati and has a "perfect memory" (Office phone: 513-621-4525). He set a lot of P&G's international operations.

Note 2. This information was compiled with great help from Ed Rider (Corporate Archivist) and Diane L. Brown (Archivist), Procter & Gamble Co., P.O. Box 599, Cincinnati, Ohio 45201-0599.

241. Wilson, Harry D. 1916? Soy beans. Baton Rouge, Louisiana. 7 p. Undated. [1 ref]

• ***Summary:*** Soybeans are advocated as a crop for Louisiana. They give a greater yield of meal than cottonseed, and as much oil.

"After a careful examination into its merits, we unhesitatingly recommend soy beans as one crop that should occupy a prominent place on every farm in the State of Louisiana.

"It is practically a companion to cotton; its similarity in culture is its first recommendation, and we trust that it will not be long before it is known as one of Louisiana's great staple crops." Address: Commissioner of Agriculture and Immigration of the State of Louisiana, Baton Rouge.

242. 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].

243. 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.].

244. *Weekly News Letter* (*USDA*). 1917. The soy bean. Thrives in United States–Of importance as source of oil, food products, and fertilizer. 4(23):4. Jan. 10.
• ***Summary:*** "While the bean may be grown throughout the humid and semihumid sections of the South and in the southern portion of the corn belt, it thrives especially well in the cotton-growing regions."

"Soy beans have been grown for forage in this country for many years, and their adaptability to a wide range of climatic and soil conditions has been fully demonstrated. In recent years the crop has been grown to an increasing extent for its seed in eastern North Carolina. A large production of the beans in this section in 1915, together with the occurrence of a cottonseed shortage, led to the experimental pressing of a considerable quantity of beans by local oil mills. These experiments were entirely satisfactory, and the mills participating in them are now taking an active part in the development of this new industry with American-grown beans. Oil mills on the Pacific coast have been operating for several years with soy beans imported from Manchuria [since about 1911] and have found a ready sale in this region for the oil, cake, and other products."

"In large bean-growing districts special harvesters for gathering the seed in the field are used quite successfully. The cost of production varies from $7.50 to $12 per acre, depending on the methods employed in growing and handling the crop... The average yield in eastern North Carolina is about 25 bushels, although many fields produce 35 bushels or more to the acre." Address: Washington, DC.

245. 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.].

246. 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.].

247. 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].

248. 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].

249. 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.].

250. *Charlotte Observer* (*North Carolina*). 1917. Putting it over on the cow: Japanese manufacture artificial milk. Jan. 28. p. 4.
• ***Summary:*** From Youth's Companion: "The milk problem is by way of being solved in Japan, where cows are scarce, by an extensive use of artificial milk derived from the soy bean. First, the Japanese soak the beans, then boil them until the liquid turns white, when they add sugar and phosphate of potash. The boiling is resumed until a liquid results very similar in consistency and appearance to ordinary condensed milk. When water is added soy milk is hardly to be distinguished from fresh cow's milk.

"In composition also the artificial milk is almost like genuine milk. Its proteins, fats and sugars are in very nearly the same proportion, although, of course, they are wholly vegetable in origin.

"Whether the substitute is equal to real cow's milk as a form of nourishment is not quite clear, for much of the value of milk as a food comes from the enzymes or vitamins it contains. The Japanese, however, declare that it serves all the purposes of cow's milk, and that it has the advantage of being less liable to infection when property and carefully manufactured."

251. 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].

252. 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.].

253. 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].

254. 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].

255. 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.].

256. 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].

257. 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].

258. 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.].

259. 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].

260. Cromwell, Richard O. 1917. Fusarium-blight, or wilt disease, of the soybean. *J. of Agricultural Research* 8(11):421-40. March. Plus 1 unnumbered page with 2 photos at end. Based on his 1918 PhD thesis, Univ. of Nebraska. [26 ref]

• ***Summary:*** One of the earliest studies on a soybean disease, this gives a full account is given of *Fusarium* blight caused by *F. tracheiphilum* Smith found in North Carolina. The disease is characterized by a chlorosis and shedding of leaves, and ultimately the death of the plant ensues. Cultural and morphological studies show that the organism producing the disease on the soybeans is identical with the organism producing the wilt of cowpeas, and inoculation experiments show that cross inoculations can be made. Infection probably occurs through the roots, and a coarse sandy soil appears to favor the development of the fungus.

"North Carolina is probably foremost among these [Southern] States in the production of soybeans. The yield in 1909 was 13,313 bushels, and in 1915 was estimated as approximately 1,000,000 bushels."

Photos on end plate 95 show: (1) Diseased stem of soybean plant, interior of healthy (unstained) stem, and interior of diseased (discolored) stem of soybean plant. (2) Soybean plants grown out of doors in pots in the same type of clay soil. The plant on the left is healthy, while that on the right is diseased and stunted through the naturally infected soil. Address: Asst. Plant Pathologist, North Carolina Agric. Exp. Station.

261. 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.

262. 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.

263. 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.

264. 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.

265. 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.].

266. *Neue Hamburger Zeitung* (*Hamburg, Germany*). 1917. Vermischtes. Eine neue Verwertung der Sojabohne [Human interest: A new way of using the soybean]. April 24. p. 11, cols. 2-4. [Ger]
• ***Summary:*** During this time of war in Germany, the soybean has come to be used directly as a human food, as in the case of the so-called Aguma-Mehl [a type of soy flour]. In most other countries, including America, it has been used mainly as a fertilizer or as a addition to cattle feed. However in eastern North Carolina, an entirely new way of using soybeans has been found... A cottonseed mill has started to press the oil from soybeans. During the last half year approximately 100,000 bushels of soybeans have been used in this way. The oil is used in various ways–in the manufacture of paints, varnishes, soaps, glycerine (*Glyzerin*) and also as an edible oil. A number of the larger oil mills in the southern United States are planning to follow the example of this mill in North Carolina.

Note: This same article appears again on page 13 of this issue.

267. 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.

268. 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.].

269. 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.

270. 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.].

271. 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.].

272. 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].

273. 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.].

274. 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.

275. Williams, C.B. 1917. Re: Paying Mr. V.R. Herman. Letter to Prof. C.V. Piper, Office of Forage Crop Investigations, Bureau of Plant Industry, Washington, DC, May 24. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Piper: At this time your office is paying Mr. V.R. Herman $60.00 per month as salary for work in connection with the cooperative cowpea and soybean investigations we are conducting with your office. I should like to inquire if your office is planning to carry this amount

of Mr. Herman's salary during the fiscal year ending June 30, 1918.

"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.

276. 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.].

277. 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.

278. Ives, C.L. 1917. Re: No mills in North Carolina crushed soya beans during the past season. Letter to George Washington Carver, Tuskegee Institute, Alabama, June 11. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Your favor [letter] of 8th instant is at hand. On account of the high prices having been paid for soya beans during the past season for planting and canning purposes, we have not been able to do any crushing, and do not know of any mills in the state that did crush any during the past season. We regret that we are not in a position to send you any soya bean products."

Location: Library of Congress, Washington, DC. Microfilm of The George Washington Carver Papers in the Tuskegee Institute Archives, Roll 5 #0710. Address: New Bern Cotton Oil and Fertilizer Mills, New Bern, North Carolina.

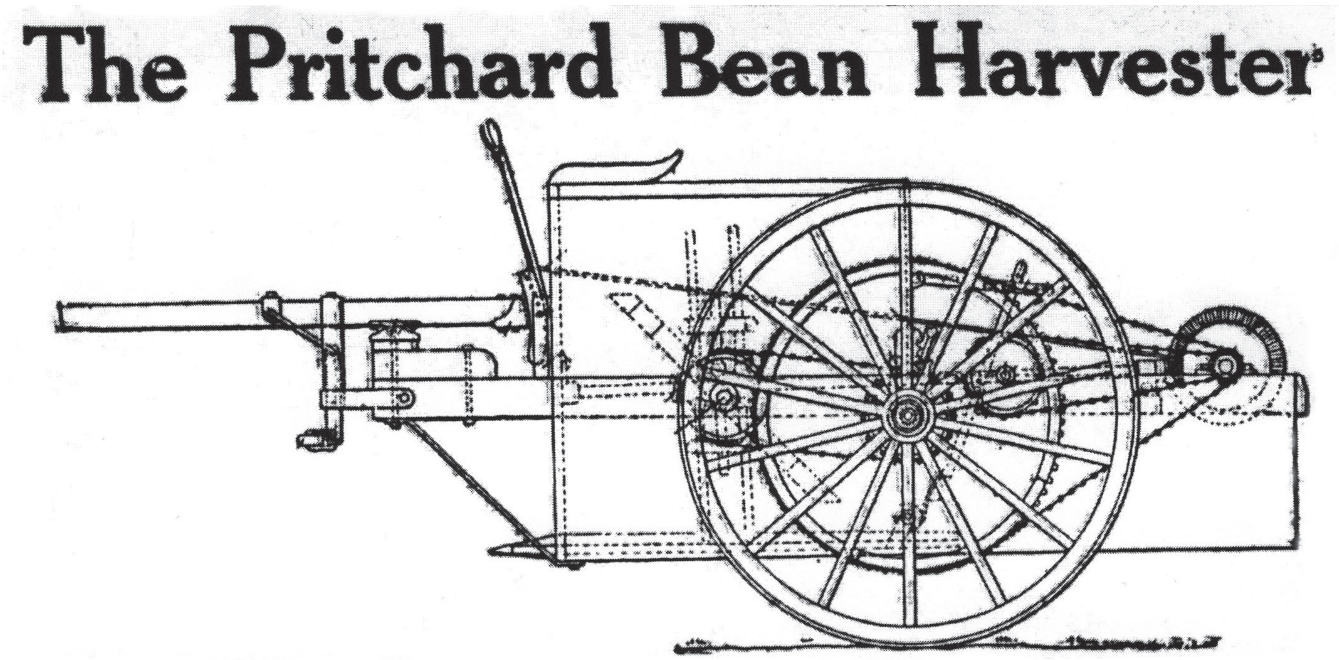
279. Morse, W.J. 1917. Re: More on cooperative research. Letter to Prof. C.B. Williams, North Carolina Experiment Station, West Raleigh, N.C., June 12. 1 p. Typed, without signature.

• ***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.].

280. 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.

281. Pritchard Bean Harvester Co. 1917. The Pritchard Bean Harvester. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*). Aug. 18. p. 6.

• ***Summary:*** "This is a successful Soy Bean Harvester that by repeated tests has proven it will harvest 25 per cent more beans to the acre than any other machine. It will gather beans drilled with corn without removing corn stalks.

"The Pritchard Bean Harvester will not clog. The slot or passage for the stalk vines extends to the rear end, thereby allowing unobstructed passage.

"This machine is of lighter draft by one-half than other machines, but is guaranteed to be strong and durable. This is the Soy Bean Harvester that you have been looking for. For further information and price address:"

A large illustration (quite like a mechanical drawing) of the machine fills about half of the ad. Address: Elizabeth City, North Carolina.

282. 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.

283. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Edenton Cotton Oil Mill.
Manufacturer's Address: Edenton, Chowan County, North Carolina.
Date of Introduction: 1917 August.
Ingredients: Soybeans.
How Stored: Shelf stable.
New Product–Documentation: 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. He learned that the Edenton Cotton Oil Mill in the Edenton, North Carolina had received 2,000 tons of soy beans.

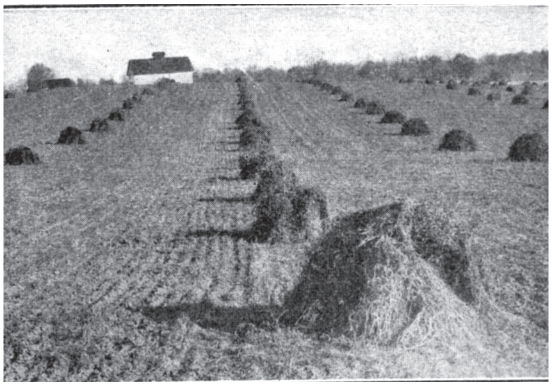
284. Morse, W.J. 1917. Harvesting soy-bean seed. *Farmers' Bulletin* (*USDA*) No. 886. 8 p. Sept. Superseded by Farmer's Bulletin 1605.

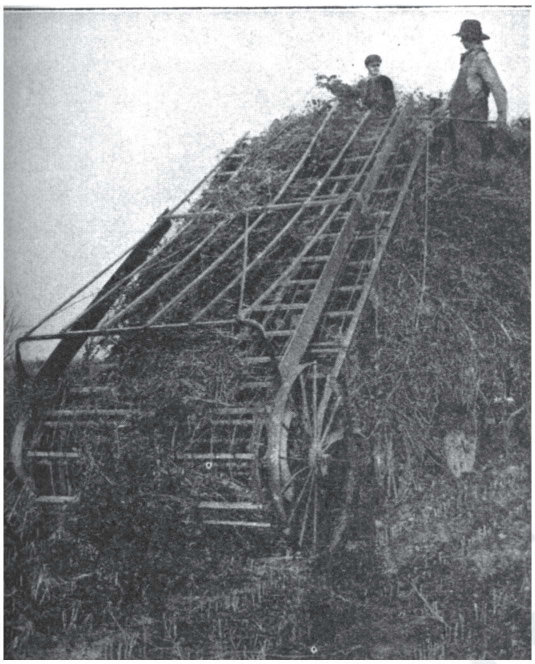
• ***Summary:*** Contents: The soy bean as a seed crop. Time of harvesting. Methods of harvesting. Methods of curing and handling. Thrashing [Threshing]. Special bean harvesters. Soy-bean straw. Storage of seed.

"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. See previous page.

(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.

285. Pate, W.F. 1917. Soybean harvesters. *North Carolina State College of Agriculture, Extension Circular* No. 56. 8 p. Sept.

• ***Summary:*** Contents: Introduction. Methods of harvesting. Gordon harvester. Pritchard harvester. Little giant machine. Tarheel harvester. Keystone machine. Scott machine.

A description of each machine is given, with a photo or detailed illustration (line drawing), plus the name and address of the manufacturer, price (typically $100–$135), size, weight, and features. Each of these machines is apparently meant to be pulled by two horses or mules.

The Gordon Harvester, made by L.S. Gordon of Elizabeth City, North Carolina, was the first machine in the state made for harvesting beans. It sells for $120, weighs about 800 lb, and is 12 feet long. The beater is chain-driven and is arranged to revolve parallel to the row.

The Pritchard harvester is manufactured at Elizabeth

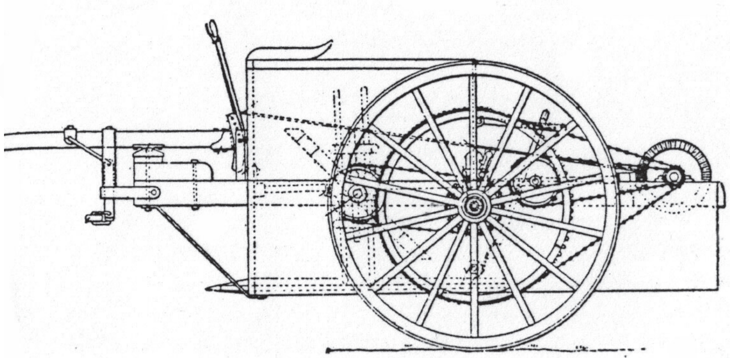


FIG. 2. Drawing Showing Working Parts of Pritchard Machine.

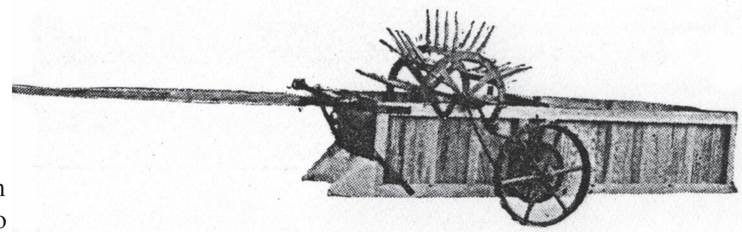


FIG. 3. Showing the Beater Arrangement of the Little Giant Machine.

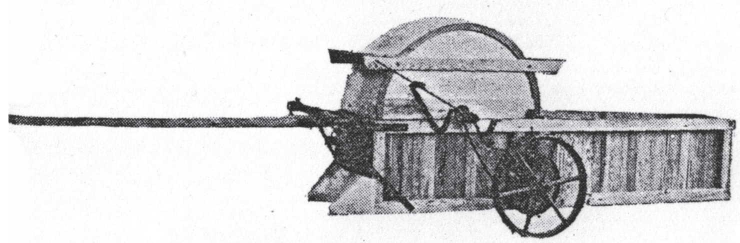


FIG. 4. Little Giant Machine Ready for Use.

City by George Pritchard. It retails at $135, weighs about 1,000 lb, and is made in 3 sizes. The body of the harvester is 8 feet long and 44 inches wide. The beater inside of the harvester is chain driven and revolves across the rows.

The Little Giant machine is made by Herman Hardy of Lagrange, NC, and sells for $100. It weighs about 800 lb and is about 11 feet long. Additional photos (p. 8) show: Harvesting soybeans with a grain reaper. Thrashing soybeans that have been cut with a reaper.

"Methods of Harvesting: In harvesting soybeans, two methods are generally practiced in North Carolina. One method is to cut the vines when lower leaves are yellow and the beans are just about ripe and then cure in the swath and cocks as is done with cowpea hay. The cutting may be done with an ordinary mowing machine, self-rake reaper, or with a binder, if the plants are tall enough. After the plants are dry, the seed may be thrashed out with an ordinary grain thrasher, after reducing the speed of the cylinders so that the beans will not be split.

"The other method commonly used is by means of special bean harvesters, which thrash the beans from the vines as they stand in the field. This latter method is coming more and more into common use. There are five different harvesters manufactured in North Carolina. The principal feature of all these machines is the beater, which thrashes the beans from standing stalks in the field. The beaters of the different machines have different numbers of fingers. In some, the beaters revolve parallel to the row, while in others they do so at right angles to the row. In the manufacture of some of the harvesters, mowing machine wheels are used, while with others the harvesters are mounted on ordinary cart-wheels. Some of the machines have their beaters chain-driven, while others are connected up by gears. Two of the machines have been on the market for many

years; the others have been offered for sale for the first time during the past season or two. Some are adjustable from axles and tongue, while others are not." Address: Agronomist in Soil Fertility, Raleigh.

286. Stoddard, William Leavitt. 1917. Soy: The coming bean. *Good Housekeeping* 65:77, 126-28. Sept. [4 ref]
• ***Summary:*** *"Good Housekeeping* asked the Department of Agriculture to tell its readers the truth about the soy bean. This article is the department's answer. In the [Good Housekeeping] Institute Kitchen new recipes and methods of using the soy bean were evolved and tested. These recipes will be found at the end of this article. A list of dealers in various sections of the country who carry a supply of soy beans will be mailed upon request accompanied by a stamped addressed envelope.

"'The soy bean, also called the soja bean, is a native of southeastern Asia, and has been extensively cultivated in Japan, China, and India since ancient times... The beans are there grown almost entirely for human food, being prepared for consumption in many different ways. Their flavor, however, does not commend them to Caucasian appetites and thus far they have found but small favor as human food in either Europe or America.' Thus declared a bulletin of the Department of Agriculture [Piper and Nielsen. 1909. Farmers' Bulletin 372] before the war. Less than three months after our entrance into the war–and the entrance of the United States as a nation for the first time into a food moderation and conservation campaign–this same authority stated that 'the soy bean has already reached a place of high economic importance in America and Europe as a foodstuff... During the past season the demand for seed by food manufacturers has resulted in greatly increased prices.' The soy is a coming bean if not *the* coming bean."

Sold in some American markets under the name Togo bean, the soy bean "now flourishes in an increasingly large acreage in Tennessee, North Carolina, Virginia, Maryland, Kentucky, and the southern parts of Illinois and Indiana. The earlier varieties even mature in Ontario [Canada] and our Northern states."

The American housewife probably does not care "that there is a factory in New York is making a 'vegetable milk' of soy beans; the "flour or meal [okara] which remains after the milk is manufactured is valuable both as a stock for feed and for human consumption; that soap manufacturers and paint manufacturers are using the oil of soy beans to replace more expensive oils; and that the substitute butter makers are using the fat of the soy bean in products which thousands of consumers are using all unwitting of its true nature.

"The thing that the American housewife wants to know today is where soy beans can be bought and what are the simplest uses of them... Probably the easiest and commonest method of cooking soy beans is to use them either for soup or to bake them."

Eight recipes are given; all but two call for "soy beans." Soy-bean bread (containing 20% of the flour in the form of "soy-bean meal" [a full-fat soy flour]), Soy beans and rice (with "1 tablespoonful Worcestershire sauce"), Soy-bean loaf with tomato sauce, Vegetable roast (baked), Savory baked soy beans, Soy-bean soup, Soy-bean muffins (with "1 cupful cold baked soy-bean pulp"), and Salted soy beans (deep fried).

Photos show: (1) "The uses of the soy bean are literally legion." Muffins made with soy-bean meal. (2) Soy-bean meal ground at the Good Housekeeping Institute; the hand-turned mill and two small piles of soy beans are shown. (3) A dish of soy beans and rice. (4) A soy bean plant. (5) "Vegetable roast of which soy beans are an ingredient.

Note 1. Theodore Hymowitz writes (12 Feb. 1990): "I have no idea if William Leavitt Stoddard was related to Illinois soybean pioneer William Hoyt Stoddard. William Hoyt had one brother named Charles Lumas Stoddard."

Note 2. This is the 2nd earliest document (Spril 2015) seen concerning soybeans in connection with (but not yet in) Togo.

Note 3. This is the earliest English-language document seen (Dec. 2012) that uses the term "Salted soy beans" to refer to soynuts. It is also the earliest document seen in any language describing the frying or

deep-frying of whole soybeans to make soynuts. Previously soynuts had always been dry roasted.

Note 4. This is the earliest article on soy seen (Aug. 2002) in *Good Housekeeping* magazine.

Note 5. In the recipe for Soy-bean muffins the meaning of the ingredient "1 cupful cold baked soy-bean pulp" is not completely clear. This is the earliest document seen (June 2013) that uses the term "soy-bean pulp" (regardless of hyphenation). It probably refers to whole soybeans that have been baked then ground or mashed to a pulp and allowed to cool. However, the writer discusses okara earlier in this article, and this recipe may be calling for okara as an ingredient. If it is, this would be the earliest English-language document seen (June 2013) that calls for okara as an ingredient in a recipe. Address: [Macoupin Co., Illinois].

287. Williams, C.B. 1917. Soybeans–A future economic factor in North Carolina. *North Carolina State College of Agriculture, Extension Circular* No. 57. 11 p. Sept.

• ***Summary:*** Contents: Introduction. Soybeans versus cowpeas (Soybeans are generally better yielders when planted in rows and cultivated.) Soybeans versus peanuts ("Soybeans at $1.00 to $1.50 per bushel are decidedly more profitable to the farmer than peanuts ranging in price from 70 cents to $1.00 per bushel." Soybeans yield 20-25 bushels/acre.) Soybeans for the improvement of the soil. Soybeans for feed for live stock. Soybeans for human consumption. Utilization of soybeans by cotton oil mills (Soybeans can be milled at much less cost than peanuts or cotton, and their use can prolong the short operating season of the mills.) Products secured by oil mills in crushing soybeans.

"Since the introduction of soybeans in North Carolina more than one-third of a century ago, the acreage devoted to this crop has steadily increased, particularly in the eastern part of the State... Notwithstanding the fact that this year there has been a material increase in the acreage devoted to this crop throughout the State, it has not been nearly as great as the importance of the crop justifies...

"Since the coming of the cotton-boll weevil into Texas in 1892," affected farmers have been looking for a crop to take the place of cotton. "There is no doubt that the coming of this pest into North Carolina will lead to a material reduction in the acreage devoted to cotton and at the same time will force most growers to devote more attention to rational systems of rotation in which cotton may or may not enter." (p. 2)

"There is no question but what there will be a greater utilization of the seed from this crop, before or after crushing, for human consumption as the years go by and the acreage devoted to the crop is materially increased throughout the South. The beans, because of their high content of food nutrients, when properly prepared, make a very nutritious and appetizing food product.

"To some extent, the beans are being used at the present time in the manufacture of high-grade pork and bean products, about one-half to three-fourths soybeans being used with one-half to one-fourth navy beans. We have recently had an opportunity to sample a brand of pork and beans with tomato sauce in which the proportion of soybeans to navy beans was as three to one. We say without hesitancy that these were of very good quality. There appears no good reason why the manufacture of pork and beans into which soybeans are used should not materially increase. The beans contain as much or more protein than navy beans and are much cheaper. As a matter of fact, during the present year, the price of navy beans bought at wholesale were three to four times as high per bushel as soybeans bought in the same way.

"Soybean flour or meal, when properly prepared, may be used in the making of many nutritious breads. Such breads are claimed, with much apparent truth, to be especially adapted for invalids suffering with certain diseases and for small children...

"Soybean oil has at the present time wide usefulness in the manufacture of soaps, paints, varnishes, enamels, japans, linoleums, oil cloth and other water-proofing materials, asphaltums, salad oils, and other human foods. Therefore, it seems that there is an assured market for both the meal and the oil...

"To appreciate the importance of the oil at the present time, it is only necessary to call attention to the importation into the country during the year ending July 1, 1917, about $19,000,000 worth from Oriental ports."

Photos show: (1) A field of soybeans grown in rows for seed and soil-improving purposes. (2) Soybeans drilled in corn rows. (3) Hogs grazing in a field of soybeans. (4) People harvesting soybeans (using a harvester drawn by two horses) from standing stalks in the field, for seed and crushing purposes. (5) A man harvesting soybeans with a grain reaper.

288. Williams, C.B. 1917. Re: Soybean acreage in North Carolina is more than 180,000 acres. Letter to Prof. C.V. Piper, Office of Forage Crop Investigations, Bureau of Plant Industry, Washington, DC, Oct. 23. 1 p. plus attachment. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Piper: I notice that the monthly crop report for October 1917 on page 100 states that the estimate of acreage devoted to soybeans in North Carolina this year is 60,000. This is entirely too low as you know. I do not believe that this is one third of the acreage of soybeans sown in this State this year [i.e. the actual soybean acreage is more than 180,000 acres]. I am wondering if it would not be possible to have the Bureau of Estimates secure definite information of the acreage devoted to this crop, as well as velvet beans and cow peas, as they do other crops.

"Very truly yours,... Chief, Division of Agronomy."

Attached to the back of this letter is a printed card which

reads: "North Carolina State College of Agriculture and... announces Short Courses in Agriculture for Farmers.

"From October 30, 1917, to March 1, 1918. Courses will be offered in... soils, animal husbandry, dairying, horticulture, poultry raising, fertilizer use, soil fertility,... crop improvement, plant propagation, beef cattle, swine and... production, diseases of plants and live stock, and farm management.

"Farmers and their sons in North Carolina should make an especial effort to take one of these courses. Efficiency in farming is going to tell more and more in the future. The best prepared farmers, other things being equal, will be the ones that will make the most and will get the most out of life on the farm. Greatly increase your earning powers by attending these short courses.

"No tuition. Other expenses low. Send for announcements.

"C.B. Williams, Dean of Agriculture–West Raleigh, N.C."

Note: The upper right corner of this printed card is not visible since it is attached (by a staple) to the rear of this 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.

289. *Monthly Crop Report* (*USDA*). 1917. Immense bean and pea acreages for feed and food. 3(10):100. Oct.
• ***Summary:*** The section on "Soy beans" states: "Soy beans have for several years been grown most extensively in the following States, which are estimated this year to have planted the acreages noted: North Carolina, 60,000 acres; Tennessee, 50,000 acres; Illinois, 30,000 acres; Indiana, [blank = unknown] acres; Ohio, 12,000 acres; South Carolina, 11,000 acres; New York, 10,000 acres; Arkansas, 10,000 acres. They are grown to a limited extent in all of the eastern half of the United States. The total plantings this year considerably exceed 200,000 acres."

Note: C.B. Williams, North Carolina's soy bean expert in 1917, estimated that more than 180,000 acres of soy beans were grown in North Carolina in 1917 (see Letter to C.V. Piper of USDA, dated 23 Oct. 1917).

"Growth for commercial seed production has been confined principally to the eastern counties of North Carolina bordering upon the Sound [probably Pamlico Sound], grain being gathered elsewhere mainly for the home seed supply. The great bulk of the crop is used for forage. It is estimated that 60 per cent of the crop in North Carolina will this year be harvested for the grain. In the other States mentioned, considerably less than half this proportion would ordinarily be harvested for grain, but this year the strong demand and high price for the beans, which are excellent for human food, will no doubt encourage saving of a much larger percentage of the grain for seed than heretofore.

"Cowpeas.–The cowpea has long been a leading dependence in the South as a hay and grazing crop, and the green peas are a staple human food throughout the summer season among the rural farm population of the South. While the dried peas are not well known as a human food outside of the sections in which grown, they are valuable for this purpose.

"As a result of the general desire to increase the production of feed and food, the total acreage of cowpeas this year is probably consider ably greater than last year, but the great increase in the acreage of the velvet bean in the southeastern States has prevented the increase that might otherwise have been expected and probably led to a decrease in Georgia and Alabama. The relative shortage and high price of cowpea seed was also a limiting factor. Like the velvet bean, cowpeas are much in favor as a companion crop with corn or some other rigid-growing forage plant which will lend support to the trailing vine, but considerable acreages have are also planted for hay on land from which small grain crops have been previously harvested the same season.

"A conservative preliminary estimate of the approximate acreage in the important producing States, the crop being most important in the South Atlantic and Gulf States, is as follows: North Carolina, 175,000 acres; South Carolina 765,000 acres; Georgia, 1,000,000 acres; Alabama 1,060,000 acres; Mississippi 1,750,000 acres; Louisiana, 500,000 acres; Texas [blank = unknown] acres; Tennessee 250,000 acres."

290. 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.

291. *Times Trade Supplement* (*London*). 1917. Soy beans: Cultivation in the United States. Nov. 5. p. 170, col. 4.
• ***Summary:*** During the past few years the soy bean has become an important crop in the United States. The plant is grown mostly for forage, but in some states, such as eastern North Carolina, growing the beans has become a profitable industry. In 1910, soy beans were first processed in the USA for their oil by a mill on the Pacific Coast. These beans were imported from Manchuria, the oil was expressed using a hydraulic press, and the oil was sold to makers of soap and paint. The soy bean cake, ground and sold under a trade name, was soon recognized as a valuable feed by dairymen in the western states.

In late 1915 a shortage of cotton seed prompted several cotton mills in North Carolina to profitably produce soy bean oil and meal from home-grown soy beans. In several English mills, a solvent extraction process, using benzene, is employed. Another industry plans to make "vegetable milk" from soy beans. Note: This article was written by "a correspondent."

292. *Seed Reporter* (*USDA Bureau of Markets*). 1917-1919. Serial/periodical. Washington, DC: Bureau of Markets, USDA. Vol. 1, no. 1 (Nov. 1917) to Vol. 3, no. 4 (11 Oct. 1919).
• ***Summary:*** Succeeding title: *Food Surveys.* Note: Combined with *Food Surveys* and other market reports of the USDA Bureau of Markets under the titled *The Market Reporter* (USDA).

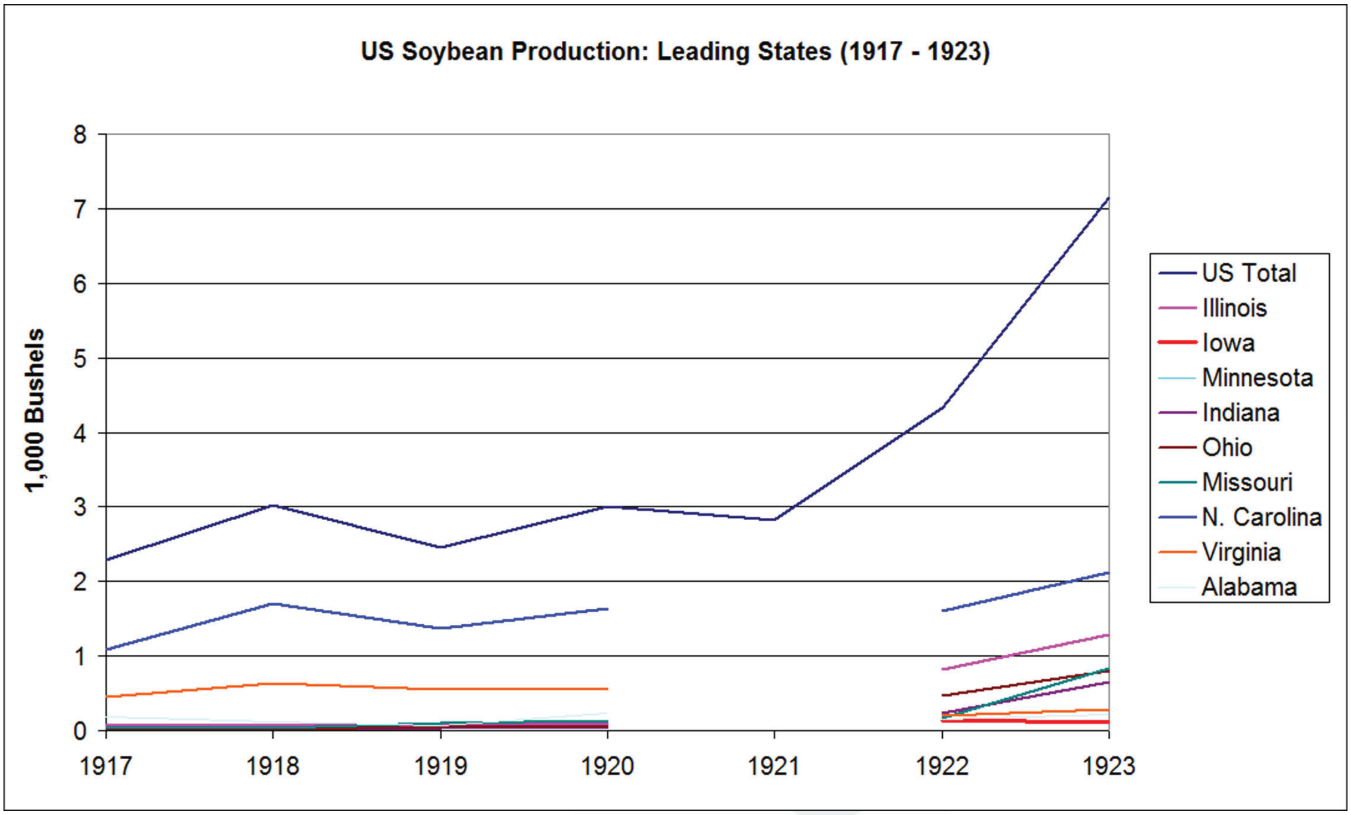
Starting in Nov. 1917 this USDA periodical began to report the earliest statistics on soy bean acreage, production, and prices in the USA. It continued until late 1919. These reports were continued in the *Market Reporter* (USDA Bureau of Markets), from Jan. 1920.

Note: The entry of the United States into the European War or Great War (later called World War I) on 6 April 1917 prompted the country to collect and publish better agricultural statistics. Address: Washington, DC.

293. *Seed Reporter* (*USDA Bureau of Markets*). 1917. Soy bean situation in eastern North Carolina. 1(1):4. Nov.
• ***Summary:*** "Eastern North Carolina, comprising some eight or nine counties, is the principal soy bean producing district in the United States. In that district the Mammoth Yellow variety is planted exclusively either as a first crop in April or May, or as a second crop after oats are harvested in June... Heretofore much of the crop was usually contracted for in advance of the harvest, at about $1.00 per bushel, but high prices that prevailed last spring and failure to make deliveries by some of the growers, account in part for the fact that none of the crop was contracted for this year. Most of the growers look for a price better than $3.00 per bushel by December, when the greatest movements from growers' hands generally occurs. Ordinarily the shippers at production points dispose of most of the beans to seedsmen, jobbers, oil mills, and canners in January and February." Address: Washington, DC.

294. *Seed Reporter* (*USDA Bureau of Markets*). 1917. Soy beans in Mississippi and Louisiana. 1(2):8. Dec. 1.
• ***Summary:*** "The soy bean acreage is rapidly being extended in these two States, especially in what is known as the Black Land or prairie belt, and in the Delta section. Most farmers plant soy beans in corn, as a second or catch crop, to be grazed by livestock and for fertilizer, and the growing and marketing of the soybean, for grain or seed is specialized in by only a very few growers... Dealers obtain their supply of seed from North Carolina, and the result of inquiries indicate that consumers will have to pay about $4.00 per bushel for their 1918 requirements. The retail price paid in the spring of 1917 was about $3.50 early in March, advancing to $5.00 by May 1, 1917." Address: Washington, DC.

295. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Hertford/Hartford Cotton Oil Co.
Manufacturer's Address: Hertford, Hertford County, North Carolina.
Date of Introduction: 1917.
Ingredients: Soybeans.
How Stored: Shelf stable.
New Product–Documentation: 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. 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:... Hartford Cotton Oil Co., Hartford, North Carolina..."

Note 1. There is a town and county of "Hertford" (pronounced quite like "Hartford") in northeastern North Carolina.

Note 2. It is not clear how, if at all, this company is related to the Eastern Cotton Oil Co. which began crushing soybeans in Hertford in 1915.

296. Gray, Dan T. 1917. Report of the Animal Industry Division. *North Carolina Agricultural Experiment Station, Annual Report* 39:21-47. For the year 1916. See p. 21-31, 45.
• ***Summary:*** Contents: Swine (Soybeans, waste peanuts, mast, "soybean meal, and peanut meal" are being tested as feed for hogs). Soybean pastures for fattening hogs (Edgecomb Branch Station). Peanut against soybean pasture as feeds for hogs (Pender Branch Station). Wheat shorts, peanut meal, and soybean meal as feed for hogs (Central Branch Station). The cheapening effect of peanuts, soybeans, and mast upon the bodies of hogs. Soybean meal as a feed for poultry (Edgecombe Branch Station, p. 45).

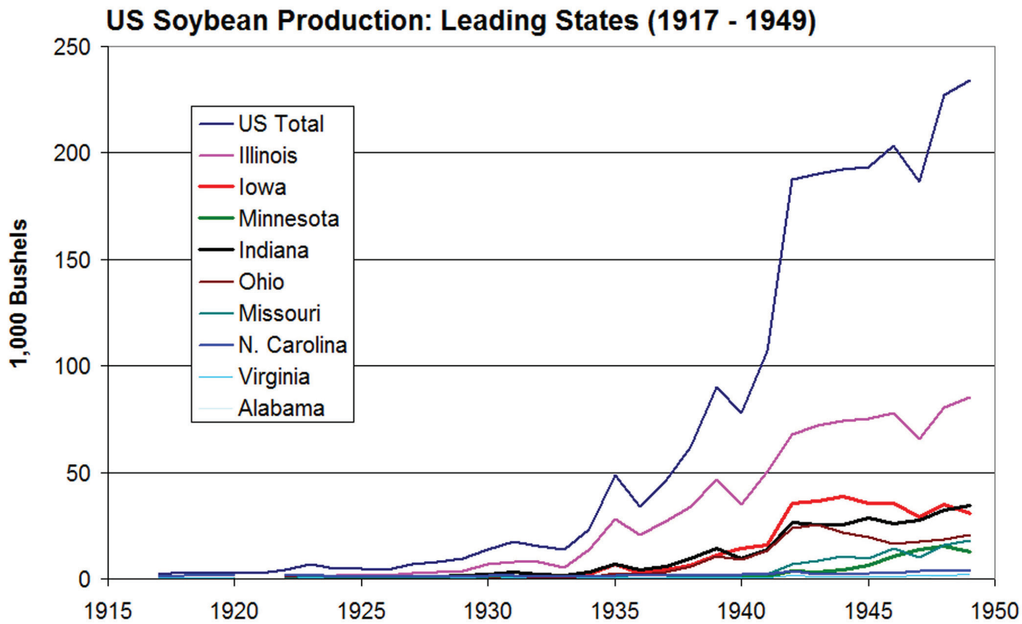
The section titled "Soybean Pastures for Fattening Hogs (Edgecombe Branch Station)" states: "Farmers all over the state are becoming very interested in soybean pasture, and are calling upon us for accurate information as to just how reliable this pasture is and how it should be used."

The section titled "Wheat Shorts, Peanut Meal, and Soybean Meal as Feed for Hogs (Central Branch Station)" notes that soybean meal refers to ground full-fat soybeans. Some packing plants and consumers believe that feeding soybean meal to hogs produces an undesirable hog body. Three lots of pigs were fed a ration of 2/3 corn plus 1/3 of one of the above protein sources. Those fed the soybean meal made the greatest average daily gains, 0.44 lb/day. "The cost to make gains was extremely high, as it cost $19.80 to make each 100 lb of increase in the shorts lot, $11.79 in the soybean lot, and $14.56 in the peanut-meal lot. Corn was valued at $1 a bushel, soybean meal at $40 a ton, and peanut meal at $30 a ton." Address: Chief, Animal Industry Div.

297. Soybean production in the United States, 1917-1949 (Overview). 1917. Lafayette, California. 1 p. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Production statistics (in bushels) are given for the following U.S. states and the yearly total: Illinois, Iowa, Minnesota, Indiana, Ohio, Missouri, North Carolina, Virginia, and Alabama.

Sources: 1917-20 from *Monthly Crop Reporter* 1920 (Feb. and Dec.); 1921-23 from Stewart et al. 1932, p. 440; 1924-49 from USDA Bureau of Agricultural Economics and Soybean Blue Book (1951, p. 34-45).

Note: Production figures for the years 1924-31 from Stewart et al. 1932 and from USDA Bureau of Agricultural Economics / Soybean Blue differ substantially, up to 50%



Year	US Total	Illinois	Iowa	Minnesota	Indiana	Ohio	Missouri	North Carolina	Virginia	Alabama
1917	2,283	78			30	14	50	1,088	450	180
1918	3,024	65			15	14	40	1,700	630	110
1919	2,460	60			36	42	98	1,373	555	59
1920	3,002	92			42	64	133	1,638	570	228
1921	2,815									
1922	4,333	812	132		240	465	165	1,600	208	155
1923	7,144	1,288	119		644	800	840	2,125	285	225
1924	4,947	1,380	120		653	230	360	1,162	195	20
1925	4,875	1,431	98		400	238	374	1,160	176	21
1926	4,239	1,750	150		529	207	398	1,062	238	18
1927	6,938	2,392	276		884	304	504	1,200	261	30
1928	7,880	3,069	357		1,000	360	722	1,080	260	24
1929	9,398	3,842	576		1,425	347	736	1,058	273	42
1930	13,929	6,970	1,023		2,114	434	966	1,344	119	40
1931	17,260	7,704	790		3,115	940	1,089	1,809	266	43
1932	15,158	7,760	936		2,256	527	1,060	1,150	171	42
1933	13,509	5,415	1,615		1,800	528	1,503	1,026	225	50
1934	23,157	13,756	2,070	30	2,960	697	781	1,176	284	60
1935	48,901	27,916	6,732	84	6,970	2,604	1,065	1,438	350	60
1936	33,721	20,448	2,688	72	4,186	2,046	225	1,728	407	84
1937	46,164	27,100	4,329	140	5,797	3,249	638	1,776	500	77
1938	61,906	33,676	6,468	180	9,380	5,901	780	1,863	412	55
1939	90,141	46,354	11,385	504	14,060	10,550	1,157	1,760	615	62
1940	78,045	34,912	14,180	795	9,399	8,976	1,417	2,280	760	72
1941	107,197	50,267	16,014	1,160	13,855	13,120	2,150	2,180	612	152
1942	187,524	68,019	35,451	3,549	26,380	23,648	7,065	3,484	1,736	204
1943	190,133	72,156	36,524	3,394	25,596	25,473	8,634	2,313	1,023	304
1944	192,121	74,258	38,773	4,004	25,336	21,877	10,518	2,110	990	300
1945	193,167	75,200	35,335	6,554	28,857	19,386	9,360	2,700	1,264	297
1946	203,395	78,020	35,604	10,675	26,106	16,254	14,360	2,862	1,106	480
1947	186,451	65,448	29,202	13,800	27,806	17,575	9,900	3,495	1,425	738
1948	227,217	80,496	35,190	15,614	32,098	18,614	15,900	3,564	1,749	1,100
1949	234,194	85,462	30,820	12,762	34,608	20,592	17,997	4,224	2,106	1,037

for smaller producers. Address: Founder and Director, Soyfoods Center, Lafayette, California.

298. Wood (T.W.) & Sons. 1917. High grade seeds for 1917 (Mail order, with order form). Richmond, Virginia. 100 p. 25 cm.
• ***Summary:*** In the section titled "Specialties in Seeds" (p. 4) a half page is devoted to "Soja Beans–A profitable crop. It contains five testimonial letters for several varieties: (1) "Considers Mammoth Yellow Soja Beans superior to cow peas as land improver." Jno. P. Hamilton, Charles County, Maryland (9 Oct. 1916). (2) "Hogs, horses and cows eager for Soja Beans" (Mammoth Yellow). Chas. P. Barnum, Montgomery County, Maryland (8 Oct. 1916). (3) "Tarheel Black Sojas surpass other kinds for hay." Jas. L. Karickhoff, Upshur County, West Virginia (17 Oct. 1916). (4) "Consider Tarheel Soy Beans far superior for a forage crop." J.P. Agnew, Nottoway Country, Virginia (Oct. 1916). (5) "Hollybrook Early Soja Beans." B.P. Williams, Wake County, North Carolina (14 Nov. 1914).

In section titled "Seeds for the Farm" (p. 88) a full page is devoted to "Soja Beans–Profitable for crop of beans and one of the best summer forage crops." Following a half-page description of the plant, are descriptions of the following varieties: "Mammoth Yellow Sojas," "Wilson Early Black Sojas," "Early Dwarf Green Sojas," "Ito San Sojas," "Tar-Heel Black Sojas," "Hollybrook Early Sojas," and "Brown Sojas." A photo shows a soja bean plant covered with pods. Note: This is the earliest document seen (Oct. 2004) that mentions the soybean variety Wilson Early Black.

This catalog is owned by the Smithsonian Horticulture Branch Library in Washington, DC. Call number: #16631. Address: Richmond, Virginia.

299. Portrait of C.B. Williams (Photograph). 1917? Undated. https://d.lib.ncsu.edu/collections/catalog/0050301
• ***Summary:*** This black-and-white portrait photo is of soybean pioneer C.B. Williams of North Carolina State University (NCSU), where he was Director of Research 1907-1912 and Dean of Agriculture 1917-1923.

Source: Special Collections Research Center at NCSU Libraries.

300. *Seed Reporter* (*USDA Bureau of Markets*). 1918. Tabulation of reports from shippers of cowpeas, soy beans, and lespedeza [Japan clover], under date of December 31, 1917. 1(4):2. Feb. 1.
• ***Summary:*** A table gives statistics for the following states: Alabama, Georgia, Mississippi, Louisiana, Tennessee, South Carolina, Central and Western North Carolina, Eastern North Carolina, Kentucky, Illinois, Indiana, Missouri, Ohio, Virginia, Other sections.

The following information is given for each state reporting. Number of shippers reporting. Quantity of 1917 crop on hand on Dec. 31, 1917 (pounds). Quantity of 1917 crop shipped out up to Dec. 31, 1917 (pounds). Estimated quantity of 1917 crop that will be shipped out after Dec. 31, 1917 (pounds). Quantity of 1916 crop shipped out (pounds). Estimated percent in grower's hands Dec. 31, 1917. Estimated quality 1917 crop. Average price paid growers 1917 crop per 100 lbs. Soy bean prices range from a $4.50 in South Carolina to $6.00 in Georgia. Address: Washington, DC.

301. Howell, E.V. 1918. Soy beans and soy bean oil. *J. of the American Pharmaceutical Association* 7(2):159-63. Feb. [14 ref]
• ***Summary:*** "This bean is a native of southeastern Asia. It is at present the most important legume grown in China and Japan, where it is grown almost exclusively for human

food. It has been cultivated from a remote period, each district having its own distinct variety, some two hundred kinds in all... The bean was introduced into England in 1790. Apparently the first mention of soy beans in American literature was in the *New England Farmer,* October 23, 1829, in an article by Thomas Nuttall." There follows a summary of this article and several other early U.S. documents that mention the soy bean.

"Importance: I think the soy bean is the most important plant introduced into the South within a hundred years. This opinion is based on the range of the plant, the value as a soil improver, and the numerous uses of the seed and oil, together with the fact that the present cottonseed oil mills can produce the oil with practically no change in machinery and thus double their mill season. The beans can be stored, as they are practically immune to insects. Especial emphasis is placed on this statement in the present demand for food on account of the war. In Japan the bean forms one of the most important articles of food, by nature a meat, to go with the starch of rice. The Chinese make from the beans a cheese resembling our own cheese, while the Japanese make the well-known sauce for rice or fish, soy or suey sauce. It is one of the principal ingredients in 'Tofu' (bean curd), natto (steamed beans), and white and brown miso, which is like our molasses brown bread."

"A factory for the production of this [soy] milk has recently been established in America. This can be used in cooking, by bakers, confectioners, and chocolate manufacturers. I have before me the following food articles in which soy bean meal is the principal ingredient: Egg substitute No. 1, egg substitute No. 2, colored cocoanuts, coffee substitute, cocoa substitute, roasted malted nuts, coloring curry powder, cutlet powder, soy and navy beans with pork, the equal of any pork and beans.

"The use of the soy meal for soups, for proportional use in muffins, cookies, fritters, croquettes, biscuit, and loaf bread is unlimited. Its use is checked only by our prejudice for certain customary flavors, just as northern people and Europeans do not use corn meal. In other words, North Carolina, if forced to by war conditions, could largely exist on the soy beans crushed in the State this year, including the imported and native beans crushed, the oil from which I estimate to yield this year 400,000 gallons. This oil can be used for frying, and for a salad oil in French dressing or in mayonnaise. I fried a partridge in the crude unrefined oil, and found it delicious.

"While the chief use, so far, of the oil has been for soaps and paints, the particular object of this paper has been to call attention to the use of soy oil in pharmaceutical preparations."

Tables show: (1) The specific gravity, saponification value, and iodine for three samples of Manchurian soy oil purchased in New York. (2) The chemical composition of soy bean meal (8.77% fat), compared with the meal of five other seeds (including cottonseed, linseed {old and new process}, decorticated peanut, and sunflower seed). (3) Four chemical constants of seven samples of domestic and imported soy oils (from L.P. Nemzek). (4) The food values (nutritional composition) of soy beans and six other foods, including lean beef, milk, and eggs.

Because of World War I: "During the past six or seven months there has been produced in this country in the neighborhood of one hundred thousand gallons of soy oil. The largest part of this quantity has been produced in North Carolina by the Elizabeth City Oil & Fertilizer Co., Winterville Cotton Oil Co., and the New Bern Cotton Oil & Fertilizer Mills. Samples from the different crushings have been examined in comparison with the imported oil."

"Medicinal use: In England a diabetic biscuit is manufactured. In this country an infant's food from the soy bean is on the market. The enzyme in the bean is also attracting attention and opening a field for investigation."

Note 1. This paper was presented at the Scientific Section, American Pharmaceutical Assoc., Indianapolis meeting, 1917.

Note 2. This is the earliest English-language document seen (Oct. 2008) that contains the word "crushings."

Note 3. This is the earliest English-language document seen (Oct. 2016) that contains concept of "new process" and "old process." But it is applied to crushing linseed rather than to crushing soybeans.

302. *Monthly Crop Report* (*USDA*). 1918. Estimated value of important products January 15. 4(2):18. Feb.

• ***Summary:*** The farm value per bushel of soy beans is given for various states in 1917 and 1918: Virginia: $3.10 / $5.20. North Carolina $1.95 / $3.00. Georgia $1.60 / $3.60. Indiana $2.30 / $3.75. Illinois–/ $3.40. Kentucky $2.40 / $3.80. Tennessee $2.25 / $3.25. Alabama $2.35 / $2.60. Mississippi $2.05 / $2.80. Texas–/ $4.40. Oklahoma–/ $5.00.

Note 1. This is the earliest USDA publication seen that gives statistics (prices) on soybeans in the United States.

Note 2. The average price in 1917 was $2.25, increasing to $3.71 in 1918–a jump of 64.8% in one year, largely because of U.S. government promotion of soybeans (and other beans) during World War I as a replacement for wheat and meat! During this period the price of soybeans increased substantially in every state.

303. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*). 1918. Success with soy beans (Letter to the editor). 33(10):316-17. March 9.

• ***Summary:*** This article consists of six letters (each of the first two a "$1 prize letter"), each with a title, from farmers who have been successful growing soybeans. They are: (1) "Planting soy beans with corn," by H.L. Umstead, Jr. of Rougemont, North Carolina. (2) "Soy beans and prosperity," by W. Burnley Raiford of Ivor, Virginia. (3) "Corn and soy

beans a fine combination," by R.C. Rosson & Son, Adams, Tennessee. (4) "Soy beans in Tennessee," by Alton M. Worden, "Altamont Range," Tullahoma, Tennessee. (5) "Soy beans great for hogs," by Howard N. Thomas of Alexander, Arkansas. (6) "Soy beans fine in central Alabama," by H. Quinn, Montevallo, Alabama. A photo shows soy beans grown in corn for grazing. Address: North Carolina; Virginia; Tennessee; Arkansas; Alabama.

304. Williams, C.B. 1918. Soy beans for southern farmers: Products of soy beans and their commercial uses–A great food and feed crop that in future will have a big place in southern agriculture. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 33(10):328. March 9.

• ***Summary:*** "Our people generally have not begin to fully appreciate the possibilities of the soy bean in the way of soil improvement and other purposes. It has a much wider range of adaptation than any of the other leguminous crops in the South, except possibly Japan clover." It is a safer and more productive crop than the cowpea.

"During the spring of 1915, farmers of the South were confronted with a situation that forced them to put in some satisfactory crop to take the place of part of the acreage that had previously been devoted to cotton, because of the very low price at which cotton had sold during the previous fall. In many sections, farmers decided to put in more of the leguminous crops, soy beans being used in many cases.

"Previously the beans that had been grown had been used almost entirely for seed purposes; but with the large crop of 1915" it was decided to try crushing some of the beans in place of cotton seed. "A determined effort was made along this line, and as a result, in North Carolina alone, a few of the oil mills operated on the beans and crushed 80,000 to 100,000 bushels. It is believed that the operation, though a new venture, was conducted at a reasonable profit in most cases.

"First Commercial Crushing of Domestic Beans: The first commercial crushing of domestic beans in this country by an oil mill was started on December 13, 1915, by the mill located at Elizabeth City, North Carolina. It is interesting to note that right from the start this mill operated night and day, the beans being secured from the local market and surrounding counties, until it had crushed something like 20,000 bushels. This mill was able to crush and handle almost a ton an hour. It is interesting to observe that they had practically no difficulty in starting and operating on the beans after they had been crushing cotton seed. They had to incur no material expense in changing from the crushing of cotton seed to the crushing of soy beans. From facts at hand, it would appear that this mill had very little, if any, difficulty in disposing of the oil and meal at fairly reasonable prices secured from the crushing of soy beans. On an average they were able to secure from 32 to 35 gallons of oil and about 1,650 pounds of meal from each ton of beans.

"In the crushing of soy beans one of the chief products secured is the oil, which has wide usefulness in the commercial world. The percentage of oil contained in beans has been found to vary from 17 to 20 per cent.

"At the present time the oil is being used in this country largely in the manufacture of soaps, paints, varnishes, enamels, linoleums and waterproofing materials. It is being used, too, to a limited extent in the manufacture of edible oils. Soy bean oil may replace linseed and cottonseed oils in the manufacture of many of the products into which these latter oils are at the present time entering. It has been shown that soy bean oil may comprise 20 to 25 per cent of the total oils of a paint without seemingly interfering with the lasting or other qualities required in a good paint. In this respect this oil is decidedly superior to cottonseed oil as the latter can seldom if ever be used for this purpose. It is significant of the possibilities of the production of soy bean oil in this country that last year there was imported into this country about 19,000,000 gallons, which at present prices would be worth more than $20,000,000. These importations have come chiefly from Asia."

"Soy Bean Meal–Composition and Value: most valuable product secured in the crushing of soy beans is the meal. That which is obtained in the crushing of yellow colored bens is of a bright yellow color, while that produced from the brown or dark colored beans is of a darker shade of yellow. The cake or meal secured by expression methods has a pleasant taste, not unlike that of malted milk. The meal is appetizing, highly nutritious and is relished by stock. When compounded properly and cooked soy bean meal [flour] makes a rich, nutritious bread for human consumption. United States Food Administration has recently placed soy bean among the substitutes to be used with wheat flour.

"Looking at this product purely from its fertilizing value, it is more valuable than cottonseed meal and now is selling for $12 to $15 per ton more than the cottonseed meal. Analyses show that it contains 7 per cent nitrogen (8.50 per cent ammonia), 1.25 per cent phosphoric acid, and 2.25 per cent potash. It is believed that the availability of these constituents contained in soy bean meal is just as high as when they are derived from cottonseed meal. Based upon these percentages, an exchange made purely from the plant-food standpoint would be about 1,600 pounds of soy bean meal of average composition for 2,000 pounds, or 33.33 bushels of beans, It should be borne in mind, however, that the farmer in making such an exchange should at least receive enough above this amount to cover well the cost of the delivery of the beans at the mill and the hauling of the meal back to the farm. When beans bring to the farmer a higher price than about $2.50 per bushel the oil mills claim they cannot handle the beans in their mills at the present prices of oil and meal and cost of operation.

"Soy Bean Metal as a Feed: In feeding experiments this meal has proved to be a superior product. When fed to

young chicks in equal quantities with wheat shorts, cracked corn, mixed with sweet milk, it proved to be a most valuable feed, being equal to rolled oats as a growth producer. From results in the feeding of pigs, investigators have been led to conclude that soy bean meal, if fed properly, does not produce soft-bodied hogs as has been though to be the case by some. Ordinarily oil mills, with which the writer is familiar, paid in 1915 and 1916 from $1 to $1.50 per bushel for the beans. Now they cannot get them at $2.50 to $3 per bushel.

A very small, oval portrait photo shows Prof. C.B. Williams. Address: [North Carolina].

305. Williams, C.B. 1918. Harvesting soy beans. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 33(11):349. March 16.

• ***Summary:*** "Many who are growing soy beans for the first time are probably wondering what will be the best way to harvest their crop this fall. Before cold weather comes on and the leaves have only dropped a little it will be well for those wanting hay to cut the vines. The leaves contain much of the food constituents of the crop and it should be planned to save as many of them as possible when curing the vines. Where grown merely for hay, the cutting should take place after the pods are formed and have grown considerably, but before they have matured. If the plants are left until the pods are mature the leaves will shed badly, and the stems will become too hard and woody for the best quality of hay. After the plants have reached the proper haying stage, there is a rather rapid decline in the feeding value of the stems.

"In cutting, an ordinary mowing machine with a side-delivery attachment or self-rake reaper, or any ordinary mowing machine without any attachments may be used with satisfactory results. It is well to cure the vines in the swath and windrow as much as possible, finishing up in the cock, as is done with cowpea-hay. Great care should be exercised that the vines be exposed to direct sunlight as little as possible after they have thoroughly wilted in the swath. If this precaution is observed, there will be a minimum of shedding of the leaves. The handling should be done, if possible, when the vines are slightly damp from dew. If favorable weather prevails the hay may be carried to the barn and stored there with safety after remaining in the cocks for about a week.

"As with cowpeas, the curing may be done usually most satisfactorily on some kind of curing frame or pole. The cocks or small stacks should be so constructed as to shed water and to admit of a free circulation of air through the center of the pile.

"When the soybeans are to be cut for hay as well as for seed, they should be cut later, after the pods are ripe but before they have dried out sufficiently for the beans to pop out. The curing of the vines should take place in the way indicated, reducing the handling to the minimum so that there will be but little, if any, shattering of the beans. After the hay has been thoroughly dried the beans may be threshed out with an ordinary threshing machine or with a husker and shredder. Usually it will be necessary to reduce the speed of the threshing part of the machines in order that there may not be any splitting of the beans. After threshing, the beans should be spread out evenly over the floor in a dry place where a free circulation of air takes place." Address: [North Carolina].

306. *Exportateur Francais* (*L'*) (*Paris*). 1918. L'emploi de l'huile de soya dans la fabrication des couleurs [Use of soy oil in the manufacture of paints]. No. 87. p. 39. March 28. [Fre]

• ***Summary:*** "The Paint Manufacturers' Association of the United States, foreseeing a scarcity of linseed oil, have conducted extensive research to find a replacement. According to their experiments, the oil extracted from soybeans is, of all the vegetable oils tested, the one that has given the best results. This is why the soybean acreage in North Carolina will be considerably expanded. The authorities are conducting a major campaign among the farmers to explain the importance of this crop, which is very profitable." Address: Hanoi.

307. *Seed Reporter* (*USDA Bureau of Markets*). 1918. Movement and supplies of soy beans and cowpeas. 1(7):1. April 6.

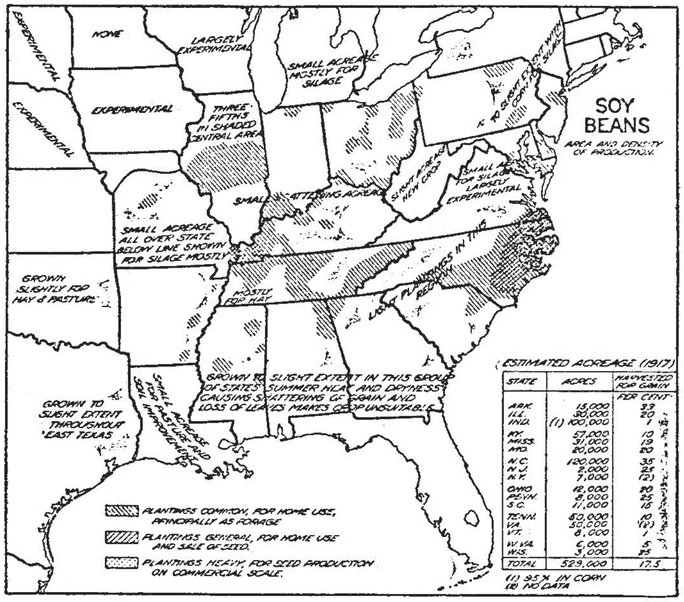
• ***Summary:*** "During the months of January and February the movement of soy beans and cowpeas from farmers' hands was unusually heavy because of the increasing high prices that were being offered by shippers."

"The prices paid by shippers to farmers in the early part of the season, or December, 1917, were as follows: Soy beans, $4.50 to $5.50 per 100 pounds; cowpeas, $3.40 to $4.40 per 100 pounds. Owing to the heavy demand during January and February, these prices advanced to $6.20 per 100 pounds for soy beans."

"There does not appear to be a general shortage of soy beans, although several counties in Louisiana, Georgia, and Tennessee report that a sufficient quantity of seed has not been obtained to supply local planting requirements for this season. However, eastern North Carolina and several counties in Mississippi and Tennessee report a surplus, and supplying those districts where there is shortage is wholly a question of distribution." Address: Washington, DC.

308. *Monthly Crop Report* (*USDA*). 1918. Special southern grain and forage crops. 4(5):48-49. May.

• ***Summary:*** The two sections titled "Soy Beans" give the most extensive and detailed statistics seen to date in the USA, for the following 18 states: Arkansas, Illinois, Indiana, Kentucky, Maryland, Mississippi, Missouri, North Carolina, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, Vermont, West Virginia, Wisconsin.



The following statistics are given for each state mentioned, and for the total of all reporting: Total acres on which grown 1916 (181,000–Data for some states is lacking or incomplete). Total acres on which grown 1917: 531,000. Planted 1917: Alone (44%), With other crops (56%). Harvested for: Grain (17%, 88,850 acres, yield of 17 bushels per acre, production of 1,186,000 bushels), hay (44.1%, 209,000 acres, yield of 1.95 tons per acre, production of 328,000 tons), placing in silo (8%). Grazed or hogged off (27.2%). Plowed under for soil improvement (3.7%).

Three maps of the southeastern United States show the areas and planting density of soy bean, velvet bean, and cowpea production. On each map are three different shading patterns: (1) Plantings common, for home use, principally as forage. (2) Plantings general, for home use and sale of seed. (3) Plantings heavy, for seed production on commercial scale. On the soy bean map, the areas of greatest planting density appear to be North Carolina, Tennessee, Kentucky, and central Illinois.

The states with the largest total soybean acreage in 1917 are:

North Carolina 120,000
Indiana 100,000
Kentucky 57,000
Tennessee 50,000
Virginia 50,000

The states with the largest production of soybeans for grain are:

North Carolina 840,000 bushels
Kentucky 108,000
Mississippi 72,000
Tennessee 50,000.

Generally speaking, the soy bean "is less favored than the cowpea farther south and less so than clover farther north... It is a legume of exceptionally great value whose possibilities are only beginning to receive recognition in most sections."

Similar statistics and information is also given for peanuts, cowpeas, and velvet beans. A table shows acreage, production and disposition statistics for southern states.

Note: This is the most useful report on soybean production and acreage in the USA since the 1910 census which gave statistics for 1909.

309. Smith, Alfred G. 1918. Soy beans in systems of farming in the cotton belt. *Farmers' Bulletin* (*USDA*) No. 931. 23 p. May.

• ***Summary:*** Contents: Commercial production promising. Uses of soy beans. Area and soils adapted to soy beans. Bearing on other legume crops. Combining soy beans with other crops: As first crop for seed, as first crop for hay, in the row with corn, with corn in alternate rows, soy beans after small grain or Irish potatoes, in corn at last working, in alternate middles in cotton. Varieties of soy beans and seed required per acre. Farm practice in growing soy beans: Inoculation, distance between rows, planting and cultivation, fertilizers used, harvesting. Yields. Comparative labor requirements. Selling prices of soy beans and soy-bean forage. Division of crop with croppers and tenants.

Varieties: "At least 90 percent of the soy beans grown in the cotton belt are of the mammoth yellow [sic, Mammoth Yellow] variety." It is "suitable for both seed and hay, and is well known in commercial channels. It is a yellow bean and a variety that is suitable for human food. Cotton mills like it on account of its oil content and its color, for it makes a yellow meal which is acceptable to farmers who are accustomed to cottonseed meal, and who look upon a dark-colored meal as one that is damaged. The mammoth yellow soy bean grows erect and stands well, so that it can be harvested with a mechanical picker, which is not the case with several other varieties."

Fertilizers used Like cowpeas, soybeans are not heavily fertilized, if at all, farmers usually depending upon the residual effect of the fertilizers applied to other crops. Lime, applied as ground limestone, ground oyster shell, or burned lime usually increases the growth of soy beans (except in limestone areas), but it is not always needed to produce a profitable crop. In actual practice most of the farmers in the soybean district of North Carolina use some form of lime, since most of the soil there is acid. The lime is secured quite easily, and the increased yields considerably more than pay the cost. The lime is applied at the rate of 2 tons of ground limestone per acre once in four or five years, or it is scattered on top of the row at the rate of about 1,000 pounds per acre just before the soy beans are planted. Light applications, occasionally as low as 150 pounds per acre, are frequently drilled in a furrow and covered, the beans being planted above.

"Sometimes acid phosphate is used. This is applied generally at the rate of 200 pounds per acre and is drilled in the row before the beans are planted. On soils deficient in potash kainit is sometimes used, but the most common practice with both acid phosphate and kainit is to fertilize the preceding crops and depend upon the residues for the soy beans. Cotton-seed meal, as previously stated, is sometimes used when planting soy beans for the first time, and sometimes on other plantings where the soil is sandy or sandy loam. The common application is from 100 to 200 pounds per acre, drilled in the row before planting the beans.

"Harvesting: The difficulty farmers have experienced in harvesting has been the greatest handicap in the extension of the production of soy beans. The development of new machines and accumulated experience with the crop, however, have overcome most of the troubles, so that farmers in the soy-bean district consider it little, if any more, trouble to harvest soy beans, except for hay, than it is to harvest oats or wheat.

"Harvesting soy beans for hay is practically the same process as harvesting cowpeas for hay... Sometimes a tedder is used for curing, but not often." The "usual custom is to shock them on hollow racks made of poles" (see fig. 5). *Merriam-Webster's Collegiate Dictionary* (1998) defines a tedder, a word first used in the 15th century, as "a machine for stirring and spreading hay to hasten curing and drying."

"In harvesting soy beans for seed mechanical pickers (see fig. 8) are used quite extensively. These pickers are of different makes, but all have the same general principle. They run astride the rows and knock out the beans, leaving the stems, leaves, and hulls on the land. The machine is drawn by two mules and operated by two men. One man drives and another throws out the excess trash that accumulates in the back of the machine. The picker will hold from 4 to 6 bushels of beans. When it is full, the beans are emptied and handled in different ways. In one common method the beans are run through a half-inch mesh sieve to remove the coarse trash and then are stacked. One or two men handle the sieve. These men may be the same who operated the machine or they may be extra men. After this the beans are cleaned with a fanning mill. Note 1. This is the earliest English-language document seen (Nov. 2006) that uses the term "fanning mill" in connection with cleaning soybeans.

"Harvesting with a picker begins some time after the leaves of the plant have fallen (see fig. 9). The time to begin is when the first pods pop open and throw out the beans. As the picker works best only when the beans are dry, the machine is not started in the morning until the dew is off, which is usually from 9 to 11 o'clock... A machine will pick from 3 to 6 acres per day, averaging about 4½ acres...

"The waste of beans in picking usually varies from one-twentieth to one-fourth, and, as a rule, averages about one-eighth. If the plants are blown down or have long branches so the machine can not handle them well, the waste may be more than this, or if the beans are left on the vines too late, so that many of them pop out, the waste may be higher. Varieties of beans that begin fruiting some distance from the ground can be harvested with the least waste by a picker, and this is one advantage of the mammoth yellow soy bean. Hogs are usually turned in to clean up the waste beans, so that in fact there is very little loss.

"A picker costs about $125, and so is within the reach of many farmers. A farmer with a small acreage of soy beans frequently buys a picker and, in addition to his own work, does custom work for his neighbors. In this way his machine is profitably used. The common price for picking beans with a picker is 20 cents per bushel, or a toll of one-tenth of the beans. In northeastern North Carolina approximately four-fifths of the beans grown for seed are harvested with pickers. Altogether there are now in use over 1,500 pickers, some of which have been in use for 10 years [i.e., since 1908] and have picked over 8,000 bushels of beans. It is noteworthy that the pickers are replacing other methods of harvesting and that the increase in the acreage of soy beans in the cotton belt can be attributed largely to these machines.

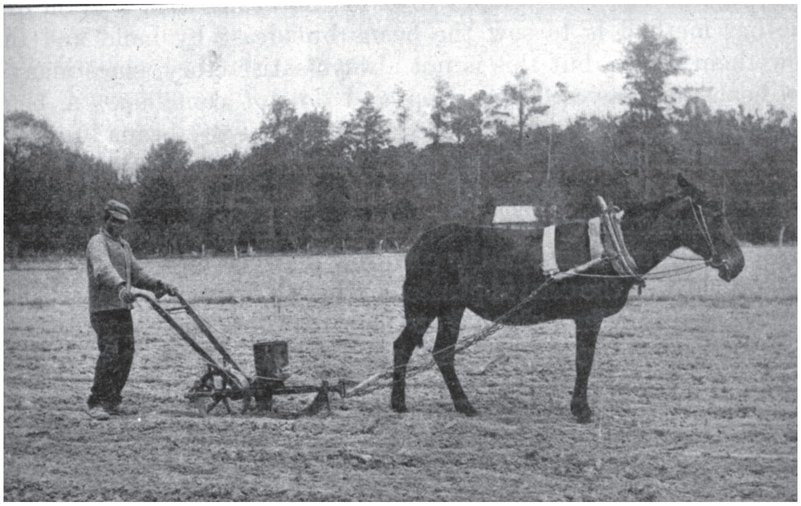
"Another way of harvesting the soy beans is to cut them with a binder and thrash them out with a grain thrasher (see fig. 10) adjusted for handling beans." When harvested with a binder, the soy beans "are cut earlier than when harvested with a picker, since to save the seed they must be cut before the pods start bursting open."

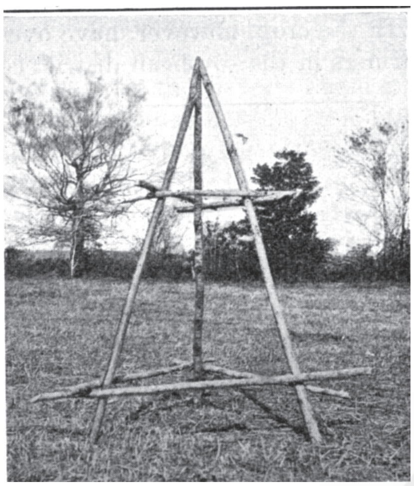
Photos show: (1) A man driving a two-wheeled machine pulled by two horses in a field of soybeans (front cover).

(2) A field of soy beans in southeastern Oklahoma, grown for seed.

(3) Soy beans planted in alternate rows with corn, ready to be harvested.

(4) A man planting soy beans with a cotton planter.





(5) A field of soy beans at Danville, Kentucky.

(6) A hollow rack used for curing soy bean hay.

(7) Soy bean hay stacked on hollow racks.

(8) Baling soy bean hay in the field from hollow racks.

(9) Three people emptying a soy-bean picker and screening the beans.

(10) A field of Mammoth Yellow soy beans to harvest for seed.

(11) People and machines thrashing soy beans.

(12) Soy beans cut with a self-reaper and piled in small bunches for curing preparatory to thrashing.

Note 2. This is the earliest document seen (Aug. 2001) that contains the term "soy-bean picker" (or "soy bean picker"). This machine, developed in North Carolina and first described by Dacy in June 1916, was an early version of the combine, and (like the combine) it greatly facilitated the work of harvesting soy beans.

Note 3. This is the earliest English-language document seen (Jan. 2003) that uses the word "mechanical" in connection with soybean production or harvesting.

Note 4. This is the earliest document seen (Jan. 2003) that uses the terms "pods pop open" or beans "pop out" to refer to shattering. In about 1942 a non-shattering soybean variety named "Rose Non Pop" was developed in North Carolina. Address: Agriculturist, USDA.

310. Johnson, G.A. 1918. The value of soy beans to southern farmers (Letter to the editor). *Atlanta Constitution* (*Georgia*). June 2. p. B6.

• ***Summary:*** The writer has learned "from experience and observation how cheap one can raise a crop of soy beans between corn rows." He describes how to do it. This was widely done in eastern North Carolina last year and those who did so "harvested from between their corn rows an average of 12 or 15 bushels of soy beans per acre, for which they were able to get from $3 to $4 per bushel for all they cared to sell, besides leaving the wasted beans which the harvester did not get as feed for their stock and to improve the land."

"One farmer has told me he would plant soy beans if there was no market for them and, if the stock would not touch them, solely" to increase the fertility of the soil.

In past years the lack of a good harvester "was one reason why a great number of people did not go into [soy] beans more largely, but now we have many harvesters on the market, and not very far from where I live there is a large factory now in course of construction which last year turned out 100 harvesters, the capacity of which will be this year from 500 to 1,000 harvesters.

"We trust that no one will hesitate to take advantage of their opportunities to add to their money crops, add to their bank account, increase the fertility of their soils and at the same time make more feed for their stock.

"You can do all this by simply planting soy beans." Address: Ayden, North Carolina.

311. *Atlanta Constitution* (*Georgia*). 1918. Soy beans with other crops. June 9. p. 15.

• ***Summary:*** Contents: Introduction–"Briefly stated, the different ways in which soy beans are planted in the soy-bean district of northeastern North Carolina, or other parts of the south, are as follows:" 1. As a first crop for seed. 2. As a first crop for hay. 3. In the row with corn. 4. With corn in alternate rows. 5. Soy beans after small grain or Irish potatoes. 6. Sown broadcast or drilled in corn at the last working. 7. Drilled in alternate rows of cotton at the last working.

312. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1918. Soy beans in North Carolina. 1(1):23. June.

• ***Summary:*** "North Carolina claims rank as the largest soy-bean producing State in the country, with an estimated crop for 1917 of 1,500,000 bushels an increase of 20 per cent over 1916. Despite this large crop, the oil mills of eastern North Carolina imported 200,000 bushels of soy beans recently from China.

"A soy-bean harvester has been invented by North Carolina farmers, and is described in a bulletin issued by the experiment station of that State. This harvester thrashes the beans from the vines as they stand in the fields. Five types of soy-bean harvesters are manufactured by North Carolina concerns.

"Of the 1916 crop, 111,000 bushels were sold to canners for canned products, and nearly 100 manufacturers throughout the country are using soy-bean oil in making soap, paint, varnish, enamel, japans, linoleums, oilcloth, and salad oils. The North Carolina Experiment Station publishes a pamphlet containing technical information from these manufacturers as to results with soy beans."

313. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1918. News of the feed mills. 1(1):37. June.

• ***Summary:*** "A soy bean flour mill is to be built at Elizabeth City, North Carolina, by the Eastern Cotton Oil Company."

314. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1918. The soy bean. 1(1):43. June.

• ***Summary:*** Contents: Wide use of soy beans [in North Carolina]. Soy bean has food value. Soy beans for hay. Concerning food value: "This remarkable legume has a composition very closely resembling fat meat. Chemical analysis shows in its composition one-third protein, or more than is found in beef, and one-fifth of its weight in fat. And so the soy bean serves the Chinaman for both beef and butter.

"Another point in favor of the soy bean is the fact that the protein which it contains is a complete protein. That is, it is capable of fully supplying the place of lean meat, milk or eggs. It is for this reason that Chinese and Japanese are able

to prepare from the soy a very good substitute for milk. A very fine cheese is also made from the soy, which is in many respects superior to ordinary cheese.

"The fat or oil of the soy is of excellent flavor and is more easily digestible than animal fat.

"The soy is a vigorous grower and produces more bushels to the acre than does the ordinary bean. Pound for pound the soy bean supplies one-half more nutriment, so that a parcel of ground planted to the soy bean supplies one-half more nutriment than if planted with ordinary beans."

315. *Seed Reporter* (*USDA Bureau of Markets*). 1918. Movement of forage crop seeds from first hands. 2(1):6-7. July 6.

• ***Summary:*** The section titled "Soy Beans" (p. 7) states: "In eastern North Carolina where they are produced more extensively than in any section of the United States, soy beans are harvested during the last of October and the month of November. Movement from farmers' hands begins December 1 and continues heavy throughout January, and sometimes later, depending upon whether the farmers consider the price offered a fair one. Some large farmers hold their supply until the spring demand and ship direct to the dealers."

Other forage crop seeds discussed are: Timothy, Kentucky bluegrass, meadow fescue, orchard grass, redtop, clovers (medium red, mammoth red, and alsike), sweet clover or melilotus, bur clover, southern spotted leaf, alfalfa, lespedeza, sorgo or "cane" and grain sorghums, millets, Sudan grass, cowpeas, velvet beans. Address: Washington, DC.

316. Howard, Bradshaw. 1918. A story of a bootstrap lift: A Piedmont farmer has paid for poor land, and has made it rich through clover and home-grown clover seed. *Country Gentleman* 83(29):8. July 20.

• ***Summary:*** About Vernon T. Woods of Alamance County, North Carolina. It is in the north-central part of the state in the Piedmont region.

"On one field Mr. Woods, after ten years of success with clover, has encountered clover sickness. He has never used any lime on the place, but has devised a profitable shift in the system to meet not only the clover sickness but the increased demand and high price for hay. This field has been set aside for a little rotation of its own. In the fall it is seeded to white-blooming crimson clover and oats. This crop is cut for hay the latter part of May or the first of June, and the ground is immediately broken and put to soy beans. Twelve hundred dollars' worth of soy-bean hay was sold from this twenty-five-acre field last year, and back it went to oats and clover again in the fall."

317. Abbot, J. Lloyd. 1918. Why I am planting over 400 acres of orchard to soy beans in preference to cowpeas or velvet beans. *Bean-Bag* (*The*) (*St. Louis, Missouri*) 1(2):11. July.

• ***Summary:*** "On ground as good as ours, velvet beans are out of the question after the first year, as it is impossible to keep them off the trees to a sufficient extent to prevent them from ruining the trees. This eliminates the velvet bean to start with, leaving only the cowpea and soy bean to consider for our own conditions, and both of them have done well in the past in our orchards.

"The soy bean can be planted both earlier and later than the cowpea, as it will germinate in weather too cool for the cowpea to germinate, and will mature a big crop of grain if planted late, in weather too cool for the cowpea to make a satisfactory yield. Light frosts sufficient to kill cowpeas and other tender plants do not affect the soy beans, either when young or old. The more fertile the soil and the greater the rainfall, the more apt the cowpea is to make big growth of vine and little grain, while under those favorable conditions the soy bean will make still greater grain yields than normally; this in addition to being a drought-resisting plant. The large rainfall is a condition which we are likely to hit every season.

"Soy beans which average 25 per cent protein and 20 per cent oil, as compared with 25 per cent protein and 1.7 per cent oil for the cowpea, are not equalled by any other grain as a supplement to the corn and roughage of the farm, and may even be substituted for that exceptionally rich feed, cotton-seed meal.

"The oil mills will pay a profitable price for the soy bean, and will not buy the velvet bean or the cowpea.

"The seed is not attacked by weevils and other Insects, as in the case of the cowpea.

"The seed may be threshed from the hay with a common grain thresher, while the cowpea requires a special machine. This after the crop has been cut with a mower or binder.

"The soy bean may be harvested directly in the field by any one of the three soy bean harvesters (the Gordon, the Prichard, and the Scott, all three manufactured in Elizabeth City, North Carolina), while the cowpea crop cannot be picked by machinery, and if the grain is to be picked by hand, which is the practice in this section, where there are so few threshing machines. If the cowpea grain is harvested by a mower, or any other machine, preparatory to being run through a thresher, only the ripe grain is secured, while the grain which would have matured from the blossoms at the time of cutting is lost. These soy bean harvesters can harvest about five acres a day, and cost only about $125.00. A grain yield of only 25 bushels to the acre, 125 bushels to 5 acres, at a price of $4.50 per bushel, will pay for itself in one season, with money saved over hand picking.

"The soy bean seed decay slowly when left on the ground, and hence are suitable for winter hog pasture.

"The soy beans ripen together, hence the total yield can be obtained by machine picking or harvesting, while to

obtain the total yield of cowpeas the expensive hand picking has to be resorted to, and the picking has to be done several times instead of just once, as with the soy bean.

"The soy bean grows erect instead of a vine, hence the difficulty of controlling it is not an item in its culture.

"In planting a row of soy beans and a row of corn, over my entire corn plantings, I get almost as much corn, just as with the velvet beans planted in this way, but I can harvest the corn at any time I wish, as well as harvest the soy beans at the proper time, neither interfering with the other, and I can get the crop off the land in time for a fall or early spring crop, which is extremely difficult with the velvet bean when It is pastured, and the velvet bean is only most profitable when pastured.

"The soy bean is superior to cowpeas or velvet beans for silage with corn.

"The grain yield of soy beans is about the same as the yield of corn in this section, although Citronelle growers made as high as 34 bushels of soys to the acre, and that only after one year's previous experience with growing the crop. Thirty-four bushels is far above the average corn yield of the section.

"The soap manufacturers and the paint manufacturers are beginning to use the soy bean oil very extensively. The refined soy bean oil is being used for table purposes, just as some of the other vegetable oils. The Europeans are several years ahead of us in this latter respect.

"The soy bean meal, the by-product of the oil mills, is a valuable stock feed, competing with peanut meal and cotton-seed meal.

"The soy bean may be used as a human food: It makes the following delicious dishes: Roasted soy beans; soy bean soup; boiled soy beans; soy bean muffins; baked soy beans; soy beans cooked with tomato sauce; baked soy loaf; soy bean crust; soy bean coffee. In this time of food scarcity, we need every staple food we can grow. The soys can be harvested and kept for food for years. What better insurance is there against a food shortage than to grow soy beans?

"Canning factories are using the soy beans instead of the navy beans to put up canned pork and beans. Try a sample of the 'Dyer' or 'Alice' brands of 'Pork and Beans' put up by the Dyer Packing Co., of Vincennes, Indiana.

"Soy beans are much richer in protein than lima beans or sirloin steak. In fact, they contain double the amount of protein contained by these two staple food products. The soy bean contains about the same amount of fat that Is contained in lima beans. The full value of the soy bean as a food product is slightly higher than sirloin steak and lima beans. It has been stated by food experts that for men who are engaged in hard manual labor, where they burn up a lot of their tissues in the effort, soy beans are as suitable for food as is steak.

"Summary: The soy bean makes more grain per acre; it can be harvested by machinery, hence more cheaply; it fits into intensified farming better; there are a greater number of uses for the grain, hence greater demand; and it is worth more per bushel when harvested than either the cowpea or the velvet bean. In addition to all these advantages, it is a delicious human food and meat substitute.

"Can you afford not to grow soy beans?" Address: Mobile, Alabama.

318. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1918. Soys in North Carolina. 1(2):35. July.

• ***Summary:*** "North Carolina, one of the foremost soy bean growing states in the Union, has a greatly increased acreage planted to that product this year, according to Colonel Fred A. Olds, of Raleigh. Estimates by the County Agents are that the acreage this year will amount to over 50,000 acres, Sampson County leading with 18,000 acres.

"The Department of Agriculture has two emergency men now in the field who are spending their time encouraging soy bean planting, and giving complete instruction as to planting, cultivating and harvesting. Colonel Olds declares that North Carolina has the honor of already leading all the United States in the production of soy beans, and yet has not done a hundredth part of what it can do."

319. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1918. Classified: For sale (Ad). 1(2):47. July.

• ***Summary:*** "Three hundred bushels mammoth yellow [Mammoth Yellow] seed soy beans. Quote best price f.o.b. Gum Neck, North Carolina. Fairview Seed Farm, Gum Neck, N.C."

Note: This ad also appeared in subsequent issues of this magazine.

320. *Monthly Crop Report* (*USDA*). 1918. Field beans acreage estimates. 4(7):78. July.

• ***Summary:*** A 10-column table gives statistics for three types of field beans: Soy beans, cowpeas, and velvet beans. For each type of bean it gives: Names of producing states, acreage in 1917 and 1918, percent planted alone vs. with other crops, percent sown for grain, hay, silo, grazing, plowing under.

The 17 states that produce soy beans are Vermont, New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Ohio, Indiana, Illinois, Wisconsin, Missouri, Kentucky, Tennessee, Mississippi, Arkansas. The states with the largest soy bean acreage in 1917 are: North Carolina 120,000 acres. Indiana 100,00 acres. Kentucky 57,00 acres. Virginia 50,000 acres. Tennessee 50,000 acres.

Of the 21 states where cowpeas are produced, those with the largest cowpea acreage in 1917 are: Mississippi 3,300,000 acres. Alabama 1,057,000 acres. Georgia 771,000 acres. South Carolina 750,000 acres.

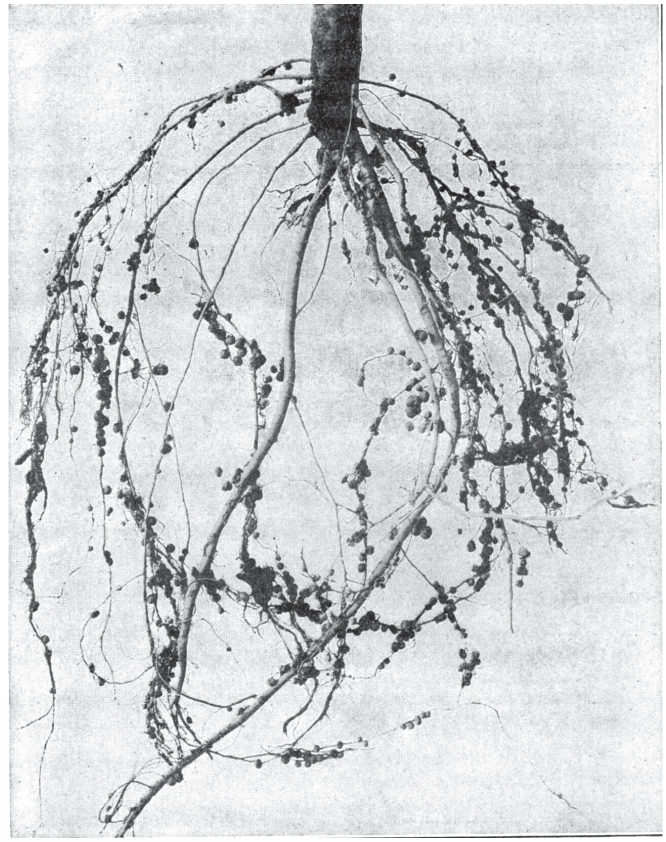
Of the 7 states where velvet beans are produced, those

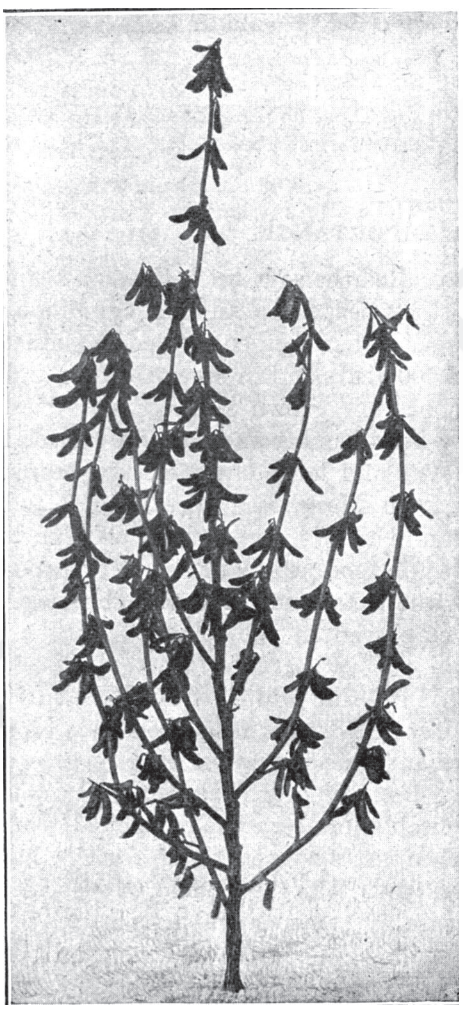
with the largest velvet bean acreage are: Alabama 1,800,000 acres. Georgia 1,300,000 acres.

Note: Cowpea acreage in the United States is much bigger than soybean acreage at this time.

321. 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,



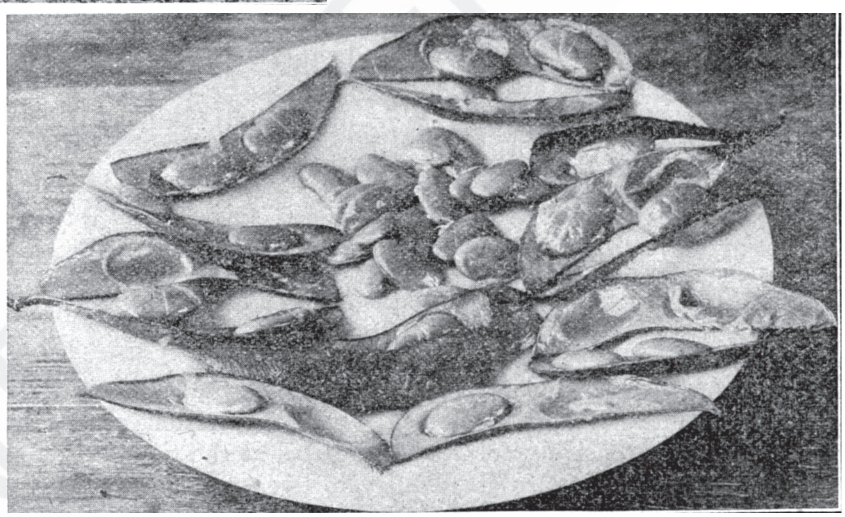


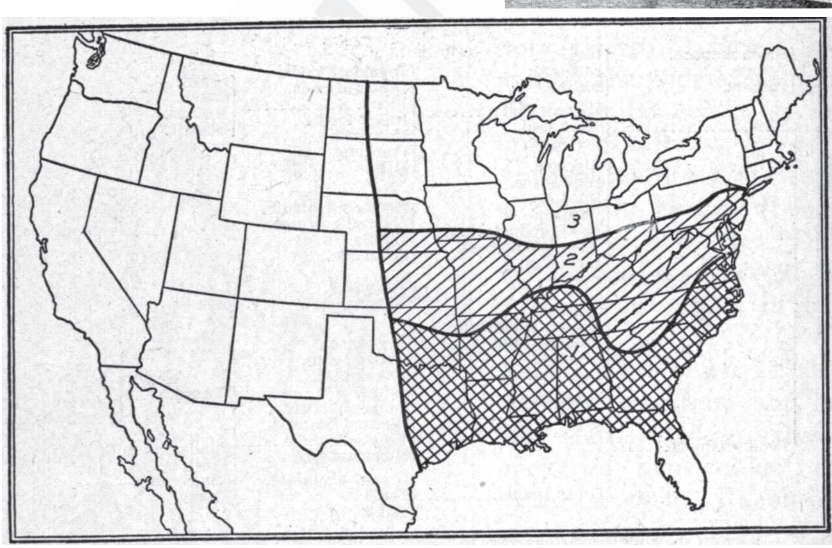
and it is quite evident that the latter two are selections from the Peking."), Shanghai ("has been grown in North Carolina under the name of Tarheel Black"), Tokyo, Virginia, Wilson-Five [black seeded], Yokotenn [Yokoten].

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

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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.

322. 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.

323. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1918. Condition of the crop: North Carolina. 1(3):26. Aug.
• ***Summary:*** "The soy bean crop is doing very well; rain has been had in various localities."

324. Withers, W.A.; Carruth, F.E. 1918. Comparative toxicity of cottonseed products. *J. of Agricultural Research* 14(10):425-52. Sept. 2. [16 ref]
• ***Summary:*** In 1915 the writers isolated gossypol, the toxic substance in cottonseed meal. Cottonseed meal, even when thoroughly cooked, is highly injurious to rabbits and pigs. In this paper, experiments conducted on four animals are described: rats, rabbits, poultry, and pigs. Raw cottonseeds are highly toxic to rats, but the cooked product is only very slightly toxic.

Soybean meal is used for comparison in many experiments in this paper (see p. 432, 433, 436, 446, 447, and 450).

"Hence we conclude that the cottonseed-meal 'injury' of swine is due, not to deficient diets, but to the presence of a toxic substance. In our opinion this toxic substance in cottonseed meal is the derivative of gossypol which we have called 'D-gossypol.'"

Note: This is the earliest English-language document seen (July 2016) that contains the word "cottonseeds" (spelled as one word). Address: Chemical Div., North Carolina Agric. Exp. Station.

325. 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.

326. Rubinow, S.G. 1918. Busy Tarheels: North Carolina extension workers perform 12,000,000 farm services in a year. *Country Gentleman* 83(36):13, col. 4. Sept. 7.
• ***Summary:*** "The Governor's Soy-Bean Bread: Farmers all over the country are taking up the soy bean and there is a big increase in the acreage this year over last. Housewives are using soy beans for table use. Cotton mills are crushing soy beans for the oil and for meal cake. The soy-bean-meal flour is being used as a substitute for white flour and the governor has soy-bean bread on his table regularly. The soy bean is North Carolina's fifth crop."

327. Smith, A.G. 1918. How to harvest soy beans: May be cut with binder and threshed with grain thresher, but far better to use soy bean picker–A demonstrated success–How it operates. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 33(38):1042. Sept. 21.
• ***Summary:*** "The best method of harvesting soy beans, everything considered, is with a soy bean picker such as is used in northeastern North Carolina. This part of the country, incidentally, is the soy bean section of the United States. It probably produces more soy beans than all the rest of the country combined, and the crop has now become a staple, one from which an income is expected as regularly as from cotton and corn. In Hyde County, the soy beans were first cut and threshed, but it is noticeable that now the pickers have largely supplanted the binder and thresher, and where new areas are found growing soy beans, the picker is used almost exclusively for harvesting."

The author then describes how the soy bean picker operates, when to do the work of harvesting soy beans, and how to avoid waste. The information is a summary of that which first appeared in his excellent bulletin "Soy beans in systems of farming in the cotton belt" (May 1918). A small oval portrait photo shows Mr. Smith. Address: Div. of Farm Management, USDA, Columbia, South Carolina.

328. Holmes, Arthur D. 1918. Digestibility of protein supplied by soy-bean and peanut press-cake flours. *USDA Bulletin* No. 717. 28 p. Sept. 25. [78 ref]
• ***Summary:*** Contents: Introduction. Investigations of digestibility of common legumes. Source and supply of soy-bean and peanut press cakes. Factors considered in determining food value of a protein. The amino acids supplied by soy-bean and peanut proteins as compared with those supplied by common cereal proteins. Biologic value of soy-bean and peanut proteins as compared with that of common cereal proteins. Digestibility of soy-bean and peanut proteins. Preparation of soy-bean and peanut press-cake flours. The subjects of the digestion experiments. Preparation of experimental diets. Details of the experiments. The digestibility of protein supplied by soy-bean press-cake flour. The digestibility of protein supplied by peanut press-cake flour. Experiments with flour made from roasted

peanuts. Experiments with flour made from raw peanuts. Summary of all experiments with peanut flours. General conclusions regarding the value of soy bean and peanut flours as food.

"Those legumes most commonly used in this country are the well-known navy beans, red kidney, and lima beans, the garden pea, frijoles, pinto beans, and several varieties of cowpeas."

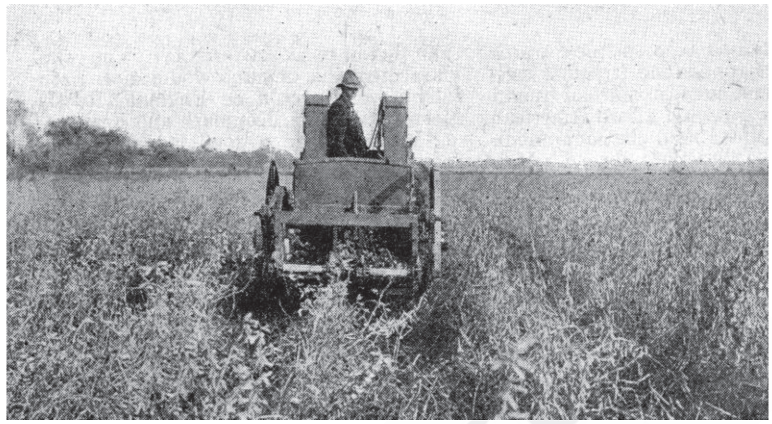
It has been estimated that during the 1917-18 season North Carolina produced 150,000 bushels of soy beans and more than 3,500 tons of press cake. Such "press cake has been very largely used as stock feed and, because of its high nitrogen content, for fertilizing purposes."

In experiments with soy-bean flour, the coefficients of digestibility for the entire diet were, for protein 86.6%, for fats 94.2%, and for carbohydrate 96.3%. The digestibility of soy-bean protein was estimated at 85.3%. This is significantly higher that the digestibility of the protein of most other legumes.

Conclusion: "Soy beans and peanuts are classed as a 'sure crop,' and both yield valuable products (press cakes) whose chief use at present is said to be for stock feeding. The boll weevil has made the growing of cotton unprofitable in some sections of the South. As a result during the last season or two, the culture of soy beans and peanuts has increased with unusual rapidity. This situation, coupled with the present great demands for oils, has caused many of the cotton-seed-oil millers to utilize their machinery for pressing soy beans and peanuts." Address: Specialist in Charge of Digestion Experiments, Office of Home Economics, USDA.

329. Jordan, Sam. 1918. Soy beans from soup to nuts: A new crop with many uses both on farms and in factories. *Country Gentleman* 83(39):7, 34. Sept. 28.

• ***Summary:*** Begins by discussing: The possibilities of soy beans "as a substitute for meat." The rising demand for "soy oil" which started a few years ago when the flax crop was little better than a total failure. "Industrial uses" of soy oil in soap, paint, and varnish. "Several packing houses were experimenting with the oil as a possibility in oleomargarine

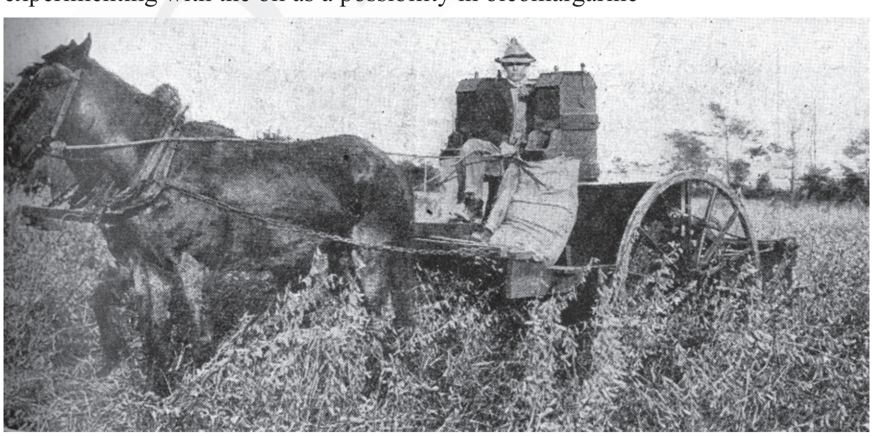


manufacture." "Soys fix soils for cotton." "Varieties of soy beans have been matured as far north as Quebec" [Canada]. The "development of the soy in the cotton sections will no doubt be swifter from an industrial standpoint because of the already existing facilities for oil extraction."

Concerning food uses, the author believes that "the soy bean as human food is destined to play a leading part in the way of a substitute for meat. From studies made of soy beans as food, the use of flour seems to be one form in which their use will suit the American taste and palate best."

"I have heard that the soy-bean milkman comes around before breakfast each morning in the Orient and leaves soy-bean milk." A Chinese student recently verified this story and said that in his family's household "it was customary to drink a glass of the milk upon arising." The student added that fried bean curd was often served for breakfast, and with soy sauce for dinner. "This soy sauce is something more or less familiar to Americans, the acquaintance being contingent upon the frequency with which our Chinese restaurants are patronized. It is the dark-brown liquid usually on the tables in the vinegar bottles. It is also the base of our Worcestershire sauces.

"For supper a favorite dish is sprouted beans in salad form, mixed with small pieces of meat or egg. They usually have also some form of bean cheese or fermented boiled beans. Next to baked and boiled beans, the preparation of soy-bean milk is a thing which should be more widely known."



"The author gives a brief description of how this milk is made, noting that it can be used in "cream sauces, puddings, custards, and even ice cream when some high flavoring is added to kill the beany taste. Much of the strong taste can be eliminated by boiling the milk slowly and stirring to prevent scalding.

"The residue [okara] obtained by straining the milk makes an excellent base for muffins and even bread, when it is used in the proportion of one part to three or four parts of wheat flour."

"In regard to fresh bean curd or 'tofu,' as the Chinese call it, it is hardly probable that we shall use it generally at an early date. The process of making it will no doubt come through the activities of our increasing number of women home-demonstration agents and, also, it is being made commercially by several Chinese firms in this country. When it does become more widely known, however, it is destined to be used extensively. It has very little taste of its own, and takes the flavor of everything with which it is used, generally as a base. It is also highly nutritious.

"Soy sauce is likewise destined for greater use, but the process of its manufacture is too complicated for domestic preparation. It can be purchased at Chinese groceries in this country, and probably from the majority of Chinese restaurants.

"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."

"And here is one for vegetarians–a 'vegetarian roast.' This is made by using equal parts of soy beans and peanuts, with the peanuts roasted and the beans boiled until soft before both are mixed and treated as an ordinary meat loaf. Such a roast as this is now being prepared by several food-manufacturing firms in the South, where both peanuts and soy beans are plentiful. It is being placed on the market in one and two pound containers."

"The beans served as a green vegetable are treated after hulling in much the same manner as Lima beans or peas. To hull, however, they should be boiled in the pods for about five minutes, then dipped into cold water, after which they shell easily. They can also be canned in this way, treating them after hulling the same as Lima beans. It is often desirable to serve them with rice or potatoes."

"So here we have a small glimpse of what their [soy beans'] future really is. A crop with a great industrial importance, a crop with known forage and manurial possibilities, and a crop holding forth a beneficent promise as an essential food, soy beans will soon be giving corn and wheat a close race for the more prominent places on our agricultural map."

Photos show: (1) Soy beans after being soaked but before boiling. (2) Piles of hay, used for forage. (3) Side view of a soy-bean harvester (with a man on top, pulled by two horses) used in the South, showing the bags filled. (4) A rear view of the same separating and bagging soy-bean harvester. Note: This is actually an early harvester-thresher, also called a "combine."

Note 1. This is the earliest document seen (March 2012) that uses the term "from soup to nuts" in connection with soybeans.

Note 2. This is the earliest English-language document seen (Jan. 2013) that uses the term "soy-bean sprouts" to refer to these sprouts. Address: Columbia, Missouri.

330. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1918. Editorial: Food for thought. 1(4):10-11. Sept.
• ***Summary:*** "Recalling an editorial appearing in the last issue of The Bean-Bag dealing with bean flour, and urging bean flour manufacturers and dealers to get busy acquainting the public with this new commodity, we wish to call attention to the following editorial from the Boston Herald, which would tend to substantiate our opinion. The editorial:

"'Washington, like a hotter place, is paved with good intentions. Government [DC] paternalism sees to that... But the kind which is practiced in several of the United States departments is more ardent than well-informed.

"'The Department of Agriculture issues a circular bearing as its title the injunction. 'Use soy-bean flour to save wheat, meat, and fat.' Very good. The soy or soya bean itself is an excellent food, and converted into flour it should be extremely useful. But let us not hurry. First, procure the flour. A Boston correspondent, after fruitless local inquiries, wrote to the department for information and was courteously furnished with a list of dealers from whom soy-bean flour may be purchased. Five are in North Carolina, one is in South Carolina, two are in Chicago [Illinois], and two in Seattle. So, of course, is the flour.'"

"The same condition exists throughout the country. Thousands of people would be only too glad to comply with the Government's request, but they are unable to get the flour. Acquainting the public with bean flour, and placing it where it can be purchased, is, or should be, the duty of the bean flour manufacturer and dealer."

331. *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.

332. Pate, W.F. 1918. Soybean harvesters. *North Carolina State College of Agriculture, Extension Circular* No. 80. 8 p. Sept.
• ***Summary:*** This circular is similar in content to Extension Circular 56, 1917, by the same author but contains some new information. A table shows updated prices, and detailed questions and answers (specifications) comparing 6 types of harvesters.

Photos show: (1) A fine growth of soybeans in rows 3

feet apart (front cover).

(2) Side view of the Gordon Harvester in action, pulled by 2 horses. "This machine weights about 800 pounds. The length of the body is 12 feet and width 22 inches. The width of the whole machine from center tread to center is 42 inches. The beater consists of 14 fingers which revolve parallel to the row. It is chain driven. The machine can he raised and lowered from tongue and axle."

(3) Rear view of the Pritchard Harvester. "The Pritchard Harvester at work. This machine weighs about 1,140 pounds. The body is 10 feet long and is made in three widths: 32 inches, 48 inches, and 44 inches. Each size has a different width tread as follows: 46, 52 and 58 inches. The body can be raised or lowered from both axle and tongue. The beater is chain driven and revolves at right angles to the row. With this machine the passage for the stalks extends clear to the rear end of the machine."

(4) Side view of the "Little Giant Machine ready for use. This machine weighs about 800 pounds, and the body is 11 feet long and 30 inches wide. From center tread to center is 39 inches. The machine can be raised or lowered both from axle and tongue. The beater has 35 spike-like teeth and is chain driven. The wheels and axles are the same as those used on a mowing machine."

(5) "Working parts of the Pasquotank machine. This machine weighs about 800 pounds, and the body is 8 feet long and 40 inches wide. It can be raised and lowered from axle and tongue. The beater is driven by chains and gears, and has 8 fingers on the cylinder, which makes about 400 revolutions per minute. On the rear of the machine there is a screening device with bin below of six bushels capacity." (6) "Side view of Taylor Harvester. This machine weighs about 500 pounds. The length of the body is 12 feet and tongue 9 feet long. The inside width of the body is 22 inches. From center tread to center is 46 inches. The beater consists of sixteen fingers which revolve parallel to the row. It is chain driven. This machine is put out in three sizes." (7) Man harvesting soybeans with a grain reaper. (8) Man thrashing soybeans that have been cut with a reaper. Address: Agronomist in Soil Fertility, Raleigh, North Carolina.

333. *Bulletin Economique de l'Indochine* (*Hanoi*). 1918. L'emploi de l'huile de soja dans la fabrication des couleurs [Use of soy oil in the manufacture of paints (Abstract)]. 20(132):992-93. Sept/Oct. [Fre]
• ***Summary:*** A French-language summary of the following French-language article: *L'Exportateur francais* (Paris). 1918. "L'emploi de l'huile de soya dans la fabrication des couleurs" [Use of soy oil in the manufacture of paints]. No. 87. p. 39. March 28. Address: Hanoi.

334. MacDougall, Sarah. 1918. Introducing to America an entirely new food–The soy bean: Dr. Yamei Kin. *Bean-Bag* (*The*) (*St. Louis, Missouri*) 1(5):17-19. Oct.
• ***Summary:*** From St. Louis Post-Dispatch Sunday Magazine: "Soy beans! Once I tried to cook them. After that I never wanted to hear any more about them. But that was before I was invited to a soy bean luncheon in a Greenwich Village apartment. Whenever anyone said 'soy beans,' I would recall that bowl of pebbles and then an unspeakably unpalatable mass of stuff that had to be thrown away. But now! As long as I live soy beans will seem like a symbol of pleasant sensations inside and out. I must tell you about that luncheon.

"I went the other day to see Dr. Yamei Kin, a charming Chinese woman, who is giving her time and talents to the Government to help solve the food problem. Her specialty is Oriental food, especially soy beans, and she has been spending the summer showing how that food can be adapted to Occidental appetites. I found her in a blue silk kimono and a big white apron, hustling about the kitchen of the United States Department of Agriculture Laboratory in New York.

"The place looked as if somebody had just milked the cows and brought in the milk pails. On the floor near the stove were two 12-quart pails filled with warm milk. Dr. Kin was starting to make curds and whey. I watched her put a couple of spoonsful of fluid into each pail and saw the milk curdle in the good old way. Then the Chinese boy helper strained the stuff through an aluminum strainer and cheesecloth. They were going to make cheese.

"The Chinese lad had just finished milking the soy beans before I came in. That may sound queer to a mind that doesn't orientate toward those beans. But its all very simple. If we knew as much as we ought to know about soy beans there wouldn't need to be any cattle or grazing lands or winter fodder. Because soy beans are ready to supply meat and milk and butter and cheese and all the rest of it. Dr. Kin says so. And there are rows of jars and bottles on shelves and tables in that kitchen to prove it. Besides, there was a soy bean luncheon.

"The beans from which the milk had been extracted were soaked the night before. In the morning the Chinese lad put them through the mill, which is part of the kitchen equipment. It looks primitive, being made of two huge pieces of granite, imported from China. In its homeland this mill is worked by coolies, in New York by electricity. When the grist comes out of the mill it is strained. That was the stuff that filled those two pails. Dr. Kin told me that in China people eat the curds and cheese in their natural state. Here, however, she is making that cheese a base for a series of camouflage experiments.

"'We made ours into fish for dinner last night,' said a man from a nearby laboratory, who comes in every day to find out whatever happens to be new about soy beans.

"'How was it?' asked Dr. Kin.

"'Great,' said the man. 'My wife fried a couple of fish and then fried some soy bean cheese in the gravy, and, honest to goodness, I couldn't tell which was which. It has a way of absorbing the flavor of whatever it's cooked with,' he explained to me.

"'We had ours with chops,' remarked another laboratory expert who joined us. His name was Mr. Gleason. He declared that if he didn't know the difference he might have thought he was eating an extra chop. Everybody in the place was ready to root for soy beans.

"Dr. Kin explained that the reason the soy bean has been misunderstood in America was because people didn't take the trouble to investigate and analyze it, and to find out what are its food properties with reference to the nutrition we get from meat and vegetable.

"'Don't try to think about soy beans in a scientific way,' she advised me. 'This thing I am working with is in reality a vegetable cheese. It takes the place of meat. We've been using soy beans in China for over 2,000 years, and they are really very delicious and nutritious,' this in an offhand way, as if an experiment of 20 centuries or so ought to pave the way for the American appetite. She didn't want me to get my mind cluttered with such terms as carbohydrates and proteins.

"'I wouldn't waste a minute experimenting with food that was merely nutritious,' she told me. 'This whole movement about finding out the possibilities of food is part of the cultural development of the American people. The older a civilization becomes, the more people like to be surrounded by beautiful things. Chinese art, you know, is the most highly developed art in the world. All this bother about beans is not a question of science or of what is good for us, but it is a question of what is dainty, what is nice, what appeals to the taste. Making a study of eating is a part of the fine art of living.

"'American women, you must admit, are lacking in artistic sense. That is because the country is so young. When the process of refinement is farther advanced they will not regard household work, and especially cooking, as drudgery. It is really art. The older nations, being more cultured, make a deeper study of things. Chinese, for instance. But the Americans are very susceptible, very open-minded and frank and eager to acquire new ideas.

"'The trouble with vegetarians was that they expected us to eat such awful things. I'm not a vegetarian, but I must admit that I find great satisfaction in being able to sit down to most of my meals without facing the fact that I am eating slices of what was once a palpitating little animal, filled with the joy of life. I shouldn't be surprised if the soy bean will save the lives of many American animals.'

"On a long table was a row of glass jars filled with what looked like slices of white cheese [fermented tofu]. It was soy bean cheese. A jar was filled with a brownish paste [probably a type of Chinese jiang]. It was soy beans. There were bottles filled with the condiment we get with chop suey. That, too, was made from soy beans. Talk about dual personalities! The soy bean has so many aliases that if you couldn't like it in one form you would be pretty sure to like it in another.

"Dr. Kin has been trying any number of experiments with a view to boosting the bean to a bigger place commercially. In due time the results of all these experiments will be catalogued at Washington [DC]. Perhaps some day there will be a Bureau of Beans, from which may be obtained for the asking recipes on a thousand ways to prepare soy beans.

"Because she is working for the Government Dr. Kin

doesn't disclose many details about the things she is doing. All that is worth while will be public information in due time, she says. Canning curds and cheese so they can be kept an indefinite length of time and then utilized in various forms is something she is trying to perfect.

"'I might talk to you until doomsday about the manifold uses of soy beans, but you wouldn't understand,' she told me candidly. Then she invited me to have luncheon in her apartment, promising me a practical and palatable demonstration that would make an impression in the way food ought to interest us. Of course, I was charmed with the idea. The only hitch was that I had to have luncheon without my hostess. Dr. Kin was going out of town early in the afternoon.

"While the Chinese lad was getting his instructions about piloting me to the apartment and serving luncheon, Dr. Kin turned to me and asked what kind of cheese I liked best.

"'Roquefort,' said I.

"'That's good,' said she, and then she told the boy something else in Chinese, told me she hoped I'd enjoy the luncheon and invited me to spend all afternoon at the flat if I cared to read any of her books or look at her pictures.

"Before we turned in at 56 West Eleventh street, I discovered that Wei, my amiable escort, was somewhat limited as to English vocabulary. He had been here only six months. When he entered the apartment he ushered me into a cool-looking parlor, indicated a comfortable big chair beside an open window, and disappeared with a smile that seemed to say: 'I'll rustle along the luncheon if you just sit there and fan yourself.'

"In a corner over near a window there was a big mahogany desk that looked like business. On it was the photograph of a Chinese-American youth, a strapping tall fellow who looked every bit a soldier. He is Dr. Kin's soldier son, Alexander, 21 years old, who left college to enlist as a private, and is now with Pershing's Eighty-second Division.

"A book and a magazine lay side by side on that desk. The book was Rabindranath Tagore's 'Nationalism.' The magazine was 'The Bean Bag.' I took up the magazine. Here are a few things I learned:

"Three million acres have been cultivated to soy beans in the South, principally in North Carolina; man could come nearer living well on soy beans alone than on any other food: it is the nearest substitute to meat there is; containing starch, sugar, fat, cellulose, albuminoids, mineral salts; a new harvester has been invented that threshes the beans on the vines, over 100 American manufacturers are using soy bean oil for soap, paint, varnish, enamel, salad oil; soy beans are listed in the food market of the District of Columbia; the soy, or soja, is the first and oldest of the 150 branches of the bean family; Manchuria claims the honor of its nativity; the Manchurian railroad recently opened a branch and an improvement station for distribution of the Ssupingkai special." Continued.

335. *Popular Science Monthly.* 1918. How North Carolina's soy beans are harvested. 93(Part 2):84. Oct.
• ***Summary:*** "The production of soy beans in North Carolina exceeds a million bushels a year. To harvest the crop, special machines have been invented by the farmers themselves.

"The harvesters thresh the beans from the vines as they stand in the field. Five types of harvesters are made by farmers in North Carolina, but a beater with fingers is common to all the machines. The beater gathers the beans from the growing stalks. Its operation varies according to the type of harvester. Some beaters revolve parallel to the row; others at right angles to the row. Some harvesters are carried on mowing-machine wheels and others on common cart-wheels. In some the beaters are driven by chains; in others by gears.

"L.S. Gordon, a farmer of Elizabeth City, invented the first one. Another successful harvester is the invention of Herman Hardy, of Lagrange.

"George E. Pritchard, of Elizabeth City, invented a complicated but efficient mechanism."

An illustration / diagram shows the inner workings of the "Pritchard harvester–one of several machines invented by North Carolina farmers."

336. Williams, C.B. 1918. Soy bean products and their uses. *Bean-Bag* (*The*) (*St. Louis, Missouri*) 1(5):27-31. Oct.
• ***Summary:*** This article is a reprint of: Williams, C.B. 1916. "Soy-bean products and their uses." *North Carolina Agricultural Experiment Station, Circular* No. 34. p. 1-7. Dec. Address: Chief, Div. of Agronomy, North Carolina Agric. Exp. Station.

337. 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.

338. 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.

339. Gray, Dan T. 1918. Report of the Animal Industry Division. *North Carolina Agricultural Experiment Station, Annual Report* 40:33-63. For the year ended June 30, 1917. See p. 33-43, 57, 62-63.
• ***Summary:*** One section, titled "Value of Soybean Pastures for Hogs (Central Station Farm)" (p. 33-34) states: "It is absolutely impossible to make money with any kind of live stock unless pastures of various kinds are used as a basis... One of the best pastures, and one that can be used practically anywhere in the state, is soybeans... hogs running upon soybean pasture gained just twice as rapidly as did those which were enclosed in the lot and fed all the corn and shorts they would consume... it cost $13.24 to produce each 100 lb of increase in live weight in the dry lot and $5.50 to produce an equivalent increase in live weight in the soybean-pasture lot... 200 lb of pork were produced to each acre."

Other sections are titled "Value of soybean pasture for feeding dry brood sows (Central Station Farm)" (p. 34). "The amount of corn which should be fed in conjunction with soybean pasture (Edgecombe Branch Station Farm)" (p. 36). "Value of soybean pasture in conjunction with corn (Cotton Valley Farm)" (p. 36-37). "Relative value of soybean and peanut pastures (Pender Branch Station Farm)" (37-38). "The cheapening effect of peanut pasture, soybean pasture, and mast upon the bodies of hogs" (p. 41-43). "Raising chicks on soybean meal and buttermilk (Pender Branch Station farm) (p. 62-63).

The section, titled "Soybean meal for little chicks (Edgecombe Branch Station Farm)" (p. 57), states: "Soybean meal is another new feed upon our markets and many enquiries are coming to Dr. Kaupp relative to its value as a chicken feed." At the Edgecombe Branch Station Farm it was found that when soybean meal was fed in equal quantities with wheat shorts and cracked corn mixed with sweet milk, the soybean meal proved to be a most valuable feed and one to be recommended as a good ration for feeding little chicks. One lot of chicks on soybean meal averaged 1.4 lb when 8 weeks old. A second lot, handled and fed exactly as the first, except that rolled oats were used in place of soybean meal, averaged 1.1 lb in weight at the same age. Results based on tests with 16 lots of chicks showed that soybean meal can replace rolled oats in chick feeding. Address: Chief in Animal Industry [Durham, North Carolina].

340. 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.

341. *Seed Reporter* (*USDA Bureau of Markets*). 1919. Soy bean, cowpea, and velvet bean seed outlook. 2(7):3-4. Jan. 11.
• ***Summary:*** "It appears that the supply of the 1918 crop of soy beans for seed will be less than the 1917 crop. In eastern North Carolina, where large quantities, principally of the Mammoth Yellow variety, are normally produced for shipment to other sections, many farmers harvested large acreages for hay and also allowed livestock to graze considerable acreage that was intended for seed purposes." Address: Washington, DC.

342. *Seed Reporter* (*USDA Bureau of Markets*). 1919. Stocks, shipments, prices, etc., of soy beans and cowpeas. 2(8):6. Feb. 8.
• ***Summary:*** A table gives statistics concerning the following states: Virginia, North Carolina, Tennessee, Mississippi, Georgia, Louisiana, Other states. The following statistics are given: (1) Quantity of 1918 crop on hand Jan. 15, 1919 (North Carolina has the largest amount, followed by Virginia). (2) Shipments of 1918 crop made up to Jan. 15, 1919 (North Carolina 628,000 lb, Virginia 150,000 lb, Mississippi 12,000 lb). (3) Estimated shipments of 1918 crop to be made after Jan. 15, 1919 (North Carolina 3,086,000 lb, Virginia 520,000 lb).

(4) Total estimated shipments of 1918 crop made or to be made (North Carolina 3,714,000 lb, Virginia 670,000 lb, Louisiana 42,000 lb). (5) Total shipments made last year (1917 crop) (North Carolina 5,082,000 lb, Virginia 1,265,000 lb, Mississippi 48,000 lb). (6) Estimated percentage of 1918 crop still in growers' hands (Jan. 15, 1919) (ranges from 90% in Georgia and Louisiana to 55% in Mississippi).

(7) Average price per 100 pounds paid to growers this season to Jan. 15, 1919 (ranges from $3.35 in North Carolina to $5.25 in Louisiana). (8) Estimated average quality 1918 crop for seed (ranges from 90% in North Carolina to 70% in Tennessee). Address: Washington, DC.

STOCKS, SHIPMENTS, PRICES, ETC. OF SOY BEANS AND COWPEAS.

(All statements of quantity are given in thousands of pounds, that is, the last three figures (000) are omitted.)

STATE OR DISTRICT	Quantity 1918 crop on hand Jan. 15, 1919.	Shipments of 1918 crop made up to Jan. 15, 1919.	Estimated shipments of 1918 crop to be made after Jan. 15, 1919.	Total estimated shipments of 1918 crop made or to be made.	Total shipments made last year (1917 crop).	Estimated percentage 1918 crop still in growers' hands (Jan. 15, 1919).	Average price per 100 pounds paid to growers this season to Jan. 15, 1919.	Estimated average quality 1918 crop for seed.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%	Dol's.	%
SOY BEANS.								
Va.	66	150	520	**670**	1,265	80	3.60	85
N. C.	273	628	3,086	**3,714**	5,082	85	3.35	90
Tenn.	14	1	0	**1**	16	85	4.75	70
Miss.	2	12	10	**22**	48	55	4.25	80
Ga.	0	0	12	**12**	0	90	......	85
La.	0	0	42	**42**	42	90	5.25	85
Other States	0	0	19	**19**	38	90	5.75	75
Totals.	355	791	3,689	4,480	6,491	......	......	....

343. Snypes, M.V. 1919. Farmers' experience meeting: Success with soy beans. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 34(6):220-21. Feb. 8.
• ***Summary:*** The author began growing soy beans in North Carolina 4 years ago. He describes his methods of culture (the second year he got a yield of 3 tons of hay/acre) and notes that he fed the hay to his stock. Address: Nebo, North Carolina.

344. *Chemische Umschau auf dem Gebiete der Fette, Oele, Wachse und Harze* (*Germany*). 1919. Technologie: Fettgewinnung, Fettwirtschaft [Technology: Obtaining fats and oils, and their economics]. 26(2):28-29. Feb. [Ger]
• ***Summary:*** Soybean oil: In North Carolina, with state subsidies, soybean cultivation, has increased rapidly. The Paint Manufacturers' Association of the U.S. says that of all substitutes for linseed oil, soybean oil is the best.

345. *Seed Reporter* (*USDA Bureau of Markets*). 1919. Final soy bean, cowpea, and velvet bean, and millet and sorghum seed shippers' report. 2(9):6. March 8.
• ***Summary:*** A table shows soy bean statistics for the following states, ranked in order of "Total estimated shipments of 1918 crop made or to be made": North Carolina 4,764,000 lb, Virginia 1,483,000, other southern states 200,000, Tennessee 142,000, Indiana 99,000, other northern states 89,000 lb.

Average price per 100 lb paid to growers this season to Jan. 15, 1919, ranged from a low of $3.35 in North Carolina to a high of $6.00 in Indiana.

346. Burgess, James L. 1919. Relation of varying degrees of heat to the viability of seeds. *J. of the American Society of Agronomy* 11(3):118-20. March. [2 ref]
• ***Summary:*** One way to kill insects in seeds is to heat the seeds. But the vitality and germination rate of some seeds is harmed but such heating. "Soybeans were practically unaffected by a temperature ranging from 140ºF to 194ºF, running through a period of 1, 3, and even 5 hours." A table (p. 120) shows the viability of field seeds after exposure to various temperatures for 1 to 5 hours. Address: North Carolina Seed Lab., NC Dep. of Agriculture, Raleigh.

347. Owens (M.F.). 1919. Classified advertisements. *Bean-Bag* (*The*) (*St. Louis, Missouri*) 1(10):40. March.
• ***Summary:*** "For sale–Mammoth Yellow and Hollybrook Early Soy Beans. For prices and particulars, write M.F. Owens, Columbia, N.C. [North Carolina]." This ad appears in numerous subsequent issues under classified ads. Address: Columbia, North Carolina.

348. 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.

349. 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.

350. Gray, Dan T. 1919. Soybean pastures for hogs. *North Carolina State College of Agriculture, Extension Circular* No. 85. 8 p. April.
• ***Summary:*** This is a "Reprint and Revision of Experiment Station Circular No. 24." Contents: Introduction (The value of soybean pasture). Proper amount of corn to feed with soybean pasture. Carrying capacity of each acre of soybeans. Pounds of pork made on each acre.

"Until the farmer sees his way clear to make a permanent pasture, or has one already made, he should keep out of the livestock business. It is, in fact, almost impossible to realize a profit upon any kind of stock without good pastures. Therefore, the first thing to be done when one contemplates engaging in stock raising is to establish a pasture." Address: Chief, Animal Industry Div., Raleigh.

351. USDA Bureau of Crop Estimates. 1919. Cowpea, soy bean, and velvet bean production, 1918 and 1917 as estimated by state field agents. Washington, DC. 1 p. May 25.
• ***Summary:*** Lists soy beans produced for grain by states, giving acres, yield per acre in bushels and total production in bushels, for 1917 and 1918.

In 1918 the five leading states in total production (in bushels) were: (1) North Carolina 1,700,000. (2) Virginia 630,000. (3) Alabama 240,000. (4) Mississippi 96,000. (5) Kentucky 60,000. Note that all are southern states.

Total production in the USA in 1918 was 3,041,000 bu, up 35% from 2,245,000 bu in 1917.

Other states include Pennsylvania, South Carolina, Georgia, Ohio, Indiana, Illinois, Missouri, Tennessee, and other (120,000).

Note: This is the single best document seen to date with statistics for soybean production, acreage and yield in the United States.

352. *Seed Reporter* (*USDA Bureau of Markets*). 1919. Soy beans: Counties reported as normally producing either a surplus quantity, a sufficient quantity, or an insufficient quantity of seed as compared with planting requirements. 2(12):6. June 7.
• ***Summary:*** A map of the United States uses 3 symbols to indicate the reports of various counties on their production of soy beans for seed as compared with planting requirements. A surplus quantity is indicated by a solid black circle, a sufficient quantity by a half black circle, and an insufficient quantity by a white circle. An estimated 80% of the counties report an insufficient quantity, and about 7-10% a surplus. The greatest surpluses appear to be in eastern North Carolina, Tennessee, Kentucky, and Indiana, with smaller surpluses in Mississippi, Alabama, and Georgia.

353. Herman, V.R. 1919. Soybeans and cowpeas for North Carolina. *North Carolina Agricultural Experiment Station, Bulletin* No. 241. 40 p. June. See p. 24-40.
• ***Summary:*** Contents of the section on soybeans: Soybean history and for North Carolina. Feeding value of various hays compared. Seed production. Pasturing soybeans (in summer). Soybeans for soil improvement. Methods of culture. Rate of seeding. Time of planting. Fertilizer for soybeans. Soybean varieties.

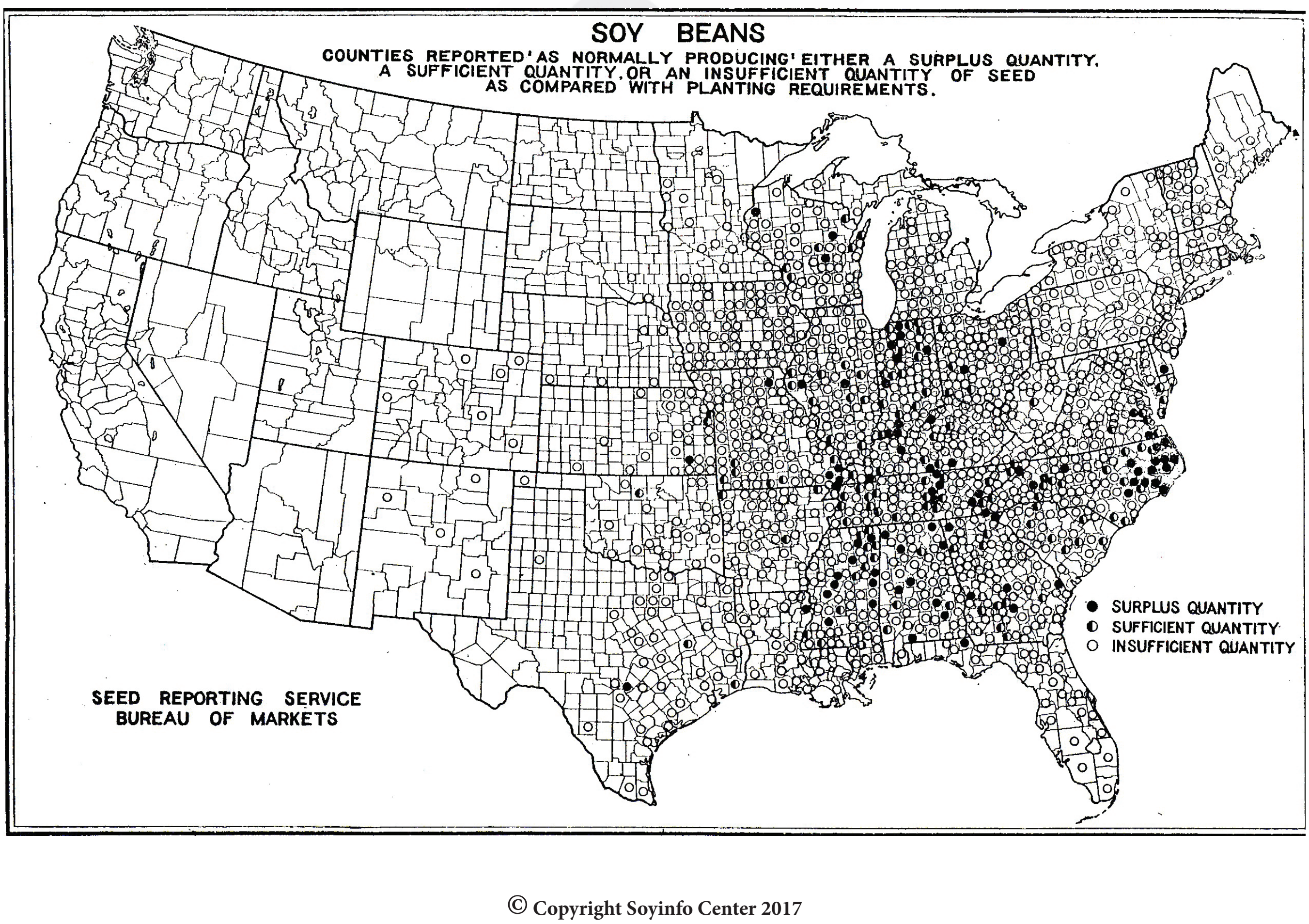
The last section, titled "Cowpeas and soybeans compared," discusses pasture, seed production, and hay production.

Soybeans "were introduced into America in 1829, but received very little attention until the variety known as the Mammoth Yellow was introduced about 1882. The introduction of this variety was followed by a decided increase in the production of the crop.

"Prior to 1900, soybeans had not been grown very extensively in North Carolina. Since that date, their value and uses have become better known, and its production has steadily increased. At the present time it is quite an important crop, particularly in eastern North Carolina, ranking sixth in commercial importance among the crops of our State" (p. 24).

"Soybeans for seed: Unlike cowpeas, soybeans are grown extensively for seed production... On the better soils of the Coastal Plain the yields have ranged between 20 and 40 bushels per acre, while 15 to 25 bushels is considered a good yield in the piedmont and mountain sections.

"The method of harvesting soybeans depends, to a large extent, upon the amount grown. Small quantities may be pulled up by hand or cut with a reap hook and threshed out with a flail. One man should be able to thresh 5 to 6 bushels a day by this method when the plants are thoroughly dried.



Where several acres are to be harvested, it will be necessary to use machinery of some kind. Several special harvesting machines are now on the market. Most of these machines thresh the beans in the field, leaving the stalks for pasturage and soil improvement. These harvesters gather from 60 to 75 per cent of the seed, the remainder being scattered on the ground or left on the stalks. The seed left, however, are usually eaten by the hogs or cattle pastured after harvesting."

"For pasturage in the eastern part of the State, Black Eyebrow, or Manchu, gives early pasturage, the Virginia or Haberlandt, medium, and Mammoth Yellow, late pasturage."

Tables and text give the results of soybean culture experiments at various experiment stations in North Carolina. For each variety, the date of seeding, yield of seed (in bushels/acre) and yield of hay (in pounds/acre) are given. The varieties tested were: Arlington, Austin, Black Eyebrow, Chiquita. Early Dwarf Green, Haberlandt, Mammoth, Manchu, Mammoth Brown, Mammoth Yellow, Medium Yellow, Peking, Tar-Heel Black, Tokio, Virginia, Wilson, Wilson Black.

"The soybean will stand a considerable amount of frost in the spring or fall, while the cowpea is very sensitive to cold." Photos show: (1) A split view of a field of cowpeas and soybeans (front cover). (2) A man holding two soybean plants in a field of Virginia soybeans (p. 24). (3) Ventilated stacks for curing soybean or cowpea hay (p. 27). (4) A man working on machinery used in harvesting small grain (p. 28). (5) The Haberlandt soybean plant (p. 29). (6) A field of soybeans grown in rows between corn for seed, pasture, or soil improvement (p. 30). (7) A field of different soybean varieties, incl. Virginia and Hollybrook (p. 34). Tables show results of the experiments.

Note: This is the earliest document seen (Sept. 2004) that mentions the soybean variety Mammoth Brown. Address: Asst. Agronomist.

354. Mammoth Brown: New U.S. domestic soybean variety. Synonyms: Brown (Moore 1908). Brown, Giant Brown, Large Brown, Tarheel Brown (Morse 1927). 1919. Seed color: Brown (russet).

• ***Summary:*** Sources: Herman, V.R. 1919. "Soybeans and cowpeas for North Carolina." *North Carolina Agric. Exp. Station, Bulletin.* No. 241. 40 p. June. See p. 35, 37. Table XXIV lists the soybean varieties tested at the Experiment Station Farm, West Raleigh, North Carolina, 1915, 1916, 1917, and 1918. When grown for seed, Mammoth Brown took 144 days to mature and yielded 19.44 bushels per acre (the third highest of any variety tested). When grown for hay, Mammoth Brown took 108 days to mature and yielded 3,122 pounds of hay per acre (the fourth highest of any variety tested).

Williams, C.B. 1919. Report of the Division of Agronomy. *North Carolina Agric. Exp. Station, Annual Report* 41:22-35. For the year ended June 30, 1918. See p. 33. At the Central Farm (Raleigh), Mammoth Brown gave a very good yield.

Piper, Charles V.; Morse, William J. 1923. *The soybean.* New York, NY: McGraw-Hill Book Co. xv + 329 p. March. See p. 167. "Origin of this variety is rather obscure. Plants stout, erect, bushy, maturing in about 135 days; pubescence tawny; flowers purple, 65 to 70 days to flower; pods tawny, 40 to 50 mm. long, 9 to 11 mm. wide, 6 to 7 mm. thick, 2-3 seeded, shattering little; seed russet, 8 to 9 mm. long, 7 to 8 mm. wide, 5 to 6 mm. thick; hilum russet; germ yellow; oil 16.5%; 111,300 to the bushel."

1925. *Wood's Seeds for 1925* (*with order form*) Richmond, Virginia. See p. 74-75. Mammoth Brown is one of many soybean varieties sold in this seed catalog.

Morse, W.J. 1927. "Soy beans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520. 34 p. April. See p. 6-8, 10. "Brown–The same as Mammoth Brown." "Giant Brown.–The same as Mammoth Brown." "Large Brown.–The same as Mammoth Brown." "Tarheel Brown.–The same as Mammoth Brown."

Morse, W.J.; Cartter, J.L. 1937. "Improvement in soybeans." *Yearbook of Agriculture* (USDA). p. 1154-89. For the year 1937. See p. 1188. Selection by unknown breeder in North Carolina, date unknown.

Morse, W.J.; Cartter, J.L. 1939. "Soybeans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520 (Revised ed.) 39 p. Nov. See p. 10. "Mammoth Brown–No definite information has been obtained as to the origin of this variety. Maturity, about 140 days; pubescence, tawny; flowers, purple, appearing in 65 to 70 days; pods, two- to three-seeded; seeds, brown with brown hilum, about 1,855 to the pound; germ, yellow; oil, 17.77 percent; protein, 44.06 percent." Address: USA.

355. Tisdale, W.H. 1919. Report of the Division of Plant Pathology and Bacteriology: Bacterial blight of soybean. *North Carolina Agricultural Experiment Station, Annual Report* 41:59. For the year ended June 30, 1918.

• ***Summary:*** "A report of this work is in manuscript form (F.A. Wolf). This little known disease has been reported from Nebraska, Connecticut, Wisconsin, and North Carolina. Water-soaked, angular, spots are produced on the leaves and the cotyledons... The primary cause is a bacterium which was isolated and described as a new species (*B. sojae n. sp.*)." Address: Acting Chief Div. of Plant Pathology.

356. Williams, C.B. 1919. Report of the Division of Agronomy. *North Carolina Agricultural Experiment Station, Annual Report* 41:22-35. For the year ended June 30, 1918. See p. 31-34.

• ***Summary:*** In the section on "Work in the improvement of crops at the experimental farms," the subsection titled "At the Central Farm" states (p. 31): "Selections are being made to increase the yield and oil content of the Mammoth Yellow

variety of soybeans, as well as for increasing the yielding powers of the Haberlandt and Virginia varieties. Work with the Mammoth Yellow variety was started in the fall of 1916 when seed from 150 selected plants were saved from a field near Tarboro. The oil content... of the original selections ranged from 15.6 to 22% of oil in the seed."

The section titled "Results of tests with varieties of field crops" reports (p. 32-34) the results with soybean varieties which have performed best at different locations throughout the state. At the Mountain Farm (Swannanoa, Buncombe County): Haberlandt, Medium Yellow, Austin, Wilson Black, Virginia, Black Eyebrow. At the Piedmont Farm (Statesville, Iredell Co.): Mammoth Yellow, Tarheel Black, Haberlandt, Virginia. At the Central Farm (Raleigh): Mammoth Yellow, Tokyo, Mammoth Brown, Virginia, Tarheel Black, Haberlandt. At the Coastal Plain Farm (Rocky Mount, Edgecombe County): Mammoth Yellow, Wilson Black, Virginia, Haberlandt, Tarheel Black. At the Pender Farm (Truck Branch Station, Willard, Pender County): Mammoth Yellow, Wilson Black, Virginia, Tarheel Black. Address: Chief, Div. of Agronomy [Raleigh, North Carolina].

357. Kaupp, B.F. 1919. The value of soybean meal as a feed for chicks. *Poultry Item* (*The*) 21(9):6-7. July.
• ***Summary:*** A summary of results of feeding experiments conducted during 1916 at the Coastal Branch Experimental Plant which is the North Carolina Agric. Exp. Station. Rolled oats gave slightly better results than soybean meal, and the birds preferred the taste of rolled oats. The soybean meal, however, cost only $2.00 per 100 lb vs. $3.00 for rolled oats. Address: Poultry Investigator and Pathologist, North Carolina Exp. Station, West Raleigh, North Carolina.

358. Williams, C.B. 1919. Soy-bean products and their uses. *Pure Products* (*New York*) 15(7):339-45. July.
• ***Summary:*** Contents: Introduction. A wider usefulness for soy-beans. First commercial crushing from domestic beans. Soy-bean oil. Uses for the oil. Soy-bean meal. Composition and exchange value of the meal. Prices paid for beans by the oil mills. Soy-bean oil industry in England, Manchuria and Japan. Importation of oil. Soy-bean meal as a feed. Soy beans and products for human food.

The soy-bean was introduced into North Carolina about 35 years ago (i.e. in about 1884). "During the spring of 1915 farmers, particularly in the Eastern part of the State, were casting about to find a crop or crops that might be substituted, satisfactorily, for cotton, as the price of this latter crop during the previous fall, in many cases, below the cost of production. Many farmers increased their acreage of soy beans, and as a result of this increase at least a million bushels or more of beans were produced last year."

"The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, N.C. From the start this mill operated day and night solely on soy beans until it had crushed its supply of about 20,000 bushels. This mill was able to crush about 20 tons during each twenty-four hours. The change from the manufacture of cotton-seed oil to soy-bean oil was made by them without any expense as to extra machinery and with but little expense for adjustment... It is understood that before the mill had ground a single bean they had contracted their entire output of oil to one of the leading manufacturers of the country at fairly reasonable prices. It, too, had no difficulty in selling its entire output of soy-bean meal, most of it going to a fertilizer manufacturer."

"Other oil mills in North Carolina that crushed more or less soy beans during the past season were those located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

"At the present time the oil is used in this country chiefly in the manufacture of soaps, varnishes, paints, enamels, linoleums, and water-proofing materials. It has entered, also, to some extent in the manufacture of edible salad oil and butter substitutes." Address: Chief, Div. of Agronomy, North Carolina Agric. Exp. Station.

359. 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.

360. *Bulletin Mensuel des Renseignements Agricoles et des Maladies des Plantes* (*Rome*). 1919. Digestibilité de la protéine fournie par les tourteaux de soya et d'arachide moulus; recherches aux États-Unis [Digestibility of protein supplied by soy-bean and peanut press-cake flours (Abstract)]. 10(7-9):837. No. 810. July/Sept. [1 ref. Fre]
• ***Summary:*** A French-language summary of the following English-language article: Holmes, Arthur D. 1918. "Digestibility of protein supplied by soy-bean and peanut press-cake flours." *USDA Bulletin* No. 717. 28 p. Sept. 25.

Note: This is the earliest French-language document seen (Sept. 2003) with the term *tourteaux de soya* in the title, used to refer to soybean cakes.

361. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*). 1919. You should eat more soy beans, cassava, and persimmons. Oct. 11. p. 26.
• ***Summary:*** "In a recent issue of the *Youth's Companion,* David Fairchild of the United States Department of Agriculture writes on 'Fashions in Foods,' urging especially a wider use of soy beans, cassava, and persimmons, In part he says:

"'When we come to recognize the full value of the soy bean curds, or 'tofu,' and of the soy cheeses, and learn to use them to supplement our milk products, and when we come to appreciate the fine meat flavor of soy sauce, which is made by fermenting soy beans and wheat together, there will arise a demand for hundreds of millions of bushels of that remarkable field bean. Besides containing a very valuable oil, the soy bean has in it vegetable proteins that are easily digestible. We Occidentals have used animal fats and animal proteins from milk, which is literally wrung by hand from the udders of patient cattle, and have derived our high flavors from the protein of their dead bodies; whereas the Chinese and the Japanese have in large part taken their protein from soy bean milk and their flavoring from the fermented soy sauce."

"The cassava, or manihot, of Brazil..."

362. *Seed Reporter* (*USDA Bureau of Markets*). 1919. Estimated total seed requirements and the estimated percentage and quantity that are obtained from each of the three general sources of supply: Soy beans. 3(4):11. Oct. 11.
• ***Summary:*** A table concerning soy beans gives statistics for the following states: Vermont, New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Tennessee, Mississippi, Ohio, Indiana, Illinois, Kentucky, Wisconsin, Missouri, Arkansas.

For each state and for the USA total the following statistics are given: (1) Total quantity of seed planted (USA: 36,720,000 lb. Top states: Indiana 7,500,000 lb. North Carolina 5,640,000. Kentucky 4,440,000. Mississippi 3,960,000. Virginia 3,300,000. Tennessee 3,120,000 lb). (2) Seed planted that was produced on farm where used (USA: 26%. Top state percentages: North Carolina 43%. Wisconsin 37%. Mississippi 33%).

(3) Seed planted that was obtained from other farmers (USA: 10%. Top state percentages: North Carolina 16%. Tennessee 14%. Mississippi 13%). (4) Seed planted that was obtained from dealers (USA: 23,507,000 lb = 64%. Top amounts: Indiana 5,250,000 lb = 70%. Kentucky 3,197,000 lb = 72%. North Carolina 2,313,000 = 41%. Mississippi 2,138,000 = 54%. Virginia 2,112,000 lb = 64%).

363. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1919. Spray soy beans for clover worm. 2(5):44. Oct.
• ***Summary:*** "Raleigh, North Carolina.–Spraying with arsenate of lead is being practiced by farmers in the soybean belt throughout the Carolinas and Virginia to kill the clover worm, which is playing havoc with this crop at present. This practice is not practical, however, with large fields, and many farmers are cutting the mature beans in order to save as much forage as possible."

364. *Monthly Crop Reporter* (*USDA*). 1919. Production of soy beans (for grain) in the United States, by states, 1918 and 1917. 5(10):103. Oct.
• ***Summary:*** A table shows total USA statistics for 1918/1917 as follows: Acreage 180,000/155,000. Yield (average) 15.8/14.5 bu/acre. Production 3,041,000/2,245,000 bushels.

In 1918, soybean acreage for 13 states state (in descending order of acreage) was:

North Carolina 85,000 (47.2% of total U.S. acreage).
Virginia 38,000
Alabama 22,000
Mississippi 8,000
Illinois 5,000
Missouri 5,000
Kentucky 5,000,
Pennsylvania 2,000
Ohio 2,000
Indiana 2,000
Tennessee 2,000
South Carolina 1,000, Georgia 1,000.

In 1918, soybean production for 13 states state (in descending order of bushels grain produced) was:

North Carolina 1,700,000 (55.9% of total U.S.

PRODUCTION OF SOY BEANS (FOR GRAIN) IN THE UNITED STATES, BY STATES, 1918 AND 1917.

[Bureau of Crop Estimates, U. S. Department of Agriculture.]

State.	Acres.		Yield per acre in bushels.		Total production in bushels.	
	1918	1917	1918	1917	1918	1917
Pennsylvania	2,000	2,000	17.0	18.5	34,000	37,000
Virginia	28,000	25,000	22.5	18.0	630,000	450,000
North Carolina	85,000	68,000	20.0	16.0	1,700,000	1,088,000
South Carolina	1,000	2,000	6.0	7.0	6,000	14,000
Georgia	1,000	1,000	11.0	14.0	11,000	14,000
Ohio	2,000	2,000	7.0	7.0	14,000	14,000
Indiana	2,000	2,000	15.0	15.0	30,000	30,000
Illinois	5,000	6,000	10.0	13.0	50,000	78,000
Missouri	5,000	5,000	8.0	10.0	40,000	50,000
Kentucky	5,000	4,000	12.0	12.0	60,000	48,000
Tennessee	2,000	5,000	5.0	10.0	10,000	50,000
Alabama	22,000	15,000	10.9	12.0	240,000	180,000
Mississippi	8,000	6,000	12.0	12.0	96,000	72,000
Other	12,000	12,000	10.0	10.0	120,000	120,000
United States	180,000	155,000	15.8	14.5	3,041,000	2,245,000

production)
Virginia 630,000,
Alabama 240,000
Mississippi 96,000
Kentucky 60,000
Illinois 50,000,
Missouri 40,000
Pennsylvania 34,000
Indiana 30,000
Ohio 14,000
South Carolina 14,000
Georgia 14,000.

The soybean yield for each of these states is also given for each of the two years.

Note: This is the earliest document seen (Oct. 2016) in the USDA's *Monthly Crop Reporter* that gives soybean statistics in the USA. Address: Washington, DC.

365. Cromwell, Richard O. 1919. Fusarium blight of the soy bean and the relation of various factors to infection. *Nebraska Agricultural Experiment Station, Research Bulletin* No. 14. 43 p. Nov. Based on his PhD thesis, Univ. of Nebraska. [32 ref]

• ***Summary:*** The blight of soy beans is due to *Fusarium tracheiphilum.* The first report of this soy bean disease appeared in a publication by the author in 1917. "The disease is characterized by a chlorosis and shedding of the leaves or leaflets, followed by the death of the plants, and is herein called 'blight.' Soy bean blight has been observed in several localities within North Carolina on soils infested with cowpea wilt..." The physical structure of soils under natural conditions is not the limiting factor in the infection of the disease, but acidity under certain conditions has some influence. The nematode (*Heterodera radicicola*) also has some influence.

The section titled "Economic importance of the soy bean" (p. 6-7) states: "Its culture in England was begun in 1790. The plant was introduced into the United States from Japan in 1860. Since that time its cultivation as a soil-improving and a forage crop has been confined for the most part to the Southern States. North Carolina is probably foremost among these States in the production of soy beans. The yield in 1909 was only 13,313 bushels (29, p. 632), and in 1915 was estimated as approximately 1,000,000 bushels. Within the last three or four years, and especially since the war began, this crop has become increasingly important because of the large variety of products manufactured from the oil and meal and because of its introduction in the United States as a human food.

"The following is a list of the most important products obtained from soy beans or in which soy beans enter:
Soy bean milk, vegetable cheese, meal or flour, macaroni preparation, soups, pork and beans, meat substitutes, toilet powder, fertilizer, and cattle feed from the meal, and high explosives, soaps, linoleum, rubber substitutes, margarine, Japanese sauce, paints, varnishes, water-proof cloth, salad oil, lubricants, and lard substitutes from the oil."

The section titled "Other soy bean diseases" (p. 7) mentions nine, including Heterodera, and "Chlorosis and crinkling (cause?)."

The section titled "History, occurrence and importance of the disease" (p. 8) states that in 1900 Orton conducted tests for disease caused by *Fusarium* on soy beans at Edisto Island and at Monetta, South Carolina (see Orton 1902, p. 16-19). Eight varieties of soy beans [planted on 29 May 1901 in Monetta] were tried on ten plats. "The varieties tested were Tokio, Buckshot, Yosho, Ito San, Manhattan, Guelph, and Amherst [Footnote: The names in use for these varieties in 1890 were respectively as follows: Best Green, Early Black, Yoshoka [sic, Yoshioka], Rokugatsu, Gosha, Black Round, Green Medium, and Bakaziro]. Orton reported that at Edisto Island the soy bean made a heavy growth, 3 or 4 feet high, and was free from the wilt disease. It may be said that a very considerable proportion of the several varieties of cowpeas grown in adjacent plots succumbed to wilt. The results of these tests accord with the observations of others who have had opportunity to observe these crops when they were grown on soil known to be infested with cowpeas wilt."

The section titled "Field experiments to determine the susceptibility of varieties" (p. 38-40) states that the following soybean varieties were planted in May 1916 in Red Springs, North Carolina: Black Eyebrow, Brown, Haberlandt, Mammoth Yellow (which suffers greatly from *Fusarium* blight), Medium Yellow, Pekin, Tar Heel Black. and Virginia. Black Eyebrow seems to show some evidence of resistance.

A larger number of varieties were tested in this field in 1917, including the following not tested in 1916: Arlington, Auburn, Austin, Barchet, Chiquita, Early Dwarf Green, Guelph, Jet, Manchu, Peking (spelled differently this time), Tokio, and Wilson Black. Again, Black Eyebrow showed resistance. "The Brown variety, altho as badly infected by

the nematode and *Fusarium* as any of the other varieties, deserves special mention because of its tolerance to these parasites." Address: Extension Plant Pathologist, Iowa State College. Formerly Asst. Plant Pathologist, North Carolina Agric. Exp. Station.

366. Gray, Dan T. 1919. Swine experiments. *North Carolina Agricultural Experiment Station, Annual Report* 42:43-47. For the year ended June 30, 1919.
• ***Summary:*** The section titled "Curing meat on the farm (Pender Test Farm and Central Experiment Farm)" (p. 45-46) states: "Packers usually make the claim that meat made from hogs which have been fed upon soybean and peanut pastures shrink very much more during the process than meat cured from hogs fattened upon corn alone. In fact, this is one of their main arguments for discriminating against soft-bodied hogs. Our results for the past several years do not bear out the packers' charge. In our work meat cured from hogs which never had peanut or soybean pasture shrank 19.4 per cent; cured meat from hogs which were grazed upon soybeans shrank 20.6 per cent; meat made from hogs fattened upon peanut pastures shrank during the curing process 16.9 per cent." Address: Chief in Animal Industry [Durham, North Carolina].

367. Sherman, Franklin. 1919. Report of the Division of Entomology. *North Carolina Agricultural Experiment Station, Annual Report* 42:54-58. For the year ended June 30, 1919.
• ***Summary:*** One section titled "Green clover worm on soybeans" [*Plathypena scabra*] (p. 57) states: "There was a very severe outbreak in July and August, involving thousands of acres. The injury was greatest in the eastern half of the State. A search of publications revealed nothing that could meet the situation... Our studies on life-history confirmed much that had been published by others, and yielded much original data of our own... Dusting with dry arsenate of lead, mixed with dust lime in proportions of 1 to 8, gave the key to the situation. Liquid spraying can also be done." Address: Chief in Entomology [Durham, North Carolina].

368. Smith, Joseph Russell. 1919. The world's food resources. New York, NY: Henry Holt and Company. 634 p. See pages 326-27, 360-65. [1 ref]
• ***Summary:*** Contains a brief overview of the soybean, soybean production, and soybeans as a food product, with several long excerpts from Dr. J.H. Kellogg, and the *USDA Year Book of Agriculture* (about food uses, including shoyu or soy sauce).

A photo shows "Soy bean curds and cheeses in a Japanese factory," in large earthenware containers (p. 362). Note: This photo of "curds and cheeses," taken by Frank N. Meyer, shows the production of fermented tofu, probably in a Chinese factory (See: {1} Morse 1918. "The Soy-bean Industry in the United States." Plate IV, fig. 2; {2} Piper & Morse. 1923. *The Soybean.* p. 242).

Concerning use of food resources, in the USA and Canada, the chief goal of agriculture is not to feed humans but to feed animals. This was true even in the food crisis of 1918 [at the end of World War I]. About 5,191 million bushels of grain are now grown in the USA; in descending order of importance (in million bushels) they are corn (2,863), oats (1,422), wheat (643), barley (195), rye (54), and buckwheat (14). Of this total of 5,191 million, the American people eat less than 550 million (14.1%). Adding the 340 million bu exported, the total amount used for human food was 900 million bu (17.3%). "The rest, 4,300 million, went to our four-footed brethren, who outnumber us and whose food requirements, because of their greater size, are several times our own.

"In addition to the grain, they get all of the 85,360,000 tons of hay grown on 54,618,500 acres. (More than ten per cent of the half billion acres under cultivation in the United States). They also roam over millions of acres eating all the grass. It is therefore plain that more than four-fifths [80%] of the produce of American agriculture, even in 1918 [a war year], went to feed beasts." Address: Prof. of Geography, Columbia Univ., New York.

369. Winters, N.E. 1920. Soil and crop improvement under boll weevil conditions. *Atlanta Constitution* (*Georgia*). Jan. 4. p. 2F.
• ***Summary:*** An introduction notes that the writer's statements about Williamsburg county "are true of other sections of the cotton belt." "Williamsburg county, North Carolina, has been up to the present time mainly a cotton county. Some corn and tobacco are being produced," but most of these crops are cleanly cultivated crops in which very little vegetable matter is returned to the soil." Consequently, most of these soils "are low in humus or vegetable matter," and "in a very sour or acid condition. Soluble plants foods applied in fertilizer leach away in the drainage waters.

"The permanent prosperity of this county depends on the fertility of our soils and increased crop production under boll weevil conditions."

"Our climate and soil conditions permit us to grow a large variety of legumes both winter and summer for the soil... Soybeans, cowpeas, velvet beans, Japan clover and peanuts are good summer legumes."

"In order to get the best results from these legumes and fertilizers used in the rotation we must keep our soils sweet [non-acidic]. In order to do this we must apply about two tons high grade limestone per acre the first time and apply one to two tons per acre every three or four years following that." Lime also "promotes the growth and activity of microscopic soil organisms that change insoluble plant food in the soil into available forms for plants.

"Lime also supplies calcium and magnesium to the plants for food purposes, and maintains a chemical condition in the soil that increases the availability of other plant foods."

"Lime, legumes, livestock and the intelligent use of fertilizers will carry us safely through the boll weevil crisis,..." Address: Agronomist, Charlotte, North Carolina.

370. *Daily Advance* (*The*) (*Elizabeth City, North Carolina*). 1920. Charter for harvester co.: L.S. Gordon, C.R. Pugh and W.G. Gaither members of new farm machinery manufacturing firm. Feb. 3. p. 1.
• ***Summary:*** Raleigh, Jan. 2–Among the charters granted by the Secretary of State was one for the Gordon Bean and Pea Harvester Company of Elizabeth City for the purpose of manufacturing and dealing in farm machinery.

"The authorized capital was $50,000, with $15,000 subscribed by L.S. Gordon, C.R. Pugh and W.O. Gaither of Elizabeth City."

371. *Market Reporter* (*The*) (*USDA*). 1920. Stocks, shipments, and prices of soy beans, cowpeas and velvet beans for seed. 1(7):103. Feb. 14.
• ***Summary:*** A table gives a compilation, by states, based on seed shippers' reports. The states or districts covered are: Delaware, Virginia, central and western North Carolina, eastern North Carolina, South Carolina, Tennessee, Mississippi, Louisiana–Alabama & Georgia, Illinois, Indiana, Ohio & Kentucky, and Missouri. Columns show: Number of shippers reporting. Pounds of soy beans on hand Jan. 15 1920 and 1919. Shipments of 1919 crop: Up to Jan. 15, 1920, after Jan. 15, 1920. Total shipments: 1919 crop (estimated), 1918 crop. Percentage new crop in grower's hands (estimated): Jan. 15, 1920 and 1919. Average price per 100 pounds paid growers: 1919 crop, 1918 crop.

The 1918 crop was 6,756,800. The 1919 crop (estimated) was 4,898,160 (down 27.6%). The states with the largest shipments of the 1918 crop (in pounds) are: Eastern North Carolina 4,397,980. Virginia 1,185,420. Mississippi 335,500. Illinois 189,000. central and western North Carolina 186,000.

The average price paid growers for the 1918 crop (100 lb of soy beans) ranged from $3.25 in eastern North Carolina to $6.70 in Illinois. For the 1919 crop the prices were higher, ranging from $5.70 in South Carolina to $7.89 in Ohio and Kentucky. Address: Bureau of Markets, Washington, DC.

372. *Monthly Crop Reporter* (*USDA*). 1920. Cowpeas and soy beans for hay, silage, grazing, etc. (not for seed). 6(2):11. Feb.
• ***Summary:*** See next page. A table gives soy bean acreage, and yield per acre for hay for the years 1918 and 1919 in leading states. In 1919 the states growing soybeans for hay, silage, grazing, etc. (in descending order of acreage) are: North Carolina (82,000 acres, 1.5 tons of hay per acre), Alabama (78,000), Mississippi (67,000, 1.5 tons), Tennessee (60,000, 1.5 tons), Virginia (20,000), New England (13,000, 4.0 tons), Illinois (7,000), Georgia (3,000), Ohio (3,000), Missouri (2,000), and Wisconsin (2,000). Total acreage for these states is 337,000, up from 286,000 in 1918. Average yield of soybean hay in 1919 is 1.5 tons/acre, down from 1.6 tons in 1918.

A second table (not directly related to soy but of interest) shows the number and value of mules on farms by states, from 1917 to 1920. Mules are most widely used in southern states. The states with the largest number of mules are: Texas 792,000, Missouri 374,000, Georgia 344,000, Mississippi 316,000, Arkansas 315,000, and Alabama 304,000. By comparison (in Corn Belt states): Ohio 28,000, Iowa 70,000, Indiana 94,000, and Illinois 147,000.

373. *Monthly Crop Reporter* (*USDA*). 1920. Soy beans for seed or grain. 6(2):12. Feb.
• ***Summary:*** A table gives soy bean acreage, yield per acre for seed, and production of seed or grain for the years 1917, 1918, and 1919 in leading states. In 1919 the states growing soybeans for seed or grain (in descending order of production) are: North Carolina (1,148,000 bu, 14.0 bu/acre), Virginia (550,000 bu, 18.5 bu/acre), Mississippi (120,000 bu., 15.0 bu/acre). Kentucky (84,000), Illinois (78,000), Missouri (77,000), Alabama (66,000), Pennsylvania (36,000 bu), Indiana (35,000), Georgia (25,000 bu), Ohio (14,000), Tennessee (10,000, 5.0 bu/acre), Wisconsin (10,000, 7.5 bu/acre), South Carolina (6,000, 6.0 bu/acre), Other (143,000).

The average U.S. yield in 1919 was 14.3 bu/acre, compared with 17.7 bu/acre in 1918 and 14.8 bu/acre in 1917. The state with the top yield for all 3 years was Virginia with 22.5 bu/acre in 1918.

Total U.S. soybean production for seed or grain in 1919

SOY BEANS FOR SEED OR GRAIN.[1]

[Acreage and production in thousands, i. e., 000 omitted.]

State.	Acreage.			Yield per acre.			Production.		
	1919	1918	1917	1919	1918	1917	1919	1918	1917
	Acres.	*Acres.*	*Acres.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Pennsylvania	2	2	2	18.0	17.0	18.5	36	34	37
Virginia	30	28	25	18.5	22.5	18.6	550	620	450
North Carolina	82	85	68	14.0	20.0	16.0	1,148	1,700	1,088
South Carolina	1	1	2	6.0	6.0	7.0	6	6	14
Georgia	2	1	1	10.0	11.0	14.0	25	11	14
Ohio	2	2	2	7.0	7.0	7.0	14	14	14
Indiana	2	1	2	14.0	15.0	15.0	35	22	30
Illinois	6	5	6	12.5	13.0	13.0	78	65	78
Wisconsin	1	1	1	7.5	8.0	10.0	10	8	10
Missouri	6	5	5	14.0	8.0	10.0	77	40	50
Kentucky	7	7	4	12.0	12.0	12.0	84	84	48
Tennessee	2	2	5	5.0	5.0	10.0	10	10	50
Alabama	7	11	15	9.5	10.0	12.0	66	110	180
Mississippi	8	8	6	15.0	15.0	12.0	120	96	72
Other	10	10	10	14.3	17.7	14.8	143	177	148
United States	168	169	154	14.3	17.7	14.8	2,402	2,997	2,283

[1] Part of acreage planted in with other crops, such as corn.

COWPEAS AND SOY BEANS FOR HAY, SILAGE, GRAZING, ETC. (NOT FOR SEED).

[Acreage and production in thousands, i. e., 000 omitted.]

State.	Cowpeas. Acreage.[1] Acres, 1919.	Cowpeas. Acreage.[1] Acres, 1918.	Cowpeas. Yield per acre for hay. Tons, 1919.	Cowpeas. Yield per acre for hay. Tons, 1918.
Virginia	75	75	......	......
North Carolina	233	220	1.4	1.4
South Carolina	400	488	1.3	.75
Georgia	200	221	1.0	.9
Florida	30	25	1.5	1.25
Ohio	2	2	2.0	2.0
Illinois	40	50	......	......
Missouri	4	5	1.5	2.0
Kansas	3	3	1.3	1.0
Tennessee	120	150	1.5	2.6
Alabama	521	613	1.5	1.5
Mississippi	640	980	1.5	1.0
Louisiana	245	246	1.8	1.7
Texas	220	362	1.5	1.5
States named	2,733	3,440	1.5	1.3

State.	Soy beans. Acreage.[1] Acres, 1919.	Soy beans. Acreage.[1] Acres, 1918.	Soy beans. Yield per acre for hay. Tons, 1919.	Soy beans. Yield per acre for hay. Tons, 1918.
New England	13	11	4.0	3.0
Virginia	20	20	......	......
North Carolina	82	80	1.5	1.6
Georgia	3	2	......	......
Ohio	3	3	2.0	1.8
Illinois	7	9	......	......
Wisconsin	2	1	1.3	1.4
Missouri	2	2	3.0	2.5
Tennessee	60	60	1.5	2.0
Alabama	78	46	......	......
Mississippi	67	52	1.5	1.2
States named	337	286	1.5	1.6

[1] Part of acreage planted in with other crops, such as corn.

was 2,402,000 bu, compared with 2,997,000 in 1918 and 2,283,000 in 1917. The state with the top production for all 3 years was North Carolina with 1,700,000 bu in 1918.

374. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*). 1920. The farmers' experience meeting: Experiences with soy and velvet beans. 35(10):496. March 6. Central Ed.
• ***Summary:*** This article consists of four letters (the first a "$5 prize letter" and the second a "$3 prize letter"), each with a title, by farmers who have been successful growing soy beans. They are: (1) "Some things necessary to make soy beans pay," by A. Crouse Jones of Winston-Salem, North Carolina. (2) "Soy beans much preferred to cowpeas," by John H. Davis of Ripley, Mississippi. (3) "Beans enrich the land," by B. Yorkstone Hogg of Fort Pierce, Florida. (4) "Some strong and weak points of the soy bean," by Chas. Eaker of Cherryville, North Carolina.

In a small box before the first letter we read: "This is No. 9 in our series of discussions of some of the most important problems of the average Southern farmer."

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 Ootootan. 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. Wolf, Frederick A. 1920. Bacterial blight of soybean. *Phytopathology* 10(3):119-32. March. [8 ref]

• ***Summary:*** "For several years, especial attention has been given at the North Carolina Agricultural Experiment Station to the diseases of soybean; *Soja max* (L.) Piper. The most important diseases of this crop within the State have been found to be Fusarium blight or wilt, caused by *Fusarium tracheiphilum* E.F.S., and bacterial blight. Careful investigation of the former of these diseases has been made by Cromwell..."

A bacterial blight found in North Carolina is considered to differ from the one due to *Bacterium glycineum.* The disease was first observed in Nebraska in 1905 by Heald [see Heald 1906]; it was subsequently reported in Connecticut and Wisconsin. The cause of the blight is said to be *Bacterium sojae* n. sp. The disease is considered to differ in several respects from one previously described as being caused by *Bacterium glycineum.* The infection is believed to spread from the cotyledon to the true leaves and from these leaves to other leaves. Infected seed are believed to be the chief means by which the disease is carried over winter and by which it is introduced into new localities. Infected leaves which remain in the field during winter have also been found to harbor this parasite. The disease is spread in the field by splashing rains. Address: North Carolina Agric. Exp. Station.

377. Smith, Alfred G.; Hope, C.E. 1920. Farm practices with soybeans: Based on a survey of fifty farms in northeastern North Carolina. *North Carolina Department of Agriculture, Bulletin* 41(5):1-30. Whole No. 267. April.

• ***Summary:*** Contents: Introduction. Summary. Outlet for soybeans and recent economic development. General characteristics of the soybean area of northeastern North Carolina. General characteristics of the farms. Varieties and seed. Growing soybeans. Harvesting soybeans for seed. Soybean hay. Combination of crops. Distribution of labor. Yields and costs. Factors influencing yields. Capacity of man and work stock labor. Soybeans and hogs. Agreements with croppers and tenants.

"In that part of northeastern North Carolina consisting of the counties of Hyde, Tyrrell, Perquimans, Pasquotank, and Camden, more soybeans are produced than in any other section of the State. Here, indeed, soybeans have become the chief legume crop, almost entirely supplanting cowpeas. Nearly every farm produces some soybeans, and on many farms they are the leading crop both in acreage and in crop sales... Approximately 500,000 bushels of the 1916 crop were shipped out of the territory, principally for seed and feed purposes...

"The farms in the soybean area were very profitable in 1916...

"The Mammoth Yellow is the main variety of soybean that is planted in northeastern North Carolina.

"Soybean seed are usually harvested with mechanical pickers which thresh out the beans and leave the hulls on the land, or with reapers and binders, and are then threshed."

"Soybeans, on the fifty farms studied, yielded from four to thirty-nine bushels per acre, and averaged nineteen bushels when planted as the first crop and eighteen and eight-tenths bushels when planted as the second crop...

"In 1915, approximately 200,000 bushels of the North Carolina crop were crushed for oil and meal. In 1916, the mills again bought beans to crush, but an increase in price made it more profitable to resell the beans for seed and for food than to crush them for oil and meal. On this account practically none of the 1916 crop was crushed, but in the summer of 1917 fully 200,000 bushels were imported from Manchuria and crushed by the North Carolina mills.

"When used for canning purposes, the beans are usually mixed with navy beans and canned in the same way as navy beans. One dealer alone shipped 14,000 bushels out of Engelhard, North Carolina, in 1916, to a canning factory in

Indiana [Probably Dyer Packing Co. in Vincennes, Indiana], and large quantities were sold to other canning factories. The canners can therefore be regarded henceforth as purchasers of soybeans."

Photos show: (1) A man standing in a high-yielding field of soybeans. (2) A field of Mammoth Yellow soybeans ready to pick. (3) A Pritchard soybean picker with two men riding on it. (4) A field of soybeans in the shock–Hyde County. (5) Side view of one type of horse-drawn soybean picker. (6) A Gordon picker in operation harvesting soybeans between corn rows. (7) Two men threshing soybeans mechanically. Address: Raleigh.

378. 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.

379. Sherman, Franklin, Jr. 1920. The green clover worm (*Plathypena scabra* Fabr.) as a pest on soy beans. *J. of Economic Entomology* 13(3):295-303. June.
• ***Summary:*** Contents: Introduction. The life stages (egg, hatching to spinning of cocoon, larva in cocoon, true pupal stage, emergence to mating, mating to laying of eggs; total–51 days). Habits. Natural enemies. Field conditions. Experiments with remedies. Possible danger in using the hay [after it has been sprayed with powdered arsenate of lead]. Questions and answers.

"On July 29, 1919, the farm agent of an eastern county in North Carolina wrote us of a worm destroying leaves of soy beans. Within a week complaints were coming by the dozen. Larvæ were identified at Washington [North Carolina] as *Plathypena scabra* Fabr. the Green Clover Worm..." Address: Entomologist, State Dep. Agriculture, Raleigh, North Carolina.

380. Taylor, William A. 1920. Soy bean. *USDA Department Circular* No. 120. 4 p. June. Contribution from the Bureau of Plant Industry.
• ***Summary:*** Contents: Description. Adaptation. Inoculation. Culture. Harvesting. Thrashing. Storing. Varieties. Publications.

"The soy bean (*Soja max*) is also called the soja bean, Manchurian bean, and stock pea (eastern North Carolina)." "At the present time about 15 varieties of soy beans are 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 different sections of the country and are now on the market."

The more important varieties, with notes about each, are (p. 3-4): Mammoth (seeds straw yellow), Haberlandt (seeds straw yellow), Manchu (seeds straw yellow), Tokio (seeds olive yellow), Virginia (seeds brown), Biloxi (seeds brown), Barchet (seeds brown), Wilson (seeds black), Peking (seeds black), Black Eyebrow (seeds black and yellow), Hahto (seeds olive yellow), Easy Cook [Easycook] (seeds straw yellow), Laredo (seeds black), Mandarin (seeds straw yellow). Address: Chief, New and Rare Seed Distribution, Bureau of Plant Industry.

381. Sherman, Franklin; Leiby, R.W. 1920. Green clover worm (*Plathypena scabra Fabr.*) as a pest of soybeans with special reference to the outbreak of 1919. *North Carolina State College of Agriculture, Extension Circular* No. 105. 14 p. July.
• ***Summary:*** This article is quite similar to one by Sherman published one month earlier in the *Journal of Economic Entomology* (June, p. 295-303). Contents: Introduction. Past history. Outbreak of 1919. Possibilities for the future. Investigations in 1919 (Incl. life-history of green clover worm, life stages {adult or moth, the egg, larva or caterpillar, pupa or chrysalis, generations or broods, wintering–hibernation, habits, natural enemies and an important egg parasite}). Remedies: Poisoning the worms, varieties.

"Introduction: During July and August 1919, there occurred throughout the eastern half of North Carolina a sudden and widespread outbreak of a green caterpillar, often called a 'measuring-worm,' which rapidly ate away the

leaves of soybeans, stripping whole fields until they looked as if scorched by fire. Beginning in the latter part of July, the injury subsided by the middle of August, and many fields, especially of latter maturing varieties, quickly put out new growth and recovered, but in many cases the earlier maturity varieties were ruined.

"This was the Green Clover Worm (*Plathypena scabra,* Fabr),* an insect long known to be present in the State, and native to practically the whole of the eastern half of the United States." (Footnote: *"Order *Lepidoptera;* Family *Hypenidae* (*Noctuidae,* broad sense))." Address: 1. Chief in Entomology; 2. Asst. Entomologist, Raleigh.

382. 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.

383. *Market Reporter* (*The*) (*USDA*). 1920. Soy bean and cowpea seed crop approximates 1919: Better yield per acre expected this year–Prices start off below last season: Acreage, yield and prices: Soy beans. 2(20):316-17. Nov. 13.
• ***Summary:*** A table shows percentage change in acreage and yield compared with 1919 and prices for the following states: Delaware, Virginia, North Carolina, South Carolina, Tennessee, Mississippi, Alabama, Georgia, Illinois, Indiana. Yields ranged from 960 lb/acre [16 bu/acre] (Virginia) to 420 lb/acre (Alabama). Prices for 100 lb "country-run" soy beans on 3 Nov. 1920 ranged from $3.35 in Alabama down to $2.60 in North Carolina, while prices for "clean" soybeans ranged from $3.75 in Delaware and Alabama down to $3.20 in North Carolina. Address: Bureau of Markets, Washington, DC.

384. 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.

385. *Monthly Crop Reporter* (*USDA*). 1920. Crop statistics: Soy beans. 6(12):144. Dec.

• ***Summary:*** A table gives statistics for soy beans for 1918, 1919, and 1920. In 1920, the leading soybean states in terms of acreage (in descending order) were: North Carolina 91,000 (48% of total U.S. acreage), Virginia 30,000, Alabama 23,000, Illinois 8,000, Ohio 8,000, Kentucky 8,000, Missouri 7,000, Tennessee 5,000, Wisconsin 4,000, Indiana 3,000.

Yields in 1920 averaged 15.8 bu/acre, but ranged from 19.0 for Virginia down to 8.0 for Ohio.

In 1920, the top ten soybean states in terms of bushels of soybean seeds produced were: North Carolina 1,638,000,000 (54.6% of total U.S. production), Virginia 570,000, Alabama 228,000, Missouri 133,000, Kentucky 120,000, Illinois 92,000, Ohio 64,000, Tennessee 50,000, Indiana 42,000, and Wisconsin 28,000. Statistics are also given for Pennsylvania, South Carolina, Georgia, and Mississippi.

The average price on Dec. 1 was $3.064 in 1920 (range $5.00 to $2.78), $3.467 in 1919, and $3.175 in 1918.

Total farm value of soy beans, based on the Dec. 1 price, was $9.199 million in 1920, $8.530 million in 1919, and $9.601 million in 1918.

Average farm value of soy beans per acre, based on the Dec. 1 price, was $48.42 in 1920, $48.74 in 1919, and $56.81 in 1918.

386. *SoyaScan Notes.* 1920. Percentage of U.S. soybeans produced in various major states (Overview). Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** See next page. North Carolina was the first state in America to grow soybeans commercially on a large scale, with Tennessee and Virginia far behind. From 1917 to 1920, North Carolina grew about 75% of all U.S. soybeans. Not until 1924 did Illinois pass North Carolina to take the lead, which it held dramatically until about 1980, when it was passed briefly by Iowa, with Indiana in 3rd place. Missouri, Minnesota, and Ohio have continues to be leading states.

In 1980 the leading states in soybean production were:
Iowa 318.4 million bushels
Illinois 309.8 million bushels
Indiana 157.7 million bushels
Minnesota 149.9 million bushels
Missouri 135.4 million bushels
Ohio 135.3 million bushels

(Source: *1982 Soya Bluebook,* p. 173, based on Crop Production Summary, Economics and Statistics Service, USDA).

In the year 2000 the leading states in soybean production were:
Illinois 459.8 million bushels
Iowa 459.2 million bushels
Indiana 258.9 million bushels
Minnesota 293.2 million bushels
Ohio 186.4 million bushels
Missouri 175.0 million bushels
Nebraska 173.8 million bushels

(Source: *2002 Soya Bluebook,* p. 377, based on Annual Crop Summary, USDA, Agricultural Statistics Board, NASS, ERS).

387. Wolf, Frederick A. 1920. Report of the Division of Plant Pathology and Bacteriology. *North Carolina Agricultural Experiment Station, Annual Report* 43:53-55. For the year 1920. See p. 53.

• ***Summary:*** The section titled "Soybean diseases" (p. 53) summarizes two publications on bacterial blight of soybeans, by researchers in North Carolina (Wolf 1920) and Wisconsin (Coerper 1919). Address: Chief, Div. of Plant Pathology [Raleigh, North Carolina].

388. Wolf, Frederick A.; Lehman, S.G. 1920. Notes on new or little known plant diseases in North Carolina in 1920. *North Carolina Agricultural Experiment Station, Annual Report* 43:55-58. For the year 1920. See p. 57-58.

• ***Summary:*** The section titled "Soybean" (p. 57-58) discusses the following soybean diseases: (1) Mosaic: "This report of soybean mosaic from Oxford [North Carolina] appears to be the first record of mosaic on soybeans." (2) Anthracnose (*Glomerella cingulata*). (3) Phoma blight (*Phoma sp.*). Address: 1. Chief, Div. of Plant Pathology; 2. Asst. in Bacteriology [Raleigh, North Carolina].

389. "Pea pickers" lined up in Elizabeth City, North Carolina (Photograph). 1920? Undated.

• ***Summary:*** See page after next. "Pea pickers" are early soybean harvesters developed in North Carolina.

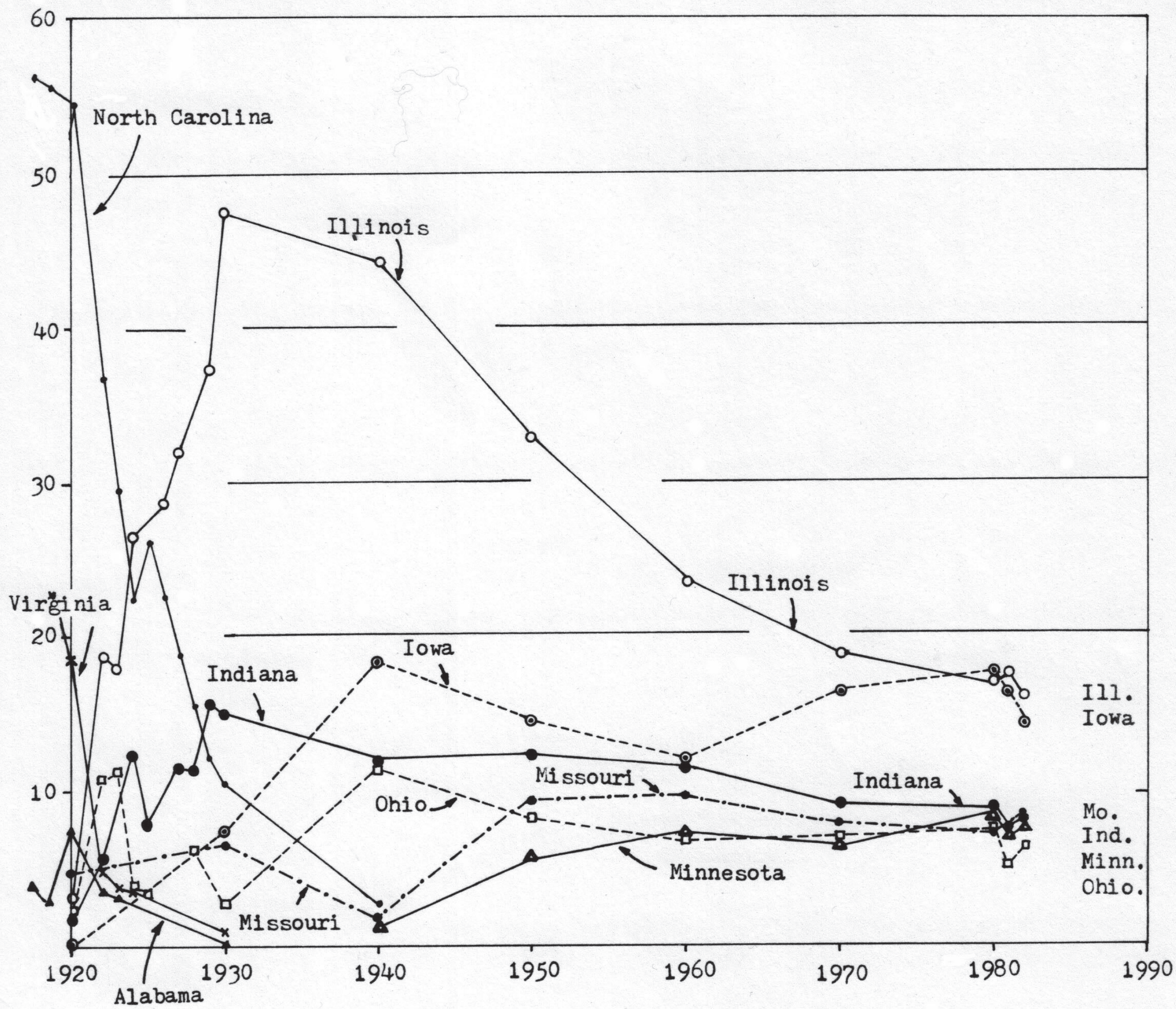
390. Boats off-loading in Knobbs Creek at Eastern Cotton Oil Co., Elizabeth City, North Carolina (Photograph). 1920? Undated.

• ***Summary:*** See two pages after next. Also called "Eastern Cotton Oil Mill."

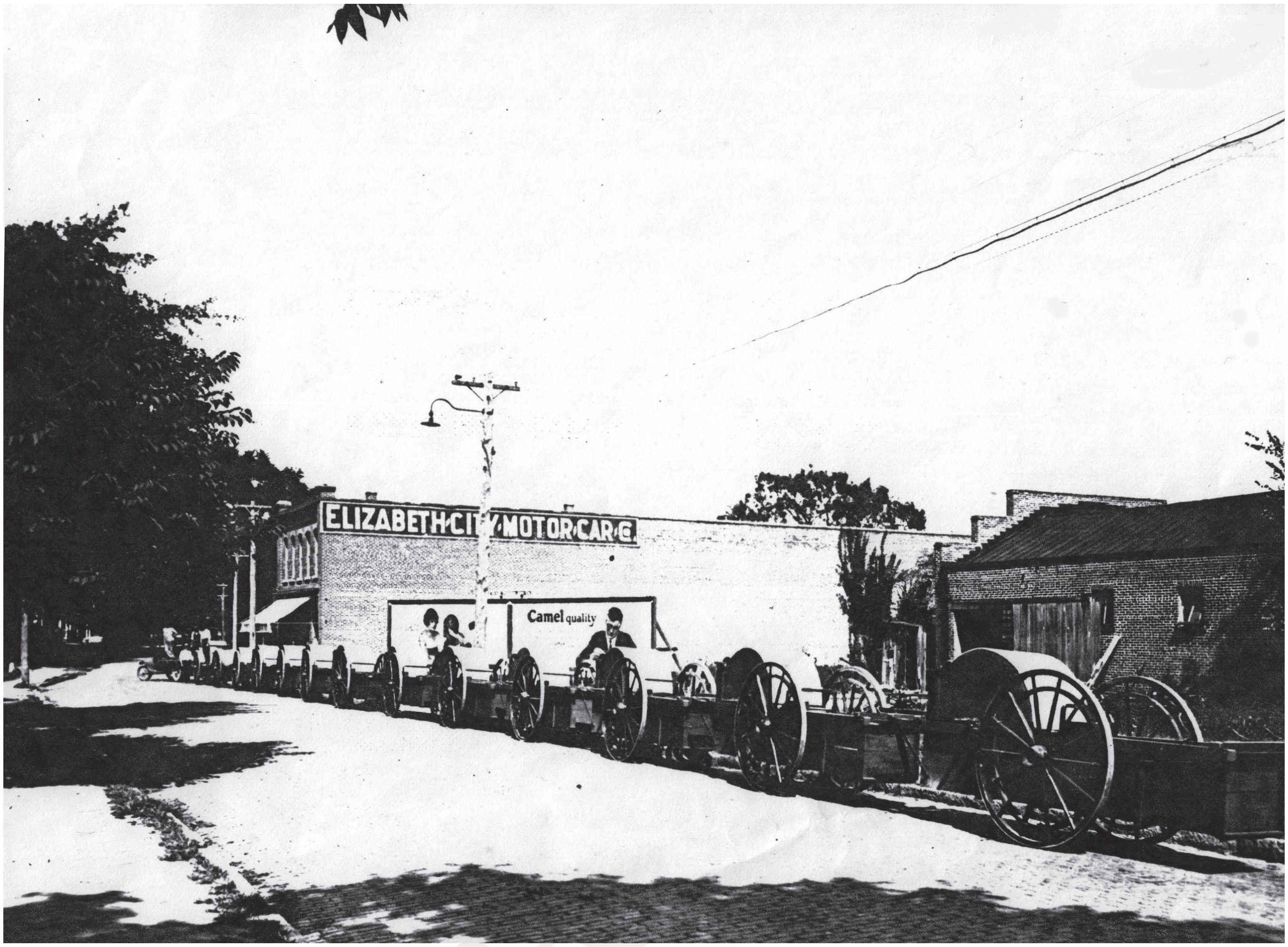
391. The Pritchard Harvester made in Elizabeth City, North Carolina (Photograph). 1920? Undated.

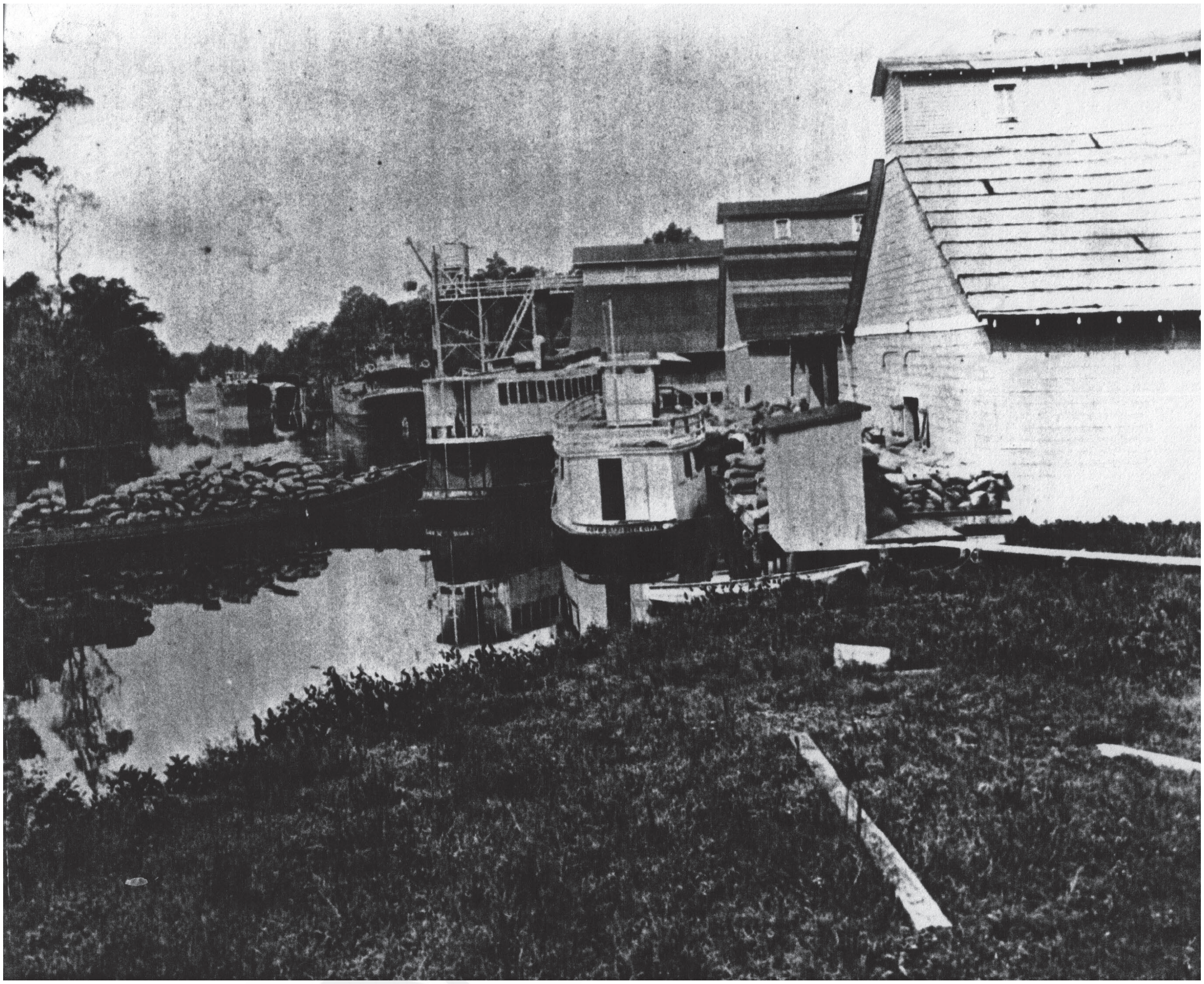
• ***Summary:*** See 3 pages after next. Courtesy Museum of the Albemarle, North Carolina Department of Natural and Cultural Resources. Sent by Paul Vincent, Collections

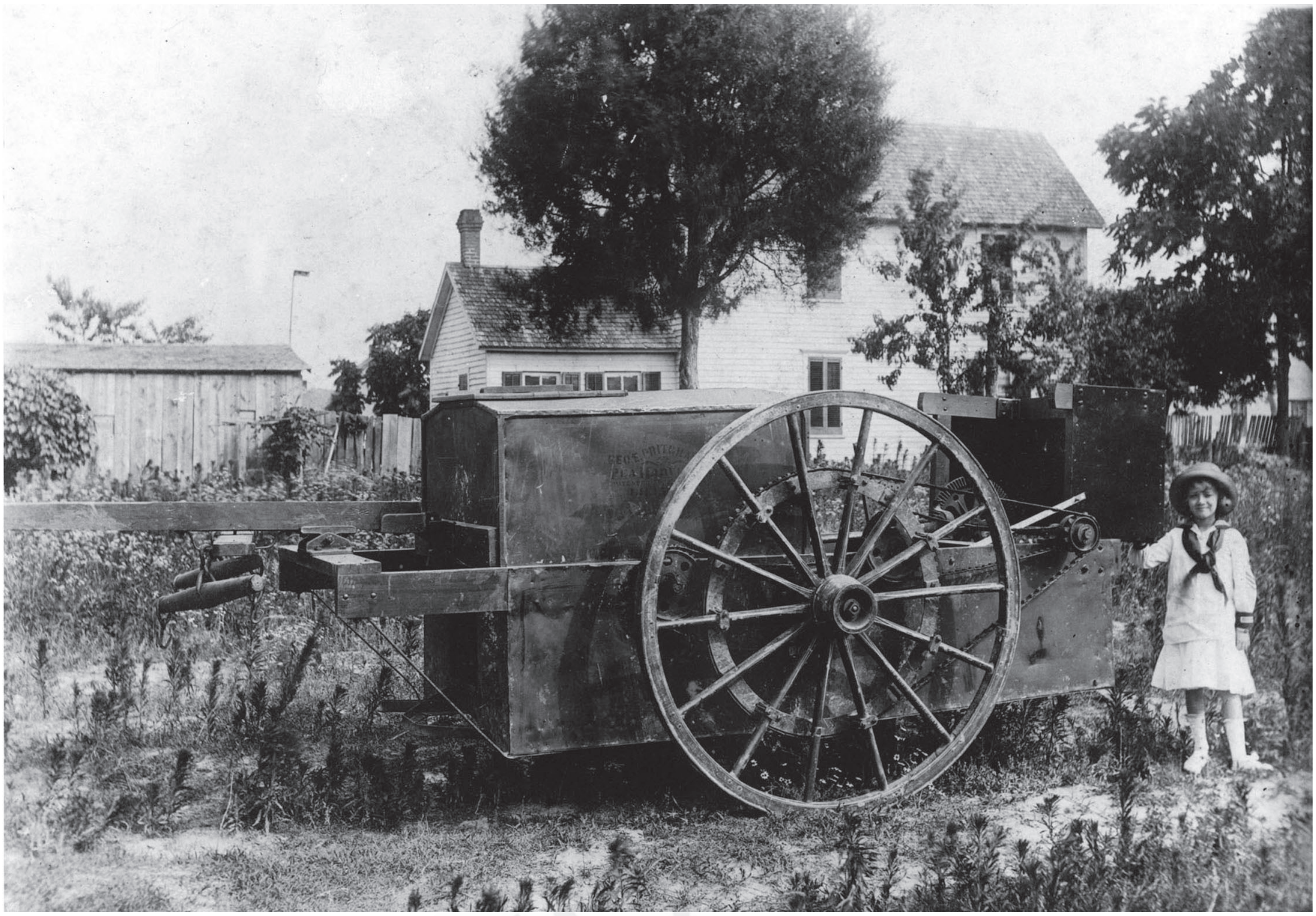
Percentage of U.S. Soybeans Produced in Various Major States (1920-1980s)



Sources: 1917-20. Monthly Crop Reporter 1920, Feb. and Dec. Piper and Morse 1923, p. 3.
1920-30. Stewart, Burlison, et al. 1932. Univ. of Ill. Bull 386.
1931-80s. USDA Crop Production Summary and Soya Bluebook.


ELIZABETH CITY MOTOR CAR CO.
Camel quality





Assistant.

392. 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.

393. Owens (M.F.) & Company. 1921. Classified advertisements. *Bean-Bag* (*The*) (*Lansing, Michigan*) 3(8):54. Jan.
• ***Summary:*** "For sale–Nice lot Mammoth Yellow Soy Beans (grown and selected especially for seed). For prices, write M.F. Owens & Company, Elizabeth City, N.C. [North Carolina], P.O. Box 256."

This ad also appears in the March 1921 issue (p. 54). Address: P.O. Box 256, Elizabeth City, North Carolina.

394. Shunk, I.V.; Wolf, Frederick A. 1921. Further studies on bacterial blight of soybean. *Phytopathology* 11(1):18-24. Jan. Reprinted in North Carolina Agric. Exp. Station, Technical Bulletin No. 20. p. 8-13. [5 ref]
• ***Summary:*** "It will be recalled that two papers on bacterial blight have appeared during the past year, one from investigations conducted in Wisconsin by Miss Coerper [1919] and the other in North Carolina by the junior writer" [1920].

Bacterial blight due to *Bacterium glycineum* and *B. sojae* could not be differentiated with certainty in the field. In cultures, *B. glycineum* produces pigment on certain media and forms acid from dextrose, saccharose, lactose, maltose and glycerine, whereas *B. sojae* is non-pigment forming and forms acid from the first two of these sugars only. Address: North Carolina Agric. Exp. Station.

395. Shunk, I.V.; Wolf, Frederick A. 1921. Soybean bacterial blight (Abstract). *Phytopathology* 11(1):52. Jan. [2 ref]
• ***Summary:*** This is an abstract of a paper presented at the Twelfth Annual Meeting of the American Phytopathological Society, Chicago, December 28 to 31, 1920.

The complete paper was published in this same issue, p. 18-24. Address: North Carolina Agric. Exp. Station.

396. Winters, R.Y.; Herman, V.R. 1921. Soybeans for the Piedmont and mountain sections of North Carolina. *North Carolina State College of Agriculture, Extension Circular* No. 111. 15 p. Jan.
• ***Summary:*** Contents: Introduction. Varieties (suited to the sections studied). The use of soybeans in the rotation. Soybeans for hay. Seed production. Soybeans for soil improvement. Culture of soybeans.

Page 3: "The soybean has been considered an important crop in certain portions of Eastern North Carolina for more than a quarter of a century [i.e., since before 1896]. At the present time it holds a permanent place in this section as a summer legume... the greatest value has come from its use as a grazing crop, for soil improvement, and for hay."

Page 11: "Several special machines are now being used to harvest larger areas. (Write for circular on soybean harvesters.) These soybean harvesters thresh the beans in the field, leaving the stalks standing for pasturage and soil improvement. Seed gathered in this way are mixed with hulls and small pieces of stalks, so it is necessary to screen them after the harvesting is done. These harvesters save from 60 to 75 per cent of the seed, the remainder being scattered on the ground or left on the stalk."

Tables show: (1) Soybean varieties for the mountain section, Mountain Branch Station, Swannanoa. western North Carolina. Seven varieties for seed and seven for hay. For each variety is given the number of days to mature and the yield of seed per acre in bushels. (2) Soybean varieties for the Piedmont section, Piedmont Branch Station, Statesville, western N.C. Same format as table 1. (3) Yield of seed and hay from cowpeas and soybeans, Mountain Branch Station. Groit, Early Red, and Taylor cowpea varieties compared with Virginia, Haberlandt and Manchu soybean varieties. Soybeans give, on average, 2.69 times as much seed and 36% more hay. (4) Yield of seed and hay from cowpeas and soybeans, Piedmont Branch Station. (5) Food content of five hays compared. (6) Soybean spacing test (1915-1917): Distance between plants in inches for 3 varieties. (7) Date of seeding Haberlandt variety soybeans at Mountain Branch Station: Effect of date on yield of seed and hay.

Photos show: (1) Piles of soybean hay (front cover). (2) Good crop of soybean hay grown from broadcast seeding. (3) "Harvesting soybean hay in the mountains" (p. 4). (4) "Soybean hay curing in cocks. This method will give splendid results in dry weather, but is not so sure as curing in ventilated stacks shown in the next picture."

(5) "Curing soybean hay in ventilated stacks. If the stacks are shaped so as to shed rain this method will cure hay in bad weather" (p. 6). (6) Two men in a soybean field on a "special soybean harvester threshing the beans in the field, leaving the stalks and hulls for pasturage and soil improvement" (p. 8). Note: This is basically an early, simple combine (combined harvester thresher). (7) A field of

soybeans ready to be harvested for seed (p. 8). (8) Piles of soybeans.

(9) Soybeans harvested for seed with a reaper-and-binder (p. 10). (10) Harvesting soybeans with a reaper pulled by a team of horses. (11) Men threshing soybeans with a grain thresher (p. 12). (12) Threshing soybeans and baling the tailings for hay. (13) A field of soybean varieties grown in Buncombe County (p. 14). Address: Div. of Agronomy.

397. *Market Reporter* (*The*) (*USDA*). 1921. Extremely small movement of soy beans and cowpeas: Comparative stocks, shipments, and prices. 3(9):129, 141. Feb. 26. Also monthly retail prices thereafter.

• ***Summary:*** A table gives statistics on soy beans for the following states or districts: Delaware, Virginia, central and western North Carolina, eastern North Carolina, Tennessee, other Southern states, Illinois, Indiana, Ohio, other Northern states.

For each state, the following figures are given: No. of shippers reporting. Pounds on hand Jan. 15, 1921 and 1920. Shipments of 1920 crop (pounds): To Jan. 15, 1921, after Jan. 15, 1921. Total shipments of those reporting (pounds): 1920 crop, 1919 crop. Average price per 100 lbs. paid growers, 1920 crop, 1919 crop.

The leading soybean producing states are districts in 1920 appear to be: (1) Eastern North Carolina. (2) Central and Western North Carolina. (3) Ohio. (4) Virginia. Address: Bureau of Markets, Washington, DC.

398. 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.

399. Grinenco, Ivan; Capone, Giorgio. eds. 1921. Produits oléagineux et huiles végétales: Etude statistique sur leur production et leur movement commercial [Oleaginous products and vegetable oils: Statistical study on their production and trade]. Rome, Italy: Institute Internationale d'Agriculture, Service de la Statistique Générale. xxxii + 421p. See p. XX-XXI, 140-41, 144-47, 442-43, 480-81. Sept. 15. Index in front. [Fre]

• ***Summary:*** In Sept. 1921 the IIA (*Institute Internationale d'Agriculture*) published this monograph in French. Two years later, by popular demand, an updated English-language edition was published. Contents: Introduction. Northern hemisphere: Europe, America, Asia, Africa, Oceania (Hawaii, Guam). Southern hemisphere: America, Asia, Africa, Oceania. Recapitulative tables of commerce, 1910-19. Note 1. All import and export statistics are given in quintals. 1 quintal = 100 kg.

The soybean (introductory information, p. xxii-xxiii, xxxii). Northern hemisphere–Europe. Germany (imports of soybean and soy oil 1910-14, p. 4). Denmark (production of soy oil in 1917, p. 17; imports and exports of soybeans and soy oil 1910-19, p. 18-20). France (imports and exports of soybeans and soy oil 1910-19, p. 28-31). Great Britain and Ireland (treated as one country; imports, exports, and reexports of soybeans and soy oil 1910-19, p. 32-35). Norway (imports of soybeans 1910-19, p. 47). Netherlands (Pays-Bas, imports and exports of soybeans and soy oil 1910-19, p. 49-52). Romania (In 1915 production of soybeans on 3 hectares was 3,600 liters). Russia (in Europe and Asia, imports of soy oil 1909-17, p. 70-71). Sweden (imports and exports of soybeans and soy oil 1910-19, p. 74-76).

Note 2. This is the earliest document seen (Oct. 2015) that gives soybean production or area statistics for Eastern Europe.

America: Canada (imports of coconut, palm, and soy oil {combined} for the production of soap {in hectoliters} 1915-19, p. 88-89). Cuba (various attempts have been made to introduce the soybean, p. 94).

United States (area and production in 1909 {659 ha}, then from 1917-1920, p. 97-98). An overview of soybeans in the USA (p. 103, 105) states that the soybean, known in the USA since 1804, has become of great economic importance during the past few years. It is becoming popular mainly as a forage plant, but also for its seeds, for extraction of oil, and for making other products. Statistics have been published regularly since 1917. The census for 1909 showed 659 hectares cultivated in soybeans. During the years from 1917 to 1919 the cultivated area surpassed 60,000 ha. The three main states for soybean cultivation are North Carolina, Virginia, and Mississippi, which in 1919 cultivated respectively 33,185, 12,141, and 3,238 hectares; this was almost 75% of the total cultivated to soybeans in the USA. In 1910, the seeds were used for the extraction of oil in the USA, and for the first time the seeds were imported from Manchuria. In 1915, domestically grown soybean were used as a source of oil. This industry is developing rapidly, because the extraction of the oil is easily adapted to existing facilities that press oil from cottonseed and linseed. A table (p. 106) shows production of 16 vegetable oils in the USA from 1912 to 1917. Soybean oil production (in quintals) has increased from 12,537 in 1914, to 44,996 in 1916, to 190,843 in 1917. Figures are also given for peanut oil, sesame oil, etc. Other tables (p. 108-10) show imports, exports, and reexports of soybeans and soy oil from 1910 to 1919.

Asia: China (exports of soybeans and soy oil 1910-19, p. 161-62). French Indo-China (overview, esp. Cambodia and Tonkin, p. 187). Japan (area planted and production of soybeans 1877-1919, p. 190; overview, p. 191; production of soy oil 1909-18, p. 192; imports and exports of soybeans and soy oil 1910-19, p. 192-93). Korea (area planted and production of soybeans 1909-1918, p. 194; imports and exports of soybeans and soy oil 1909-11, p. 195). Formosa [Taiwan] (area planted and production of soybeans 1901-06, p. 196; imports and exports of soybeans and soy oil 1909-17, p. 197. In 1901 10,888 ha produced 8,056,400 liters of soybeans. In 1904 21,960 ha produced 24,401,700 liters of soybeans). Note 3. This is the earliest document seen (Jan. 2005) that gives soybean production or area statistics for Formosa (Taiwan; ceded to Japan in 1895 after Japan won the Sino-Japanese War).

Kwantung [Kwantung Leased Territory in Manchuria] (area planted and production of soybeans 1911-17, p. 198. In 1911 14,627 ha of soybeans produced 102,112 quintals. In 1916 29,902 ha produced 153,995 quintals of soybeans).

Africa: Algeria (in recent years, trials have been made to introduce soybean culture to Algeria, p. 238). Egypt (imports of soy oil 1919, p. 244-47).

Southern hemisphere–America: (Note 4. Soy is not mentioned at Argentina, Brazil, or any other South American country). Asia: Netherlands Indies. (A) In Java and Madura, the area planted to soybeans was 162,800 ha in 1916, 175,696 ha in 1917, and 157,844 ha in 1918. Gives imports of soy oil (1,085 quintals in 1914) and exports of soybeans (46 quintals in 1913) (p. 297-98). (B) In outlying territories, gives imports of soybeans from 1913 to 1919 (p. 299). Africa: Southern Rhodesia (attempts have been made to introduce soybeans and several other oil plants from temperate climates, p. 317). Oceania: Soy is not mentioned at Australia, New Zealand, British New Guinea, former German New Guinea [later Papua New Guinea], or any other country in southern Oceania. (p. 297). Recapitulative tables–Imports and exports from 1910-1919. Soybeans, p. 368-69. Peanuts, p. 370-75. Sesame seeds, p. 376-79. Palm fruits (*Amandes de palme,* from which palm oil is obtained), p. 392-93. Peanut oil, p. 414-17. Corn oil, p. 416-17. Sesame oil, p. 418-19. Soy oil, p. 420-21. Other oils covered in detail by this book are: Cottonseed, hempseed, linseed, rapeseed

(*colza* and *navette*), poppy (*pavot* or *oeilette*), castor, olive, coconut, palm, and other–non-specified. Address: 1. Doctor of Agronomics; 2. Doctor of Economics. Both: IIA, Rome, Italy.

400. 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.

401. Edler, George C. 1921. Seed marketing hints for the farmer. *Farmers' Bulletin* (*USDA*) No. 1232. 31 p. Oct. See p. 22-23, 25.

• ***Summary:*** In the section titled "Buying seeds" is a subsection on "Surplus producing areas." Soy beans are discussed under "Peas and beans" (p. 22-23): "The soy bean crop is grown in much the same area as cowpeas, but the counties normally producing a surplus for seed purposes are fewer in number and more scattered than those for cowpeas. Eastern North Carolina grows the bulk of the commercial supply of soy beans, which are mostly of the Mammoth Yellow variety. With the advent and wider distribution of earlier varieties of soy beans, this crop has become more popular in the North and surplus quantities are now being produced in a number of counties in Ohio, Indiana, Illinois, and Wisconsin, as indicated in figure 13"–which is a "Soy bean seed map" of the United States (p. 25). Black circles show counties reported as normally producing a surplus quantity of soy beans. Half-black circles shows those producing a sufficient quantity, and white circles show those producing an insufficient quantity compared with planting requirements. Address: Specialist in marketing seeds.

402. 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.

403. *Decatur Herald* (*Illinois*). 1921. Only soy bean mill in country: Staley's plant will be unique says man who makes machinery. Nov. 22. p. 3.

• ***Summary:*** "The A.E. Staley Mfg. Co. will have the only soy bean mill in the United States next year, said F.B. Anderson, vice president of the V.D. Anderson Co., of Cleveland, Ohio, makers of oil pressing machinery, when he was here Monday to consult company officials about the installation of machinery for the proposed plant.

"The Anderson Co. installed the corn oil machinery

in the Staley plant. Soy bean oil machines are no different from the corn oil machines, he said. Soy beans could be run through the presses at the Staley plant, just as corn is run through now.

"Used in Orient: Mr. Anderson was in the orient last winter where his company sells many machines. Manchuria is the greatest soy bean producing country [in the world] and many of the Cleveland machines are installed in the soy bean mills. In other places in the Orient hand machines are still used to press the oil from the beans.

"Before the war [World War I] cotton seed mills in the Carolinas extracting [sic, extracted] oil from soy beans in seasons when they were not busy with the other, but soy beans are no longer grown extensively and that business has passed out. There is a big demand for soy bean oil and the by-products and a recently enacted tariff law places a duty on the imported oil, so that an American soy bean mill will be able to do a big business if it can get the beans."

404. *Market Reporter* (*The*) (*USDA*). 1921. Cowpea crop to be below that of last year. Reports show yields in Georgia and Alabama–Soy-bean production nearly same as last season. 4(22):337, 351. Nov. 26.
• ***Summary:*** A table gives percentage increase or decrease in soy bean acreage in 1921 compared with 1920, percentage increase or decrease in soy bean yield for the same period, and prices in various states. The states are Delaware, Virginia, North Carolina, South Carolina, Tennessee, Mississippi, Alabama, Georgia, Illinois, Indiana, Ohio, and Missouri. The acreage changes range from 200% of 1920 acreage in Illinois, to only 72% of 1920 acreage in Alabama. Yield changes range from 133% of 1920 yield in Illinois to 73% of 1920 yield in Alabama. Prices offered growers for "thrasher-run" seed per hundred pounds is given for 3 dates. On 12 Nov. 1921 the price ranged from $4.00 in Missouri down to $2.15 in Indiana. On 2 Nov. 1920 the price ranged from $3.35 in Alabama down to $2.55 in Mississippi. On 27 Nov. 1919 the price ranged from $5.80 in Missouri down to $3.95 in South Carolina. Address: Bureau of Markets, Washington, DC.

405. *Bean-Bag* (*The*) (*Lansing, Michigan*). 1921. An interesting feature of a fair held at Elizabeth City, North Carolina,... 4(6):45. Nov.
• ***Summary:*** "... early in October was an exhibit of the various products of the soy bean, whose production is rapidly increasing in North Carolina as well as in most other southern states. Twenty-five manufacturers supplied products," including "a substitute for butter, imitation milk, table syrup, flour, soap, linoleum, glycerine and paint–all made from soy beans."

406. *Weather, Crops and Markets* (*USDA*). 1922. Estimated farm value of important products Jan. 15, 1922. 1(7):148. Feb. 18.
• ***Summary:*** A table shows the estimated farm price of soy beans per bushel nationwide was $2.06 in 1922 and $2.11 in 1923. Values are also given for 16 states in 1921 and 17 states in 1922 (Delaware, Maryland, Virginia, West Virginia, North Carolina, Georgia, Florida, Indiana, Illinois, Michigan, Wisconsin, Missouri, Kentucky, Tennessee, Alabama, Mississippi, Louisiana).

407. 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].

408. Wolf, Frederick A. 1922. Additional hosts for *Bacterium solanacearum. Phytopathology* 12(2):98-99. Feb. [3 ref]
• ***Summary:*** "During August 1921 my attention was directed to a wilting of soybeans (*Soja max*)... The specimens of soybeans were sent from Columbus, North Carolina, by Mr. J.R. Sams..." The soybean was found to be a natural host.

409. 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].

410. 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.

411. *Weather, Crops, and Markets* (*USDA*). 1922. Shippers' stocks of soy beans and cowpeas large. 1(10):193, 207. March 11.
• ***Summary:*** "Total shipments of the 1921 crop of soy beans are expected to be 30% larger than the shipments of the 1920 crop last year." About 40% of the seed grown will not be shipped, but will remain in the hands of the growers. The heaviest increase in the total 1921-crop shipments is noted in eastern North Carolina, Indiana, and Illinois.

A line graph titled "Average weekly wholesale selling prices of soy beans at the large distributing markets, 1919-1922" shows that prices from January to May per 100 pounds of soy beans were about $5 in 1919, $8.50 in 1920, $4.00 in 1921, and $3.50 so far in 1922.

"The heaviest increase in the total 1921-crop shipments, made and to be made, is noted in eastern North Carolina, Indiana, and Illinois."

A table titled "Retail prices of field seeds of high quality, by geographical divisions, March 1, 1922" in dollars per 100 pounds for soy beans shows: North and middle Atlantic $4.90. East central $4.30. North central $7.10. West central $5.45. Southwestern $5.00. Address: Washington, DC.

412. 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.

413. Williams, C.B. 1922. Soybean growing in North Carolina. *North Carolina Agricultural Extension Service of the State College, Extension Circular* No. 127. 14 p. March. Revised in Jan. 1929.
• ***Summary:*** Contents: Introduction. North Carolina leads in soybean seed production. The growing plant. Distribution in North Carolina. Soybeans vs. cowpeas. Soybeans compared with peanuts. Suitable varieties of soybeans: In mountains, in Piedmont section, in coastal plain. Selection and preparation of soil. Inoculation essential. Kinds of fertilizer to use. Seeding and cultivation. Rotation with soybeans: For coastal plain soils, for Piedmont soils, for mountain section. Soybeans in mixtures (with sweet sorghum or millet). Harvesting for hay. Harvesting for seed. Soybean for soil improvement. Soybeans for soiling purposes. Soybeans for pasturage.

"The soybean is probably a native of tropical Africa

and was introduced into the southeastern part of Asia more than 3,000 years ago by ancient travelers trading between Zanzibar [which became part of Tanzania in 1964] or India or Ceylon... It was probably used for food in China before the time of Confucius."

"It must be gratifying to all North Carolinians to know that this state produces more soybeans than all the remaining part of the United States. From the latest available statistics, North Carolina produces over two million bushels annually for seed." Soybeans are produced chiefly in the northeastern part of North Carolina.

Photos show: (1) A field of soybeans sown in corn at last working (front cover). (2) A field of soybeans in rows for seed and soil improving purposes. (3) Soybean hay being cured in cocks. (4) A field of soybeans ready to be harvested for seed. (5) Two men harvesting soybean seed in the field with a harvester. (6) "One way of harvesting soybeans." Appears to be hogs eating soybeans in a pasture. Address: Chief, Div. of Agronomy, Raleigh, North Carolina.

414. Cates, J. Sidney. 1922. More soys: Many farmers see in the beans a sound new money crop. *Country Gentleman* 87(8):10, 16. April 1.

• ***Summary:*** "The three Fouts brothers, at Camden, Indiana, own farms close together, and they call the group Soyland. They are not only making money selling seed but by feeding hogs and sheep. Soys are the main crop on all three farms."

"At present the price of soy beans in the Corn Belt is the lowest in many years, seed selling on farms at $1.30 to $1.60 a bushel."

"In North Carolina, where more seed beans are raised than anywhere else, 34 per cent of the crop is grown for seed. Illinois now comes next with 28 per cent of the whole planted area harvested for seed."

"New varieties, some 300 in number, were brought in from Manchuria during the winter of 1913-1914. The whole importation was tested out at the government farm at Arlington, Virginia, and the markedly inferior ones were discarded."

Photos show: (1) Soys being cultivated with a rotary hoe on the A.P. Meharry Farm in Illinois; a young black boy sits on the equipment and 2 mules pull it. (2) Piles of soybean plants which were grow for seed and harvested with a grain binder.

415. *Bean-Bag* (*The*) (*Lansing, Michigan*). 1922. Growers hold 40 per cent. 4(11):26. April.

• ***Summary:*** "Soy beans–Of the total quantity of soy beans which it is estimated will be shipped this season, 23 per cent had been shipped by local shippers up to January 28. The quantity represented by this 23 per cent, plus the stocks in shippers' hands, equals about 57 per cent of the total 1921 crop shipments, indicating that over 40 per cent still remains in the hands of growers. The heaviest increase in the total 1921 crop shipments, made and to be made, is noted in eastern North Carolina, Indiana and Illinois.

"In the two latter states and Ohio, the average price paid to growers is unusually low for the early varieties maturing in those states, being from 25 cents to 45 cents per 100 pounds less than that paid for Mammoth Yellows in eastern North Carolina. The presence of adequate supplies at low prices will tend to accelerate the movement now under way in some sections of the corn belt, to increase the acreage planted to soy beans, and as a result, the larger stocks will likely all be used, provided they are distributed equitably.

"Prices paid growers in eastern North Carolina are about 20 cents per 100 pounds more than those paid last season; in Delaware $1.45 less at $3.30 per 100 pounds; and in the corn belt states $2.50 to $4.35 less at $2.30 to $2.50 per 100 pounds. A chart showing the range of average wholesale selling prices at representative markets for a period of years accompanies this article. The quality of soy beans for seed generally is good."

416. Jeter, F.H. 1922. Soy beans–A valuable crop. *American Fertilizer* 56(11):81-82. June 3.

• ***Summary:*** Reprinted from *The Progressive Farmer.* Discusses the growing importance of soybeans (with emphasis on North Carolina), acid phosphate as a good fertilizer, harvesting the beans, and the average yield to be expected.

417. Beemer, Alex W. 1922. The soy bean industry. *Staley Journal* (*Decatur, Illinois*) 5(12):5-11. June.

• ***Summary:*** In a box (like a horizontal sidebar) at the top of this article we read: "Staley Company Installs Soy Bean Plant: The A.E. Staley Mfg. Company announces that in response to the general and urgent desire on the part of the farmers of Central Illinois, it has been decided to install a Soy Bean Oil Plant in conjunction with the Decatur Starch and Glucose manufactory.

"A satisfactory building is now in readiness. Several oil expellers have been purchased and delivered. Bean dryers are under construction. Storage for 150,000 bushels of beans is ready for use. The plant is so planned that large increases in capacity may be had without expensive changes. The first unit will have a capacity of about 500 bushels per day, and will be finished in ample time for the 1922 crop."

Contents of article: Introduction. Big industry in Manchuria. Great success in Europe. Has large variety of uses. Good crop for Illinois farmers. Chance for development.

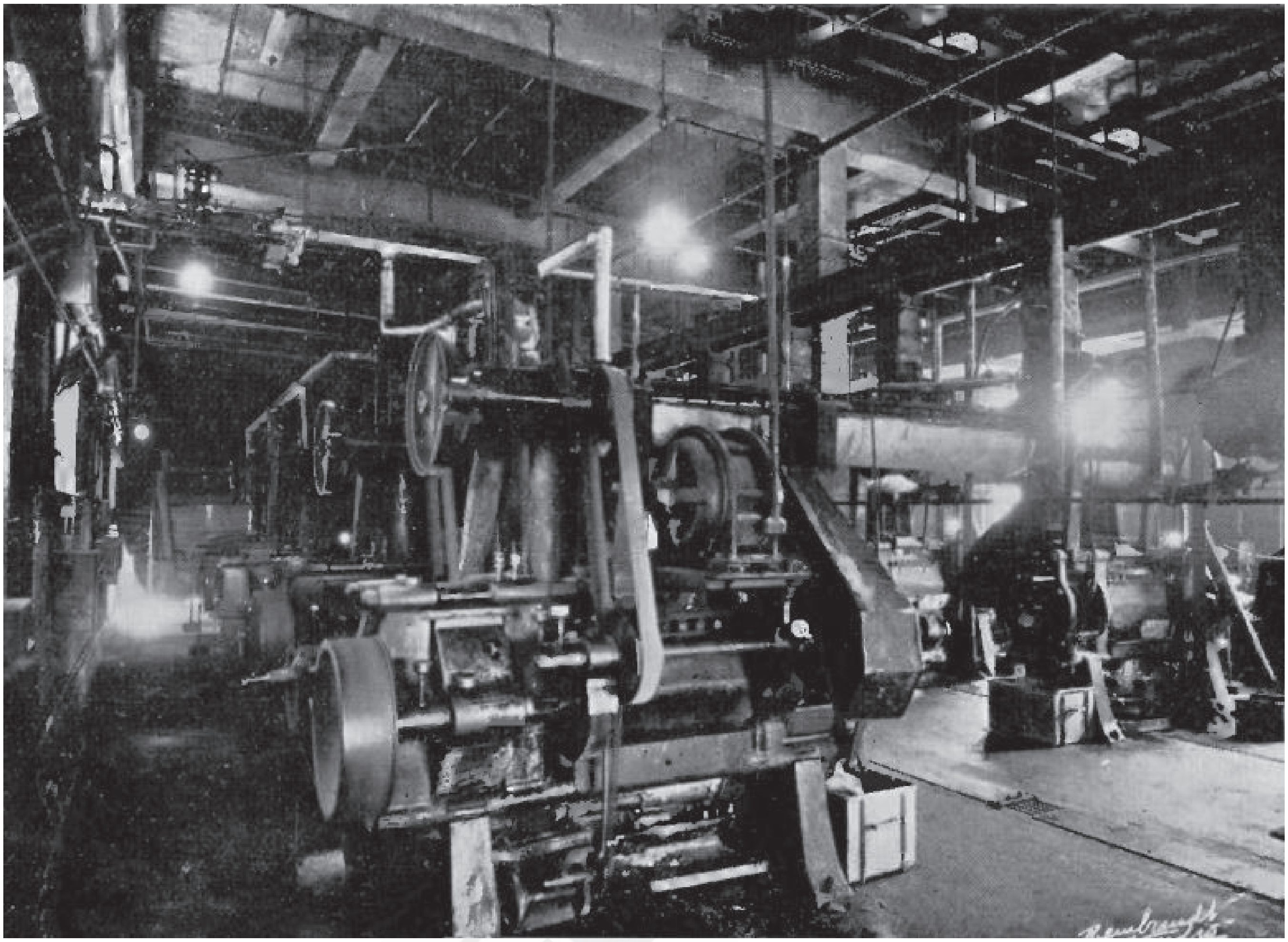
"In China and Japan, where centuries in the use of the soy bean can be drawn upon, we find it used very little in its original state. Shoyu (soy sauce) is already familiar to most of us, although unrecognized. It is this sauce which gives chop suey its characteristic flavor, and it is the basis of the now world famous Lea and Perrins Worcestershire Sauce.

A vegetable milk is manufactured from the bean. It is made every night, bottled and delivered fresh to the customers in the morning. Tofu (bean curd) is made from this vegetable milk and there are records to show that it was in use nine hundred years B.C. Miso (bean cheese), is made from a mixture of beans, salt, and rice malt [rice koji]. The beans are often picked green [edamamé], boiled, and served cold with soy sauce and in salads. All these foodstuffs are in daily use in Oriental homes.

"Big Industry in Manchuria: In Manchuria, the soy bean center of the world, the bean is grown in nearly all parts where farming operations are conducted and thrives under varied conditions, such as semiarid regions, in valleys subject to floods in the rainy seasons, and in northern latitudes similar to the Dakotas and Minnesota. Its average yearly exports from 1911 to 1918 inclusive were over 25,000,000 bushels of beans, besides large quantities of oil and cake. There are now about 60 oil mills in Dairen alone with an approximate annual capacity of 1,300,000 tons of bean cake and 300,000,000 pounds of oil annually. When the capacities of the other large oil centers are taken into account, besides the many small interior mills, one can readily see the extent of this industry.

"Great Success in Europe: The soy bean was first introduced into Europe in about 1790, but did not attract much attention.

"During the Russo-Japanese war it had been one of the main food supplies for the Japanese armies, and the farmers had increased their acreages tremendously. As a result there was a big surplus of beans when peace was declared. In 1908 shortly after the close of the war, some shipments of beans were sent to England by some enterprising Japanese merchants [Mitsui & Co.] in the hope of developing a market. The experiment met with instantaneous success, as the English concerns recognized the high value of the beans for oil and meal, and large orders followed. Germany and France were quick to recognize the merits of the soy bean, and were soon heavy importers. The demand in that year became so great that 50,000,000 bushels of beans were shipped from three ports in Manchuria, chiefly to Europe.



At the present time the soy bean is only grown in Europe to a limited extent but large quantities are imported, mostly in the form of the whole bean, as there are quite a number of crushing plants in operation."

"The soy bean was first cultivated in the United States as early as 1804, but was never considered of much economic importance, and it as only been within recent years that it has been grown to any extent."

"Soy beans were first crushed for oil and meal in 1910 by an oil mill on the Pacific coast [Seattle, Washington. Pacific Oil Mills; Albers Bros. Milling Co.]. The beans were imported from Manchuria. In 1915 and 1916 American grown seed was first crushed for oil and cake by a few of the cottonseed oil mills of North Carolina. This was brought about by a shortage of cottonseed in the south and a surplus of soy bean seed in North Carolina. North Carolina was the pioneer state in growing the bean to any great extent and that the farmers of that state think pretty well of it is evidenced by the fact that they grew over one-half of the soy beans produced in this country in 1920."

"Some manufacturers of caned baked beans use the soy bean in their products. It can be used as a substitute for the coffee bean and when properly roasted and prepared it makes an excellent substitute for coffee. The Orientals soak the bean in salt water and then roast it, this product being eaten in a way similar to salted peanuts. The green bean [when cooked] makes a very good substitute for the butter or Lima bean."

About 1000 varieties have been introduced into the United States in the past ten years but by the process of selection and imitation the list has been narrowed down to a few standard varieties. Some of the more popular varieties adapted to Illinois conditions are Perley Mongol, A.K., Ito San, Manchu, Sable, Black Eyebrow, Ebony and Ohio 9035. Any farmer can learn the variety suited to his conditions by consulting the state agricultural college or his county agricultural agent. The growing and handling of the crop can be accomplished by the ordinary farm equipment without any additional machinery.

"An ordinary threshing machine can be very quickly altered so as to thresh beans without splitting them. In New York, Michigan and Wisconsin, where beans have for many years occupied an important position, a device has been used which is a combination of harvester and thresher. We understand that this machine is very successful in its operation and very moderate in cost. Where several members

of a community are arranging to plant from twenty to fifty acres of soy beans each, they may very profitably join in the purchase of one or more of these harvesters which should pay for itself on the first crop."

Photos show: (1) "The new soy bean oil extraction plant for the Staley company will be installed in this building. Steel tanks, of 200,000 bushel storage capacity, are shown in the distance." (2) "A modern soy bean oil extraction plant." (3) "Soy bean cakes in open storage on Dairen wharves, South Manchuria." (4) "Stacks of Manchurian soy beans as far as the eye can reach, awaiting shipment to foreign markets." The last two photos are "Courtesy The Asia Magazine."

Note 1: This is the earliest document seen (Sept. 2016) concerning the work of the A.E. Staley Mfg. Co. with soybeans (one of two documents).

Note 2. In *The Kernel and the Bean: The 75-Year Story of the Staley Company,* by Dan. J. Forrestal, is some interesting background to this story. Pages 57-58: "As far back as 1918 he [Gene Staley] had begun his own soybean investigations and in 1920 he had ordered two pieces of heavy hardware called expellers, from the V.D. Anderson Company of Cleveland, Ohio, a leading manufacturer of hydraulic equipment for crushing corn germs and sunflower seeds. When the expellers arrived, George E. Chamberlain, general superintendent and Staley's 'right-hand man,' suggested that some modifications be made on the expellers before any production schedules were set. But his big worry concerned several pieces of machinery called bean dryers which were fashioned by his own well-meaning people.

"In 1921, Chamberlain had the manufacturing equipment somewhat squared away, but several new reasons for delay became apparent.

"Delay Number One involved building a ramp for use by trucks bringing soybeans to the plant-trucks being used because the loads would be less than the amount needed to justify use of railroad freight cars. To solve the problem of providing access for trucks, the ingenious Chamberlain commandeered hundreds of creosoted railroad ties and constructed an improvised ramp inclined at a 10 percent grade leading up to the area where soybeans would be dumped. Improvisation had always been among Chamberlain's virtues and the ramp was in fact nothing more than a new manifestation of the manufacturing superintendent's day-in, day-out ingenuity.

"Delay Number Two was more serious, involving not only the corporation's economic plight but also the nation's economic plight. The year 1921 had been gravely imperiled by an ominous downturn and many business institutions had been shaken by the tremors of a nationwide depression. Expenses in corn refining had exceeded income at the Staley plant–the net loss for the year 1921 amounting to $692,000. It was obvious that this was no time to be adding new expenses which would inescapably be part and parcel of a pioneering venture into soybean processing.

"Even though the corporation was 'sound as a dollar, long-range,' in the founder's words, it had to exercise caution in its expenditures."

"In 1922 Gene Staley was ready to go, risks notwithstanding."

418. Blackwell, C.P.; Jeffords, S.L. 1922. Soy beans. *South Carolina* (*Clemson*) *Agricultural College, Extension Circular* No. 36. 12 p. June.

• ***Summary:*** Contents: Introductory. Varieties (Otootan, Wilson, Hollybrook, Guelph, Mikado, Barchet). Soil adaptation. Soil preparation and methods of planting. Inoculation. Fertilizers. Lime. Time of planting. Rate of seeding. Method of cultivation. Time and method of harvesting. Uses: Forage, hay, silage, cash crop, soil improving crop. Soy bean enemies. Harvesters. Reasons for planting soy beans.

Page 7: "To operate one of the commercial harvesters or pickers it will be found necessary to have one man to drive and one to stand in the rear end of the machine and keep the excess of trash and empty pods thrown out of the hopper. When the hopper is filled, the beans are emptied out and screened and sacked. A third man can follow the machine with a screen and sheet and keep the beans sacked without stopping the picker. The hopper will hold from six to eight bushels of beans, depending on the make of the machine. The number of acres that one machine can handle in a day will vary from four to six, and the length of harvesting season will vary from ten to fifteen days. In the commercial soy bean districts the farmers estimate that 40 to 50 acres is about the amount that one harvester can take care of during an average season."

Photos show: (1) The Big Jumbo soy bean harvester manufactured by Geo. E. Pritchard, Elizabeth City, North Carolina. (2) The Little Giant soy bean harvester made by Hardy & Newsom, La Grange, North Carolina. (3) Threshing soy beans on an ordinary threshing machine after they have been harvested with a reaper. Courtesy of International Harvester Co. Address: 1. Chief of Agronomy Div., Clemson Agricultural College, South Carolina.

419. *Weather, Crops, and Markets* (*USDA*). 1922. The increased production of early maturing varieties of soy beans in the corn belt... 2(2):29. July 8.

• ***Summary:*** "... has affected the demand for North Carolina grown Mammoth Yellows and resulted in a larger than normal carryover of the latter in growers' and shippers' hands this season."

Note: This is the earliest English-language document seen (Jan. 2004) that contains the word "carryover" to refer to soy beans stored or carried over from one growing year to the next.

420. *Atlanta Constitution* (*Georgia*). 1922. Soy bean failure in South Carolina probed by Harris. Aug. 20. p. A6.
• ***Summary:*** Constitution Bureau, Raleigh Hotel, Washington [DC]. "The failure of the soy bean industry in South Carolina, according to the oil mill crushers of that state, was due to a variety which shattered very easily and caused trouble in crushing, as well as failure to give proper treatment to the plant at maturity. These conclusions were given by the bureau of plant industry to Senator Harris of Georgia, who laid the complaints before the bureau in an effort to get information for the Georgia growers of soy beans."

Dr. W.A. Taylor, chief of the bureau, says that proper handling of the plants at maturity can avoid much loss of the seed by shattering. "When grown for seed alone, the shattering of the pods of soy bean plants is a serious fault, and inexperienced growers are likely to sustain heavy loss of seed unless advised of the proper time of harvest and the best method of cutting and curing." "In North Carolina and throughout the corn belt states, large acreage of soy beans are grown annually for seed, and very little loss results from shattering."

421. 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.

422. Lehman, Samuel G. 1922. Pod and stem blight of the soybean (Abstract). *J. of the Elisha Mitchell Scientific Society* 38(1&2):13. Sept.
• ***Summary:*** *Phomopsis sojae* n. sp. was isolated from the stems, pods, and seeds, and has been observed to cause the death of young soybean plants. It overwinters in diseased stem and seed. The ploughing under of the diseased plants, use of healthy seeds, and crop rotation are recommended.

This is the abstract of a paper read before the 21st annual meeting of the North Carolina Academy of Sciences, May 1922.

423. *Weather, Crops, and Markets* (*USDA*). 1922. New outlet for soy beans. 2(16):335. Oct. 14.
• ***Summary:*** "The increased production of soy beans in the Corn Belt States is forcing growers to look for new outlets for their product. Heretofore the demand for planting purposes, especially of those varieties that would mature seed in the Middle Western States, was greater than the supply and growers realized abnormally high prices for their stocks.

"With an ample seed supply in 1921, however, the acreage was increased further, in many instances, superseding oats. This resulted in a surplus production and consequent lower prices. These factors are conducive to the manufacture of soy beans into oil and cake or meal and have stimulated the erection of mills in the corn belt for this purpose. In North Carolina, the heaviest soy bean producing state, cotton seed oil mills have crushed soy beans in previous years when there was a favorable ratio between the price of the raw and the manufactured product."

424. Gordon Bean Harvester Co, 1922. Save soy beans and save money (Ad). *Independent* (*The*) (*Elizabeth City, North Carolina*). Oct. 20. p. 8.
• ***Summary:*** "The Gordon Bean Harvester is the Oldest on the market.

"It is the best; More Gordons have been sold than all others.

"Because of its lasting construction and the way it saves beans, it is the cheapest.

"We are prepared to take care of your orders. If you haven't the cash, we can make time arrangements."

In a small box inside the ad: "Carts built to order: See us if you need a cart. We can save you money because we have a big shop, good equipment and good mechanics who do the work."

"'The one farm implement that lasts a lifetime; get the Gordon–a good one."

A photo shows a man standing atop a Gordon harvester which is pulled by horses. Address: Matthews St., Elizabeth City, North Carolina. Phone: 744.

425. *Independent* (*The*) (*Elizabeth City, North Carolina*). 1922. Showing the farmers many modern methods. Oct. 20. p. 1.
• ***Summary:*** "Farmers of this section attending the Fair here last week had more demonstrators of farm machinery present to discuss labor saving machinery for the rural residents than ever before."

"...; the Scott, the Gordon, and the Pritchard Soy Bean Harvesters were also shown to the farmers."

426. *Independent* (*The*) (*Elizabeth City, North Carolina*). 1922. Soy bean industry gets a big boost: various makes of harvesters tested Tuesday on Weeksville Farm. Nov. 3. p. 1.
• ***Summary:*** "An Elizabeth City industry yet in its infancy was given a big boost Tuesday when several makes of soy bean harvesters were given a tryout on the farm of Victor Meads in Salem township.

"In this test which took place in a heavy growth of beans, the beans were in a green state, making it harder on the harvesters. Four types of bean harvesters competed. These were the Scott one-man, and two-man harvesters, manufactured by the Scott Sales Company of this city; the Gordon two-man harvester, manufactured by the Gordon Bean Harvester Company, also of this city; and the Little Giant harvester, manufactured by Hardy & Newsom of La Grange, N.C.

"F.V. Scott represented the Scott Sales Company at this test, G.G. Markham the Gordon Company and Mr. Newsom represented the La Grange firm.

"The test was made under the supervision of G.W. Falls, agricultural agent of Pasquotank County, who was assisted by E.R. Raynor, an expert on farm machinery.

"The results show that 'the Gordon Harvester gathered 164 pounds or 2.73 bushels per acre in a given time, the Scott one-man harvester gathered 155 pounds, or 25.8 bushels per acre, the two-man harvester 165 pounds or 27.5 bushels per acre; and the Little Giant 147 pounds or 24.5 bushels per acre.

"'Each machine harvested two rows and was pulled by the same pair of mules. Two rows figured as one-tenth of an acre in giving yield per acre. The beans were weighed after having been run thru a cleaning machine.

"'The draft of the Gordon and Scott two-man machines was about the same, but was considerably less than that of the Little Giant, and the Scott one-man machine. But the two latter had to be driven at a rapid rate to give good results and keep them from choking up, and each of the two latter machines were rather heavy on the pair of mules.'

"It is the opinion of County Agent Falls that Elizabeth City manufacturers are turning out a good product. With the increase of the industry thruout the country, the demand for these machines is going to mean a lot to their producers. Elizabeth City manufacturers are spending a lot to improve their products, and with the start they have on the rest of the manufacturers springing up thruout the country, they have little to fear from competition so long as they keep up their improvements.

"One other harvester, that of G.E. Pritchard, did not go in competition with the others at the test this week. But the Pritchard harvester has been on the market sometime and has also made a name for itself among soy bean growers.

"The Gordon harvesters are being turned out in large numbers at the plant in this city and are being shipped all over the country. The plant employs several mechanics and turns over many dollars in this city annually.

"The Little Giant, manufactured at La Grange, N.C., is also used a great deal in this section and is sold by Spence-Hollowell Company, the big farm supply house of Elizabeth City.

"The Scott Bean Harvesters have made a name for themselves not only in Elizabeth City, but in every bean growing section of the United States. Only the other day, three bean harvesters were sent to distant points. One of them went by express to Locus Ridge in Louisiana right near the Texas border. This order from such a distance is a good advertisement for the Scott, because the express charges amounted to almost as much as the original cost of the harvester.

"Mr. Scott has placed his harvesters on the farms of 12 states–Illinois, Indiana, Mississippi, Arkansas, Georgia, South Carolina, Tennessee, Ohio, Pennsylvania, Virginia, Louisiana and North Carolina."

427. *Weather, Crops, and Markets* (*USDA*). 1922. Soy bean and cowpea seed crops less than last year. 2(19):403. Nov. 4.
• ***Summary:*** Reports indicate low yields on reduced acreage. Prices are lower than for several years. Eastern North Carolina continues to be the leading producer of commercial soy beans. Unfavorable weather conditions caused low yields.

Figures for soybean acreage and yield (compared with the previous year), and prices (on 3 Nov. 1920, 12 Nov. 1921, and 23 Oct. 1922) are given for the following states: Delaware, Virginia, North Carolina, Tennessee, Mississippi, Alabama, Georgia, Illinois, Missouri.

428. *American Bee Journal.* 1922. Soy bean honey. 62(11):525. Nov.
• ***Summary:*** "C.L. Sams, Extension Specialist in Beekeeping, is quoted in the *High Point Enterprise* (North Carolina) as authority for the statement that Dr. E.E. Kickham secured an average of 117 pounds of honey per colony from soy beans from 40 colonies, after a heavy spring flow."

429. *Weather, Crops, and Markets* (*USDA*). 1922. Movement of soy beans reported below normal. 2(23):491. Dec. 2.
• ***Summary:*** A table gives soybean prices on 12 Nov. 1921, 23 Oct. 1922, and 20 Nov. 1922 for the following states: Delaware, Virginia, North Carolina, Tennessee, Illinois, Indiana, Ohio, and Missouri. Prices offered to growers per 100 pounds "thresher-run" on 20 Nov. 1922 range from $1.75 in Illinois to $2.60 in North Carolina. Average price is $2.25.

430. Calvin, Martin V. 1922. Soy bean, food for man and beast. *Atlanta Constitution* (*Georgia*). Dec. 3. p. D4.
• ***Summary:*** "The writer's attention was attracted, in 1902, to the soy bean by results obtained from a trial package of imported seed, sent to him by a friend in Washington, D.C. Planted in a sandy loam, the beans did encouragingly well. The bunches were large and in full leaf." The soy beans did much better than Whippoorwill cowpeas.

"The soy was introduced into this country in 1804, but was given passing notice only. In 1917, the soy came into favorable notice generally at the south and in the west. It has been slowly winning its way into the confidence of the people."

A table shows acreage, yield, and production (in bushels) of soy beans in 14 states in 1919. Those with the largest acreage were North Carolina (82,000) and Virginia (30,000); all the rest had 8,000 acres or less. Total production was 2,248,500 bushels. The average farm price for soys was $2.80 in 1919 and $3.20 in 1920. "It is generally conceded that southern soil and climate are especially adapted to the soy bean. It is easy of cultivation and can be made a highly profitable crop." Address: Statistician, Georgia Dep. of Agriculture.

431. U.S. Department of Commerce. Bureau of the Census. 1922. Fourteenth census of the United States taken in the year 1920. Volume V. Agriculture–General report and analytical statistics. Washington, DC: Government Printing Office. 935 p. See p. 777.
• ***Summary:*** Table 58 titled "Miscellaneous beans (Dry beans other than edible)–Farms reporting, 1919 and 1909, and acreage, production, and value, 1899 to 1919, by states" (p. 777) gives statistics for soy beans, castor beans, horse beans, and other beans. Of these four types, soy beans are by far the most important. Looking first at soy beans for the United States as a whole: The number of farms reporting increased from 339 in 1909 to 31,124 in 1919. Acreage increased 69-fold from 1,629 in 1909 to 112,826 in 1919. Production (in bushels) increased 64-fold from 16,835 in 1909 to 1,084,813 in 1919. And value increased 216-fold from $20,557 in 1909 to $4,450,099 in 1919.

The leading soybean producing states in 1919, listed in descending order of acreage were: North Carolina 47,041 acres / 498,048 bu. Virginia 10,283 acres / 111,353 bu. Tennessee 7,649 acres / 49,731 bu. Michigan 6,257 acres / 78,515 bu. New Mexico 5,838 acres / 52,190 bu. Alabama 3,928 acres / 38,690 bu. Mississippi 3,420 acres / 24,839 bu. Illinois 3,288 acres / 23,812 bu. Indiana 2,807 acres / 23,010 bu. Missouri 2,682 acres / 18,315 bu.

Other states reporting soy bean acreage and production (listed from east to west by geographical region) are: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Wisconsin, Minnesota (331 acres), Iowa (471 acres), North Dakota, Nebraska, Kansas, Delaware, Maryland, West Virginia, South Carolina, Georgia, Florida, Kentucky, Louisiana, Oklahoma, Texas, Montana (132 acres and 831 bushels), Idaho, Wyoming (22 acres and 97 bushels in 1919), Colorado, Arizona, Utah, Washington state, Oregon.

Note 1. This is the earliest document seen (June 2016) concerning soybeans in Wyoming, or the cultivation of soybeans in Wyoming. This document contains the earliest date seen for soybeans in Wyoming, or the cultivation of soybeans in Wyoming (1919). The source of these soybeans is unknown.

Note 2. New Mexico has surprisingly large acreage and production of soy beans at this early date.

Note 3. This is the 2nd earliest document seen (June 2011) concerning soybeans in Montana, or the cultivation of soybeans in Montana.

Note 4. This is the 2nd earliest document seen (Dec. 2004) that contains official national production or acreage statistics for soy beans in the United States. Address: Washington, DC.

432. 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.

433. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Eastern Cotton Oil Co.
Manufacturer's Address: Elizabeth City, North Carolina.
Date of Introduction: 1923 January.
Ingredients: Soybeans.
New Product–Documentation: Gardner, Henry A. 1923. "Examination of commercial American soya bean oil." *Paint Manufacturers' Association of the U.S., Educational Bureau, Science Section, Circular.* No. 165. p. 117-18. Jan. "The following mills are now crushing the bean and selling the oil... Eastern Cotton Oil Co. (Elizabeth City, North Carolina).

Markley, Klare S.; Goss, Warren H. 1944. *Soybean Chemistry and Technology.* Brooklyn, New York: Chemical Publishing Co. vii + 261 p. See p. 138. "The earliest recorded crushing of American-grown soybeans took place at the cottonseed oil mill of the Elizabeth City Oil and Fertilizer Company in Elizabeth City, North Carolina. This mill was later operated by the Eastern Cotton Oil Company, but its operation were discontinued in the early 1930's."

434. Gardner, Henry A. 1923. Examination of commercial American soya bean oil. *Paint Manufacturers' Association of the U.S., Educational Bureau, Scientific Section, Circular* No. 165. p. 117-18. Jan. [1 ref]
• ***Summary:*** "As a result of the efforts of the Educational Bureau (Footnote: See Circular No. 155 [Nemzek 1922]), soya oil has now become an important American crop product. The following mills are now crushing the [soy] bean and selling the oil, according to the Secretaries of the Cottonseed Crushers' Associations: Chicago Heights Oil Co. (Chicago Heights, Illinois), Monticello Co-operative Soybean Products Co. (Monticello, Illinois), A.E. Staley Mfg. Co. (Decatur, Illinois), East St. Louis Cotton Oil Co. (East St. Louis, Illinois), Peru Products Co. (Peru, Indiana), Eastern Cotton Oil Co. (Elizabeth City, North Carolina), Havens Oil Co. (Washington, North Carolina)." Note 1. No additional information is given about any of the above companies.

A table gives an analysis of the two samples of American soya bean oil and compares them with the A.S.T.M. [American Society for Testing and Materials] Tentative Specification Requirements for 1922.

Note 2. This is the earliest document seen (March 2000) stating that the following companies are actually crushing soya beans and selling the oil: Monticello Co-operative Soybean Products Co., East St. Louis Cotton Oil Co., Peru Products Co., and Eastern Cotton Oil Co. (North Carolina).

Note 3. This is the earliest document seen (March 2008) that mentions soybean crushing by a cooperative (Monticello Co-operative Soybean Products Co., later also called Piatt County Soybean Cooperative Co.).

435. Pellett, Frank C. 1923. Honey from soy beans. *American Bee Journal* 63(1):20-21. Jan.
• ***Summary:*** The time at which bees work soybeans is quite variable, with some reports of work from morning until night. A Tennessee beekeeper reported the hours as 9 a.m. to sunset, while a North Carolina beekeeper reported bees working from early morning until about noon or no later than one o'clock. The latter was probably J.R. Pinkham of Washington, North Carolina, who also advised that a strong colony will store 100 to 250 pounds of honey in 30 to 40 days, with one colony filling 175 sections in 1922.

The sample of honey submitted by Pinkham was described by Pellett as light in color, thin and light in body, with a particular distinctive and pleasing flavor, and granulating quickly. Mr. Pinkham stated that beans do not yield as heavily on uplands as on the black swamp or Pocosin silt (soil).

436. 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.

437. Smith, Alfred G. 1923. New grist for the oil mills: Soys have a great market in Dixie's cottonseed plants. *Country Gentleman* 88(6):8, 42. Feb. 10.

• ***Summary:*** "More boll weevil, more soy beans! That's the prospect in sight. There are sporadic plantings all over the Cotton Belt, and though the acreage isn't large soy beans look like a comer... The chief soy-bean section of the country has been along the northern limits of cotton production." North Carolina is the leader, followed by Tennessee and Kentucky.

"Fortunately the South has the biggest market in the world for soy beans. There are in round numbers 1,000 cotton-oil mills that crush cottonseed, and every one of these mills can be used for crushing soy beans with practically no additional expense for change of equipment. The only difficulty is to get a sufficient quantity of soy beans to make it worth while. During the war [World War I] some cotton-oil mills imported soy beans from Manchuria for crushing purposes. I know of at least two North Carolina mills that used over 5,000 tons of Manchurian beans. Jonathan Haven, at Washington, North Carolina, has been crushing soy beans, both local and foreign, in his cotton-oil mill for years."

"The North Carolina soy-bean picker is the best machine for harvesting beans for seed in the Cotton Belt. There are various makes of this machine, but they are all built on the same general principle and sell for from $100 to $150. The machine straddles the row and by means of revolving beaters knocks the beans off into the body of the machine. A part of the vines and leaves are also knocked off, but a man stands in the back of the machine and throws out the trash, leaving the beans in the bottom to be taken out later. The machine is pulled by two horses and has to be emptied when from four to six bushels are picked. These beans are run through a fanning mill and are then ready for storage. From an eighth to a sixth of the beans shatter out on the ground while picking, but the usual custom is to save these by following with hogs.

"These pickers will not pick the beans when they are wet or immature...A picker will pick from four to six acres in a day and from twenty-five to forty acres in a season. In heavy beans the machine makes a good pull for a team, and where work is rushed and no stops made at noon it is advisable to change teams, but where the beans are light a team will pull the machine all day with ease. These machines are not made to harvest broadcast beans.

"The sample of beans harvested with a picker is superior to that of beans run through a threshing machine. There are no cracked or immature beans, and after cleaning they do not spoil when put in bins in bulk. I saw 2,000 bushels of picked beans stored seven feet deep in a bin for four months, and they were still in perfect condition."

A photo shows this machine being pulled by two horses. One man is seated on top, holding the reins; another is standing behind one of the back wheels.

438. 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 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 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.

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.

439. *Weather, Crops, and Markets* (*USDA*). 1923. Comparative stocks, shipments, and prices of soy beans, cowpeas, and velvet beans for seed. 3(9):195. March 3.
• ***Summary:*** A table gives figures for the following states: Delaware, Virginia, North Carolina, Tennessee, Mississippi and Georgia, Illinois, Indiana, Ohio, and Missouri. Total stocks on hand 27 Jan. 1923 for all these states are 4,274,460 pounds. Average price per 100 pounds for the 1922 crop ranged from \$2.40 to \$3.85. Average: \$3.05, up \$0.25 per 100 lb over 1921. Address: Washington, DC.

440. Piper, Charles V.; Morse, William J. 1923. Photographs and illustrations (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p.
• ***Summary:*** Photos show: (Fig. 1) Typical soybean plant (p. 1). (2) Plant of wild soybean (p. 2). (3) A fleet of junks engaged in carrying soybeans to Newchwang, Manchuria, from different points in the interior, taking away bean oil and bean cake to other places * (p. 6). (4) Soybeans in sacks brought to a bean center by horses in winter in Manchuria (p. 8). (5) Chinese bean cart loaded with beans in wicker containers in Manchuria (p. 8).

(6) Type of cart and method of hauling soybeans with a horse in Manchuria (p. 10). (7) Manchurian farmers hauling the bean crop to market in winter on sleds (p. 10). (8) Plants of a soybean variety from India (p. 38). (9) Plants of the wild soybean from Soochow, China, grown at the Arlington Experimental Farm, 1908 (p. 38). (Fig. 15) Soybeans grown on the edges of a rice field in southern China * (p. 58).

(16) A man in a field of the Peking variety of soybean grown in rows and cultivated (p. 61). (17) A broadcast field of soybeans showing how weeds have overrun the field (p. 61). (18) The ordinary grain drill furnishes a most convenient method of seeding in rows or broadcast (p. 63). (19) Soybeans and corn grown in alternate rows for pasturage; a man in a hat stands between the rows (p. 65). (20) The roots of a soybean plant, showing abundant development of nodules (p. 66).

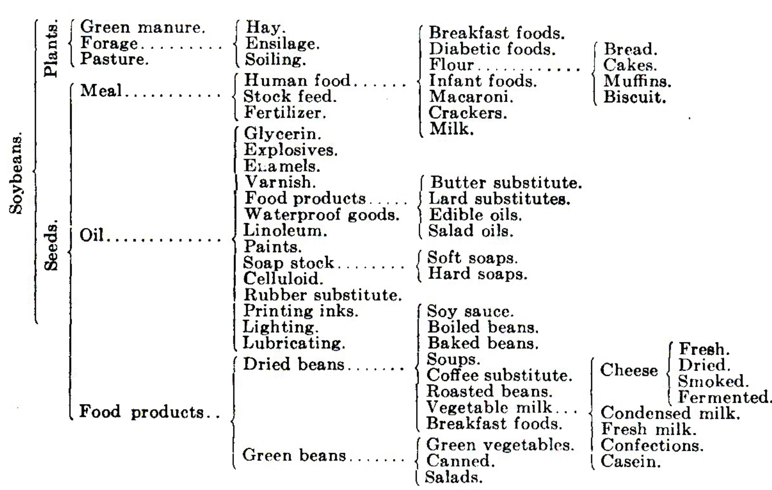
(21) A man standing in a plat of soybeans without inoculation (in the foreground) and an adjacent plat which had been inoculated, in the background (p. 67). (22) A man seated on a cultivator pulled by two horses doing the last cultivation on a field of soybeans (p. 79). (23) Soybeans and sorghums grown in mixture for forage purposes (p. 80). (24) A field of soybean and Sudan grass grown in mixture for hay (p. 81). (25) A field of soybeans and corn grown in the same row for ensilage (p. 82).

(26) Soybean hay on frames. Under favorable weather conditions, hay can be successfully cured in this manner (p. 86). (27) A field of mature soybeans ready to cut for seed (p. 90). (28) Harvesting soybeans for seed with a bunching attachment on the mower (p. 90). (29) Self-rake reaper used in cutting soybeans for seed (p. 91). (30) Soybeans cut for seed with binder and soybeans placed in shocks for curing (p. 92).

(31) The ordinary gasoline threshing outfit which may be used in threshing soybeans (p. 92). (32) A special bean harvester used in gathering the soybean seed from the standing mature plants and also cleaning it (p. 94). (33) A special bean harvester by which the plants are cut, thrashed, and cleaned (p. 94). (34) A special soybean harvester used to gather soybean seeds from the standing mature plants, and which can be adjusted to level or ridged cultivation. On one side is written "The Little Giant Bean Harvester," manufactured by Hardy & Newsom, La Grange, North Carolina (p. 95). (35) Method of storing soybean seed awaiting shipment in Manchuria. The beans in sacks are stacked under Chinese mats (p. 98).

(37) Pasturing a corn and soybean mixture with sheep (p. 133). (38) Thrashing soybeans from the field and baling the straw (p. 141). (39) The larger plant is the Guelph or Medium Green which is very pubescent, while the smaller plant is a nearly smooth variety from Japan (p. 149). (40) Pods of soybeans showing the range in size and shape (natural size; p. 151).

(41) Seeds of the most important varieties of soybeans now grown in the United States showing the wide range



in size and shape of seed. The name of each of the 20 varieties is given. A side view and a ventral view of each pair of seeds is given (p. 152). (42) Seeds of a black and white variety (Widower) from Korea. The white is due to the splitting of the outer later of the testa. A side view of six varieties is shown (p. 155). (43) A field of the Biloxi soybean, which requires a long season to mature (p. 163). (44) A man standing in a field of the Virginia variety of soybeans (p. 170). (45) Seeds of a natural soybean hybrid showing peculiar types of coloration (p. 175). (46) Pods of soybeans, hairy and smooth (p. 176). (47) A sterile soybean plant obtained from a natural hybrid (p. 176). (49) Seeds of an artificial soybean hybrid, showing peculiar types of coloration (p. 181). (56) An old style Chinese oil bean press, Manchuria (p. 195). (57) Coolies at Newchwang, Manchuria, carrying loads of soybeans from the junks to big stacks, where they are kept until the factory needs them for oil manufacture * (p. 196). (58) "Seeds and pods of the Hahto variety of soybeans, the seeds being especially valuable as a green vegetable" (p. 222). (59) Baskets of sprouted, small 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.

441. 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).

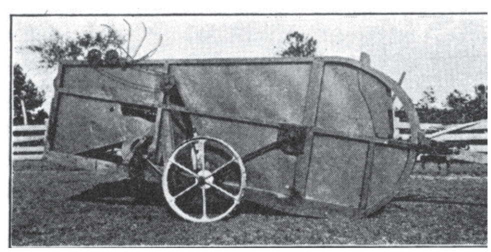
Table 30 (p. 89) shows tons of soybean hay to the acre at different experiment stations in the USA for different varieties: Aksarben, Biloxi, Black Eyebrow, Chestnut, Chiquita, Elton, Early Brown, Ebony, Habaro, Haberlandt, Hamilton, Ito San, Mammoth, Manchu, Mandarin, Mikado, Medium Green, Midwest, 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).

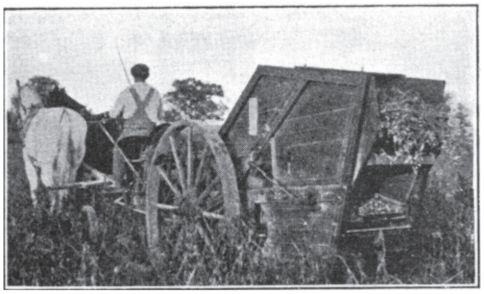
"Thrashing.–The ordinary grain separator (Fig. 31) can be adjusted to thrash soybeans successfully, but as equipped for small grains, a large percentage of cracked beans will result. The chief cause of split beans is the high speed of the cylinder which should be reduced at least one-half, but the speed 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.

442. 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).

443. 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."

444. 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.

(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

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

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.

445. Lehman, Samuel G. 1923. Pod and stem blight of the soybean. *Annals of the Missouri Botanical Garden* 10(2):111-69. April. Based on his 1923 PhD thesis, Washington Univ., St. Louis, Missouri. [28 ref]
• ***Summary:*** "This disease was first called to the writer's attention in the summer of 1920. During that season it occurred in abundance on soybeans in the plant-breeding grounds of the North Carolina Agricultural Experiment Station."

"The disease is not known to be widely distributed, having been found to date only in 3 localities, all of which are in North Carolina."

Discusses *Diaporthe sojae* (=D. phaseolorum var. sojae). The perfect stage of *Phomopsis sojae* was developed in culture and named *Diaporthe sojae.* Full description is given to the disease and the fungus. Under morphology, the author discusses the mycelium, pycnidia, pycnosporophores, stylospores, and perithecia. The infection and dissemination are favored by high humidity. The pycnospores germinated best at pH 4.1-6.1. Light was essential to the formation of pycnidia. Black Eyebrow was the most susceptible variety of soybean to the disease.

A footnote on page 111 reads: "An investigation carried out in part in the department of botany and plant pathology of the North Carolina Experiment Station of the State College and State Department of Agriculture, finished at the Missouri Botanical Garden in the Graduate Laboratory of the Henry Shaw School of Botany of Washington University, and submitted as a thesis in partial fulfillment of the requirements for the degree of doctor of philosophy. Published by permission of the Director of the North Carolina Agricultural Experiment Station." Address: Asst. Plant Pathologist, North Carolina Agric. Exp. Station. Formerly Rufus J. Lackland Research Fellow in the Henry Shaw School of Botany of Washington Univ. [St. Louis, Missouri].

446. 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.

447. 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.

448. Haskell, R.J.; Wood, Jessie I. 1923. Diseases of cereal and forage crops in the United States in 1922. *Plant Disease Reporter, Supplement* (*USDA*) No. 27. p. 164-266. July 1. See p. 256-58. [8 ref]

• ***Summary:*** Soybean: Bacterial leaf spots–bacterial pustule caused by *Bacterium phaseoli* var. sojense. Bacterial blight caused by *Bacterium glycineum.* Bacterial wilts caused by *Bacterium solanacearum* and *Bacterium flaccumfaciens.* Downy mildew caused by *Peronospora* sp. Pod and stem blight caused by *Phomopsis sojae.* Wilt caused by *Fusarium* sp. and *Sclerotium rolfsii.* Mosaic (reported from Indiana again, and for the first time for Connecticut, New York, Virginia, Kentucky, and Louisiana). Necrosis due to unbalanced nutrition. *Alternaria atrans.*

Downy mildew caused by *Peronospora* sp. is reported by F.R. Perry from Genesee County, New York. This is the first report of a downy mildew on soybean received by the Survey, and apparently it is the first report for the United States. According to E.J. Butler (1918) *Peronospora trifoliorum* de Bary occurs on soybean in the province of Kashmir in India, and has been reported on this host from Formosa also; and *P. trifoliorum* var. *manshurica* Naoumoff has been described on soybean from Russian Manchuria.

Note: This is indeed the earliest document seen (Feb. 2017) that records the occurrence of *Peronospora* sp. on soybeans in the USA. Address: 1. Plant Pathologist; 2. Junior Pathologist. Both: USDA Plant Disease Survey, Office of

Cereal Investigations.

449. Cates, J. Sidney. 1923. New stunts in harvesting soys: Cheaper ways to handle the job are being worked out. *Country Gentleman* 88(28):5, 30. July 14.

• ***Summary:*** "This is one of a series of articles gathered... from every part of the United States... for the purpose of suggesting to farmers ways of increasing their income."

"Prof. J.C. Hackleman, of the University of Illinois, voiced the point of view I found all through the Corn Belt states when he remarked to me a few weeks ago: 'The soy is one crop we are trying to raise with machinery which belongs to other crops. I am not sure that is going to be a success very much longer. We have passed the experimental stage and are ready to get into commercial production of beans. This is going to mean special machinery.

"'We have special machinery for every other crop... The fellow with ten to twenty acres of beans is going to cut the crop for hay. The grain crop is always going to be grown in large acreage. It will have to be in order to be economical.'"

The most economical way of harvesting soy beans is with a picker, which was developed in eastern North Carolina years ago. "The economy of this outfit, as compared to harvesting with a binder, a self-rake reaper or with a mower, was brought out several years ago in a study of a large group of soy-bean farms made by A.G. Smith of the old Office of Farm Management. This study, summarized, shows that it took .84 man days and .55 horse days to harvest an acre of beans by the picker plan. Using a grain binder and thresher, as is now the usual Corn Belt practice, it took .99 man days and .77 horse days to complete an acre. This is an increase of approximately 18 per cent man labor and 40 per cent horse labor over the picker scheme. In this study the self-rake reaper required 1.4 man days and 1.29 horse days to the acre. Harvesting with mower and thresher, the man labor was 1.02 days an acre, and horse labor .60." Also the picker, which picks the beans directly from the stalk, gives a much higher quality of beans than any other harvesting plan. Moreover the beans are not cracked in harvesting as is sometimes the case when the beans are threshed.

Harvey Clapp in Accotink, Virginia, raises 100 acres of soys. "His farm is entirely motorized." Mr. Clapp built his own planter, cultivator, and harvester. While the binder has proved the most popular harvesting implement, a great many farmers still use the old-style self-rake reaper. Mowers with a buncher attachment are also in use on many farms. Beans harvested with the binder are set up in shocks without caps.

"Wherever corn is a crop of importance, the soy is creeping in, for forage and for hogging down. Soy beans and corn supplemented by a mineral mixture puts the same rapid growth on hogs as corn and tankage. And at the Indiana station they are crying from the housetops the results of a study which seems to show that twelve acres of beans and forty acres of corn will feed just as many hogs as eighty acres of corn alone. And they are claiming out in Ohio and Indiana that clover-sick land after a round of soy beans can be put back to clover and will grow a splendid crop.

"All these findings seem to mean a year by year increase in seed demand and a good price for the man with seed beans for sale."

A large photo shows a grain drill following a reaper harvesting the soys. Each machine is pulled by a team of horses. Broadcast beans leave the land in good shape for wheat seeding.

Note: This is the earliest document seen (March 2007) that mentions Harvey Clapp of Virginia; he developed an early soybean harvester, considered a forerunner of the combine.

450. 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.

451. Brown, F.A. 1923. Sudan grass and soy beans for hay crops (Letter to the editor). *Rural New-Yorker* 82(4768):1390. Nov. 10.

• ***Summary:*** This letter begins: "North Carolina Crop.–With this I am sending you a photograph of a field of Sudan grass and Soy beans on the farm of Mr. E.B. Foushee, fast outside of Roxboro, N.C. The crop was planted on August 5 and the picture was taken on October 2, the day it was cut. Mr. Foushee, who is shown standing in the grass, is 6 ft. tall. The wind was blowing hard, so the grass does not show up to its full height. Estimated yield, four to five tons of dry hay per acre, and a hay that is superior to Timothy in feeding value, and better liked by the stock.

"Does not this answer your question of a few weeks ago as to what hay crop can be grown as a second crop? The Sudan was just heading and the beans setting. Both would have made far more and even better hay if left for two or three weeks longer, but the weather was perfect for hay drying, and Mr. Foushee. was afraid to wait. If frost holds off till the middle of November, as usual, there will be another light cutting of the grass or a lot of mighty good pasture."

A large (9 by 5 inches) photo shows two men and a horse in a field of Sudan grass and soy beans on the farm of Mr. E.B. Foushee, just outside of Roxboro, North Carolina. One of the men, Mr. Foushee, is 6 feet tall; the Sudan grass is about as tall as he is. Address: North Carolina.

452. *Weather, Crops, and Markets* (*USDA*). 1923. Soy bean production equal to last year. 4(20):537. Nov. 17.

• ***Summary:*** Figures are given in a table for the following states: Delaware, Virginia, North Carolina, South Carolina, Tennessee, Alabama, Georgia, Indiana, Illinois. The figures are: 1923 acreage for seed and yield per acre compared with 1922. Prices offered to growers for thresher-run seed (per 100 pounds) for 3 Nov. 1920, 12 Nov. 1921, 23 Oct. 1922, and 24 Oct. 1923. The 24 Oct. 1923 figures range from $2.00 in Illinois and Indiana to $3.15 in Delaware. States expecting a large acreage increase are Indiana (+25%), Delaware (+20%), and South Carolina (+20%).

"A larger percentage of the total production than ever before will be made up of the early maturing varieties because of the indicated increased production in Delaware and the Corn Belt States." A large increase in the available quantity of the Manchu variety is expected; it "has proved to be highly adapted for growing over a wide area in the Central West.

"The supply of Mammoth Yellows probably will be slightly less than last year because of the 5% smaller production reported for North Carolina."

453. *Weather, Crops, and Markets* (*USDA*). 1923. Soy bean prices and movement. 4(26):701. Dec. 29.

• ***Summary:*** Soybean prices for 15 Dec. 1921, 12 Dec. 1922, 20 Nov. 1923, and 17 Dec. 1923, and percentage of each crop sold by that date are given in a table for the following states: Delaware, North Carolina, Tennessee, Illinois, Indiana, Ohio, and Missouri. Prices currently offered to growers per 100 pounds range from $2.60 in Illinois to $3.75 in Delaware. Address: Washington, DC.

454. *Weather, Crops, and Markets* (*USDA*). 1923. Estimated farm price of important products, Nov. 15, 1922 and 1923. 4(26):685. Dec. 29.

• ***Summary:*** A table shows the estimated farm price of soy beans per bushel nationwide was $2.06 in 1922 and $2.11 in 1923. Values are also given for 18 states in 1922 and 12 states in 1923 (Virginia, North Carolina, South Carolina, Georgia, Ohio, Indiana, Illinois, Wisconsin, Missouri, Kentucky, Tennessee, Alabama).

455. Capone, Giorgio; Grinenco, Ivan; Costa, Mario. eds. 1923. Oleaginous products and vegetable oils: Production and trade. Rome, Italy: International Institute of Agriculture, Bureau of Statistics. 545 p. See p. XX-XXI, 140-41, 144-47, 442-43, 480-81. No index. 24 cm. [Eng]

• ***Summary:*** In Sept. 1921 the IIA published a monograph on this subject in French. By popular demand, this English edition was published 2 years later. Contents: Introduction (p. VII-XXXII): General scope, general survey of the 9 principal crops (including soya beans) plus others, final points of consideration. Part I (p. 1-402) is an analysis by region, and within each region by country, countries of vegetable oil production and trade. Regions are Europe, North and Central America, South America, Asia, Africa, and Oceania.

Major countries: Denmark (p. 20-23; oil production 1916-1921, oil imports 1910-1922). France (p. 26-34). Germany (p. 35-40). Great Britain and Ireland (p. 41-43). Netherlands (p. 65-68). Norway (p. 69-70). Russia–European and Asiatic (p. 84-93). Sweden (p. 100-03). Canada (p. 111-15). United States (p. 131-47). Argentina (p. 179-85;

no soy). Brazil (p. 187-90; no soy). Ceylon (p. 218-21; no soy). China (p. 222-26). Dutch East Indies (Java & Madura, Other islands; p. 229-33). Formosa (p. 238-39; gives soybean production and acreage from 1900 to 1921). Japan (p. 259-64; gives Japanese soybean production and acreage from 1877 to 1921, and production of soya oil from 1909 to 1920. Japan's leading oil produced domestically from 1895 was rapeseed oil). Korea (Chosen, p. 265-67). Kwantung Leased Territory (p. 268). Hawaii (p. 388; Hawaii produced 17 long tons of soybeans on 20 acres in 1909, and 10 tons on 15 acres in 1919).

Part II (p. 403-506) is recapitulatory tables for both soya beans and soya bean oil: Area and production by crop (1909-1922), Trade by crop (1909-1921). Cottonseed (p. 410-11). Linseed (p. 414-15). Soya beans (p. 442-43, 480-81).

Pages XX-XXI state: "In the absence of data from China, the chief grower of soya beans, it is impossible to make even the roughest estimate of the world's yield of this product. Among the few countries of any moment as producers of soya beans, we may mention: Japan, where this crop increased rapidly between 1877 and 1887 and then became nearly stationary at about 500,000 long tons [2,240 lb per long ton] per annum, although in the last few years some further increase has been noticeable; Korea, with a continuous increase in area and yield, from 1910 onwards, (the crop of 1920 was about 600,000 long tons); and United States, where from 1909 to 1921, the area under soya beans increased from about 1,600 to 186,000 acres with a production of about 70 thousand long tons. It may be observed that the increase of this crop during the last twenty years is supplemented by attempts already made and in progress for its introduction into countries with a favourable climate, especially into Africa."

"Exports are exclusively from China and Korea. The Chinese exports have increased very greatly during the last thirty years. Before 1890 they were insignificant, in 1901 they had reached a total of more than 100 thousand tons, and during the decade from 1909 to 1918 they averaged about 600 thousand tons and reached their maximum in 1919 with about 1 million, declining in the two following years to 600 thousand long tons.

"With regard to Korea although we have not a complete series of data for the period 1909-1918, the ever-increasing importance of its exports of soya beans may be emphasized; during the last few years these have been double the average of the years 1909-1911, and in 1921 they already equalled one third of the Chinese exports."

"The chief importers, in Europe are Great Britain, Denmark, and Holland, and, in Asia, Japan, and the Dutch East Indies. To these must also be added Russia-in-Asia as the Chinese Customs register large exports destined for the Russian Pacific ports."

"England, which at one time constituted the greatest market for the soya bean, has continually reduced its imports: these were 420 thousand long tons in 1910, 76 thousand in 1913, and about 60 thousand in the two years 1921-1922... In the Asiatic market, represented in this case by Japan and the Dutch East Indies, imports have continuously increased especially in the last few years of the period under consideration.

"The trade figures of *soya oil* (see tables on pages 480 and 481) indicate that China is the principal exporter, having quadrupled its shipment during the period from 1914 to 1919, attaining in the latter year a total of over 140 thousand long tons."

Other countries unrelated to soy (some no longer in existence): Europe: Esthonia [Estonia], Luxemburg [Luxembourg], Serb-Croat-Slovene State. North and Central America: British Honduras [named Belize after about 1975]. South America: Curaçao [Curacao], Falkland Islands, British Guiana, French Guiana. Asia: Aden [became part of independent Yemen in 1967], Andaman and Nicobar Islands, Bahrein Islands [Bahrain], Borneo (British Protectorates), Dutch East Indies, Federated Malay States, Formosa, French Settlements in India, Indo-China, Persia, Portuguese India [annexed in 1962 by India; became Union territory of Goa, Daman, and Diu], Protected Malay States, Russia, Japanese Saghalin (Karafuto), Siam [later Thailand], Straits Settlements [later Singapore], Timor and Cambing, Wei-Hai-Wei [Weihai, Wei-hai, or Weihaiwei; seaport in northeast Shandong province, northeast China]. Oceania: Australia, Fiji Islands, French Settlements in Oceania, Gilbert and Ellice Islands, Hawaii, Island of Guam, New Caledonia, New Hebrides, Papua, Samoan Islands (American Samoa), Solomon Islands, Territory of New Guinea (*Later German New Guinea*), Tonga, Western Samoa (*Formerly German Samoa*).

Note 1. This document gives a clear definition of the geographical region named "Oceania."

Note 2. A "quintal" is probably 100 kg. Address: 1. Doctor of Economics; 2. Doctor of Agronomics. Both: IIA, Rome, Italy.

456. Capone, Giorgio; Grinenco, Ivan. 1923. United States (Document part). In: G. Capone & I. Grinenco, eds. 1923. Oleaginous Products and Vegetable Oils: Production and Trade. Rome, Italy: International Institute of Agriculture, Bureau of Statistics. 545 p. See p. 131-35, 140-41, 144-47. [Eng]

• ***Summary:*** Crop production: Tables (p. 131-32) show the area under and production of oil-yielding crops in the USA from 1849 to 1922. In 1849 and 1859 census data, only linseed production data was recorded: 14,050 long tons (1 long ton = 2,240 lb) in 1849 and 14,175 tons in 1859. Though small amounts of flax were grown for fiber (to make linen) prior to 1900, the plant has always been cultivated mainly for its seed–linseed. But starting in 1869-72 we see that cottonseed was by far the leading U.S. oil-yielding crop,

with 1,176,465 tons produced, compared to only 43,250 tons for linseed. The earliest cottonseed oil press was established in 1834, but the process was not widely adopted in the U.S. before 1870. Cottonseed remained king; in 1922 more than ten times as much cottonseed was produced as linseed–the second largest oil crop. Production of hemp (*Cannabis*) is first shown in 1889 with 24,881 acres that year, decreasing to 7,647 acres in 1909; the plant was grown exclusively for its fiber, and mainly in Kentucky. The decrease in cultivation is due mainly to the increased use of jute. Likewise, production of groundnuts (peanuts) is first shown in 1889, with 35,236 tons grown on 203,946 acres that year, rising to 190,663 tons in 1909. In 1917 groundnuts passed linseed to become America's second largest oil-yielding crop.

Production of soya beans is first shown in 1917, when 57,007 tons were produced on 154,000 acres. Production and acreage remained approximately constant until 1920, then rose to 70,291 tons on 186,000 acres in 1921.

Pages 140-41 note of the USA: "Although known in the United States as far back as 1804, it was not until a few years ago that this plant became any of great economic importance. Soya made its appearance in the first place as a fodder-plant, then, be it due to either the demand for beans for sowing purposes or for oil-extraction and for the manufacture of other products, the extension of soya cultivation received a strong impulse.

"Statistical data concerning this crop have been published regularly since 1917. The census report for 1909 gives the cultivated area under soya in that year as 1,629 acres; during the years from 1917 to 1921, the land devoted to soya cultivation for the production of beans covered more than 160,000 acres.

The most important growing centres for this crop are the three States of North Carolina, Virginia, and Mississippi, where is there cultivated, altogether, nearly 75% of the total area of land under this crop in the United States.

"In 1910, soya beans imported from Manchuria were utilized for the extraction of oil in the United States for the first time. In 1915, home grown beans, too, were used. This industry developed rapidly owing to the fact that the machinery plant already in use for the extraction of cottonseed and linseed oils, were easily adapted for compressing soya beans. But, since 1919, the production of soya oil has lost the importance it held during the war."

Production of Vegetable Oils in the United States: A table (p. 144) shows that in 1912, America's leading oils (made from home-grown or imported seeds) were cottonseed oil (crude; 640,763 tons), linseed oil (162,769 tons), corn oil (32,512 tons), and coconut oil (14,164 tons). Figures for soya oil were first recorded in 1914 (1,234 tons), increasing to 4,428 tons in 1916, then 18,782 tons in 1917, and 35,650 tons in 1918. No statistics for soya oil are given for the years 1919 to 1921. In 1918 soya oil was the fifth largest oil produced in the USA, after cottonseed, linseed, coconut (in 1899 in Florida 48,664 coconut palms were growing), maize and groundnut oils. Other interesting oils shown in this table include: Palm oil (peak of 3,848 tons produced in 1916). Mustard oil (5709 tons in 1918). Olive oil (652 tons in 1916; Olive culture is concentrated almost entirely in California; the olive planted in 1769 in San Diego was first utilized for oil at Santa Barbara in 1872). Coquito (from the palm tree *Jubaea spectabilis;* 358 tons in 1916). Grapeseed oil (336 tons in 1916). Sesamum oil (136 tons in 1917). Rapeseed oil (552 tons in 1919). Sheanut [Shea-nut oil, more commonly called shea butter from the tropical shea tree *Butyrospermum parkii*] (1,774 tons in 1916). Sunflower oil (2 tons in 1917).

A table (p. 145) titled "Total production of fats and oils in the United States, shows that during the period 1912 to 1921 vegetable oils comprised approximately 34-42% of the fats and oils produced in the USA. Animal fats and butter were the two main fats. Production of animal fats (incl. lard) increased by 69% during this period, while production of butter decreased by 31%. Total production remained unchanged at about 2,189,463 tons.

Imports of vegetable oils into the USA: A table (p. 146) shows that in 1909 the main oils imported were palm and palm kernel oil (31,034 tons), coconut oil (19,505 tons), and olive oil (13,733 tons). Statistics for soya oil imports were first recorded in 1911, when 5,039 tons were imported, increasing to 11,142 tons in 1912, then rising dramatically to 64,911 tons in 1916 (when it became America's largest imported oil), 118,263 tons in 1917, and a record 149,983 tons in 1918. Thereafter imports of soya oil fell to 87,409 tons in 1919, and only 7,715 tons in 1921. Imports of wood oil increased from 1911 to 1922.

Exports of oleaginous products: In 1909 the U.S. exported 19,315 tons of cottonseed, 2,643 tons of groundnuts, and 1,598 tons of linseed. In 1922 groundnuts were the leading export (5,635 tons), followed by cottonseed (1,624 tons) and linseed (60 tons). No soya bean exports are shown from 1909 to 1922.

Exports of vegetable oils: In 1909 the U.S. exported huge amounts of cottonseed oil (152,382 tons), followed by corn oil (9465 tons) and linseed oil (891 tons). Statistics for soya oil exports were first recorded in 1919, when 12,372 tons were exported during the last half of the year. This figure increased to 19,424 tons in 1920, but had dropped to 1,097 tons by 1922.

Soya oil was also re-exported (this is, imported then exported): Re-exports rose from 20 tons in 1911 to 1,775 tons in 1917, to a peak of 7,961 tons in 1919, falling to only 228 tons in 1921.

Note: In 1912, cottonseed oil was by far the leading vegetable oil consumed in the USA at 481,876 long tons; this was 22.3 *times* as much as consumption of olive oil. Address: 1. Doctor of Economics; 2. Doctor of Agronomics. Both: IIA, Rome, Italy.

457. Gardner, Henry A. 1923. Examination of commercial American soya bean oil. *Institute of Paint and Varnish Research, Educational Bureau, Scientific Section, Proceedings.* p. 117-18. For the year 1923. [1 ref]
• ***Summary:*** This is a reprint of Circular 165 by the same author with the same title published in Jan. 1923 by the *Paint Manufacturers' Association of the U.S., Educational Bureau, Science Section* (p. 117-18). Address: Philadelphia, Pennsylvania.

458. Lehman, Samuel George. 1923. Pod and stem blight of soy bean. PhD thesis, Washington University, St. Louis, Missouri. Henry Shaw School of Botany. 80 leaves. In: Library of Congress. Catalog Div. A List of American Doctoral Dissertations Printed in 1912-1932. 1923. [28 ref]
• ***Summary:*** This early and important thesis was published as: Lehman, Samuel G. 1923. "Pod and stem blight of the soy bean." *Annals of the Missouri Botanical Garden* 10(2):111-69. April.

George Samuel Lehman was born in 1887. Address: Washington Univ., St. Louis, Missouri.

459. *SoyaScan Notes.* 1923. Early history of soybean crushing, including solvent extraction, in the USA (Overview). Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** The first documented crushing of soybeans in the USA to obtain oil and meal took place in 1911 (probably not in 1910 as some accounts say) at Seattle, Washington. The soybeans were imported from Manchuria by the Albers Brothers Milling Co. and sold to Herman Meyer, who operated a small hydraulic press in Seattle. His establishment was later named Pacific Oil Mills.

The second U.S. crusher, and the first to crush American-grown soybeans, was the Elizabeth City Oil and Fertilizer Co. in Elizabeth City, North Carolina; ordinarily a cottonseed crusher, they began crushing soybeans on 15 Dec. 1915. At that time, North Carolina was America's leading soybean producing state. By 1916 seven cottonseed mills in North Carolina were crushing soybeans.

Soybeans grown in the Corn Belt were first crushed for oil and meal in 1919 (probably not in 1917 or 1918 as one account says) by the Chicago Heights Oil Manufacturing Co. in Chicago Heights, Illinois (located just south of Chicago). The plant, operated by George Brett and I. Clark Bradley, primarily crushed linseed for oil, but it also crushed soybeans, corn germ and mustard seed. For the first few years the soybeans were crushed using screw presses (expellers) which were generally used for crushing corn germs, but by 1922 they were using hydraulic presses. In Aug. 1923 the company went out of business for lack of soybeans. In 1924 Funk Bros. Seed Co. of Bloomington, Illinois, bought the Chicago Heights plant (Eisenschiml 1929, *American Paint Journal.* March 18. p. 22-30; *Soybean Digest,* Sept. 1944, p. 18-19 and May 1945, p. 15).

The A.E. Staley Manufacturing Co. in Decatur, Illinois, first began crushing soybeans on 30 Sept. 1922. Staley was the first company to construct a plant solely for the purpose of crushing soybeans, the first to crush only soybeans in a U.S. plant, and the first to crush only domestically-grown soybeans in a U.S. plant. Staley was also the only one of the early U.S. soybean crushers that survived under the same ownership for more than several years. Although Staley operated at a loss from 1922 to 1924 due to a shortage of soybeans, in 1925 an upswing began and from that year until 1957 Staley was America's leading soybean crusher (Forrestal 1982, p. 60-66).

In Aug. 1923 the Piatt County Cooperative Soy Bean Company (soon renamed the Monticello Co-operative Soybean Products Co.) in Monticello, Illinois became the first company in the U.S. to process soybeans using solvent extraction. The plant was scheduled to open for business on 5 Sept. 1923. They used a batch extraction process with benzol as a solvent. The plant was shut down in about 1924-26 (*Orange Judd Farmer.* 1923. July 15, p. 375; *Journal of the American Oil Chemists' Society.* 1977. March. p. 202A).

The first continuous solvent extraction of soybeans was done by the Eastern Cotton Oil Co. in Norfolk, Virginia, starting in 1924, and using a Bollmann extractor imported from Germany. The plant closed in 1925, being unprofitable (W.H. Goss. 1941. *Chemical and Metallurgical Engineering.* April. p. 80; *Journal of the American Oil Chemists' Society.* 1977. March. p. 202A). As early as 1926 the William O. Goodrich Company (acquired by the Archer-Daniels-Midland Co. [ADM] in 1928) had been experimenting with solvent extraction of soybean and other vegetable seeds using a Scott batch extraction system.

In 1933 Robert Boyer and coworkers at the Ford Motor Company developed the Ford Extractor using hexane as a solvent. By 1934 it processed 6 tons of soybeans a day using a screw inside of a metal tube. It was probably the first to use hexane as a solvent. They had a working extractor in Ford's Industrialized Barn at the 1934 World's Fair in Chicago.

ADM and The Glidden Co. initiated large-scale solvent extraction of soybeans in the USA (Chicago, Illinois) in 1934. ADM purchased from Germany a 150-ton-per day capacity Hildebrandt continuous-flow, counter-current (U-tube) hexane solvent extractor. It began operation in March 1934 on Blackhawk Street in Chicago. It was America's first successful continuous solvent extractor; at the time it was also America's largest and most modern soybean crushing system, and the first to use hexane as a solvent with soybeans. The Glidden Co. purchased an identical Hildebrandt solvent extraction plant from Germany and also installed it in Chicago. It began operation in about Nov. 1934.

In 1937 Central Soya purchased from Germany an even larger continuous solvent unit, a 275-ton-per-day

capacity Hansa Muehle extractor, which began operation in November 1937 at Decatur, Indiana.

460. Barr, J.E. 1924. Seedsmen and the soybean industry. *Seed World* 15(2):18-19. Jan. 18.

• ***Summary:*** Contents: Introduction. Excellent seed demand. Varieties for the Cotton Belt (Biloxi, Otootan, Laredo, Mammoth Yellow, Wilson, Midwest, Ito San). Future looks bright. Seedsmen should profit. Pure and adapted varieties.

"Seedsmen have played an important part in the development of the soybean industry, which only five years ago was in its infancy. At that time production was more or less confined to the state of North Carolina." "This was, and still is, made up almost entirely of Mammoth Yellows." "Now it has spread north, south and west, with over 3,000,000 acres planted in various parts of the United States."

"State extension agents helped to put the industry over in a big way. They saw the need for soybeans to grow on lands where clover would not grow, to take the place of oats where this crop was not profitable, to be used as a legume catch crop instead of millets, etc., and to provide a better balanced ration for hogging down in corn. As a result the crop has become firmly established in the farm rotation. It is no longer an experiment. Some states this year have a half million or more acres. And the total for the United States probably runs around 3,000,000 acres for hogging down in corn, for hay, silage, etc., and 200,000 acres harvested for seed."

The heart of the soybean industry is pure and adapted varieties. "The value of soybean seed lies in the varietal purity and adaptability of a variety for planting in a particular section and for the specific purpose desired."

"There may be a sharp distinction between the market price of a given variety of soybeans and its agricultural value. Regardless of the market price of a variety it has little value agriculturally until it is placed where it can be used in the section and for the purpose for which it is best suited. The soybean industry was made possible by the introduction. propagation, and distribution of adapted varieties; and its future depends in a very large measure on how well the varietal purity of these varieties is safeguarded and on the efforts made to supply seed of the varieties best adapted to local conditions." Address: Investigator in Marketing Seeds, USDA.

461. *Crops and Markets* (*USDA*). 1924. Soy beans move freely as prices advance. 1(4):61. Jan. 26.

• ***Summary:*** "Soy beans moved more freely from growers' hands during the period December 17–January 15 than earlier in the season."

"Many growers in the Corn Belt States are selling their soy beans and holding corn and grain because the former is bringing the best price. There is some indication that the supply of seed quality soy beans is not excessive. Such stocks are in strong hands and higher prices are anticipated later as the planting season approaches.

"Prices paid growers advanced 10¢-40¢ in Tennessee and the Corn Belt but remained unchanged in the eastern States. Wilsons in Delaware were selling at \$3.75 per 100 lbs.; Mammoth Yellows in North Carolina at \$3, and in Tennessee at \$3.50; and Manchus and Midwests in the Corn Belt at \$2.90-\$3.15"

A table lists prices offered growers for thresher-run soy beans (per 100 lb) on 12 Dec. 1922, 17 Dec. 1923, and 15 Jan. 1924. Prices for the first two dates (in December) are as follows: Delaware \$2.60, \$3.75; North Carolina \$3.10, \$3.00; Tennessee -, \$3,30; Illinois \$1.95, \$2.60; Indiana \$2.00, \$2.85; Ohio -, \$2.75; Missouri \$3.30, \$3.00.

An estimated 45% of the crop was sold by Jan. 15. "Wilsons in Delaware were selling at \$3.75 per 100 lbs.; Mammoth Yellows in North Carolina at \$3, and in Tennessee at \$3.50; and Manchus and Midwests in the Corn Belt at \$2.90-\$3.15." Address: Washington, DC.

462. *Crops and Markets. Monthly Supplement* (*USDA*). 1924. Annual legumes, 1922 and 1923: Soy beans. 1(Supplement 1):10. Jan.

• ***Summary:*** See next page. This table gives statistics for 19 states. The states with the leading acreage in 1922 were North Carolina (225,000 acres), Illinois (193,000), Tennessee (154,000), and Indiana, Iowa, and Alabama (113,000 each).

The other soybean-growing states in 1922 are Missouri (99,000 acres), Ohio (90,000 acres), Kentucky (65,000 acres), Virginia (63,000 acres), Wisconsin (48,000 acres), Mississippi (43,000 acres), Maryland (18,000 acres), Georgia (12,000 acres), Michigan (12,000 acres). South Carolina (10,000 acres), West Virginia (7,000 acres), Delaware (6,000 acres), Louisiana (3,000 acres).

But in 1923 Illinois became the leader. The figures for that year were Illinois (442,000), Missouri (250,000), North Carolina (240,000), Indiana (199,000), Iowa (170,000), Tennessee (159,000).

The following columns are given in the table: Equivalent solid acreage utilized: Primarily for beans, primarily for hay, primarily for grazing, hogging, etc., total. Beans gathered: Yield per acre from acreage grown primarily for beans or peas, production (from acreage grown primarily for beans, from acreage utilized primarily for other purposes, total). Hay: Yield per acre from acreage primarily for hay, production from acreage primarily for hay. Address: Washington, DC.

463. Brown, F.A. 1924. Sudan grass and beans. *Rural New-Yorker* 83:208. Feb. 9.

• ***Summary:*** "Variety Used.–So many letters have come to Mr. Foushee and myself concerning the Sudan-Soy bean crop described in my article published in *The Rural N.-Y.*

Annual Legumes, 1922 and 1923.

SOY BEANS.

State.	Equivalent solid acreage utilized.[1]								Beans or peas (gathered).[2]										Hay.			
	Primarily for beans or peas.		Primarily for hay.		Primarily for grazing, hogging, etc.		Total.		Yield per acre from acreage grown primarily for beans or peas.		Production. From acreage grown primarily for beans or peas.		Production. From acreage utilized primarily for other purposes.		Production. Total.				Yield per acre from acreage primarily for hay.		Production from acreage primarily for hay.	
	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923			1922	1923	1922	1923
	1,000 acres.	1,000 acres.	1,000 acres.	1,000 acres.	1,000 acres.	1,000 acres.	1,000 acres.	1,000 acres.	1,000 acres.	1,000 acres.	1,000 bush.	1,000 bush.	1,000 bush.	1,000 bush.	1,000 bush.	1,000 bush.			1,000 tons.	1,000 tons.	1,000 tons.	1,000 tons.
Delaware	2	3	3	3	1	1	6	7	14.3	15.4	29	46	......	......	29	46			1.75	1.40	5	4
Maryland	5	7	10	12	3	5	18	24	16.0	17.5	80	122	......	......	80	122			2.00	1.50	20	18
Virginia	13	14	40	48	10	10	63	72	16.0	19.0	208	266	69	89	277	355			1.80	1.80	72	86
West Virginia	1	1	5	5	1	1	7	7	15.0	15.0	15	15	1	1	16	16			1.70	1.70	8	8
North Carolina	100	105	65	70	60	65	225	240	16.0	17.0	1,600	1,785	400	446	2,000	2,231			1.30	1.40	84	98
South Carolina	3	5	4	9	3	7	10	21	11.0	12.0	33	60	10	30	43	90			.90	.90	4	8
Georgia	3	7	7	20	2	5	12	32	12.2	11.0	37	77	29	61	66	138			.93	.80	7	16
Ohio	31	50	30	50	29	28	90	128	15.0	16.0	465	800	......	......	465	800			1.70	1.50	51	75
Indiana	20	40	29	95	64	64	113	199	12.0	14.0	240	560	220	550	460	1,110			1.50	1.40	44	134
Illinois	65	92	70	137	58	213	193	442	12.5	14.0	812	1,288	388	434	1,200	1,722			1.50	1.80	105	247
Michigan	4	6	4	4	4	4	12	14	10.2	11.0	41	66	10	......	51	66			1.32	1.50	5	6
Wisconsin	7	4	11	14	30	30	48	48	11.0	8.0	77	32	......	......	77	32			1.20	1.30	13	18
Iowa	6	10	7	10	100	150	113	170	22.0	17.0	132	170	......	......	132	170			1.40	1.90	10	19
Missouri	15	70	33	68	51	112	99	250	11.0	12.0	165	840	41	95	206	935			1.25	1.40	41	95
Kentucky	6	6	38	38	21	21	65	65	13.0	14.0	78	84	84	94	162	178			1.25	1.45	48	55
Tennessee	6	6	125	130	23	23	154	159	9.0	9.0	54	54	63	63	117	117			1.35	1.35	169	176
Alabama	18	17	60	52	35	37	113	106	8.6	8.5	155	144	83	78	238	222			1.20	1.03	72	54
Mississippi	8	8	19	23	16	14	43	45	12.0	14.5	96	116	96	116	192	232			1.20	1.35	23	31
Louisiana	1	1	1	6	1	1	3	8	12.1	16.0	12	16	9	13	21	29			1.00	1.40	1	8
Total	314	452	561	794	512	791	1,387	2,037	13.78	14.47	4,329	6,541	1,503	2,070	5,832	8,611			1.394	1,455	782	1,155

Nov. 10 that none of us has the time to spare to answer all, so I am giving the details asked for. The seed can be had from most reliable dealers, but buy from reliable ones only, those who guarantee that there will be no Johnson grass seed in the Sudan grass. Soy bean seed from one place is probably as good as from another, if not old. Here we use the Mammoth Yellow bean, mostly. North of Baltimore a little earlier variety may be better. Some varieties yield more seed but less forage than others."

Also discusses: Drilling the seed. Cutting [harvesting]. Annual seeding. Soil requirements of Sudan grass and soy beans. Restoring a farm (with crops {oats and vetch}, manure, and fertilizers such as acid phosphate). Pasturing stock.

Sudan grass, being an annual and a non-legume, will never take the place of clover and alfalfa. Yet either of these latter legumes alone, "or with Soy beans, it is the best temporary hay crop and Summer pasture that is now in use in this country." Address: Person County, North Carolina.

464. McNair, A.D. 1924. Labor requirements of Arkansas crops. *USDA Department Bulletin* No. 1181. 64 p. March 15. See p. 5, 7, 19, 61.

• ***Summary:*** This Bulletin begins: "A farmer knows, in a rough-and-ready way, the labor requirements of the crops he has grown. He knows that cotton requires more labor than corn and that there is a busy season for cotton in the spring and early summer, an idle period in August, and another busy season in the fall in harvesting the crop. This knowledge about crops, like his knowledge of the seasons and rainfall, is of utmost importance in managing the farm, but unless this knowledge is translated into figures and charts it can not be used by others who may be interested in these problems.

"The purpose of this study is to put that knowledge in tangible form for all the crops grown in Arkansas. The figures, however, must be interpreted with reason and judgment, as they can not, in the nature of the case, be anything more than fair averages for a series of years. These labor data are subject to modifications due to weather, character of soil, relative weediness of land, presence of stumps and stones, length of rows, and other factors which will be discussed later..."

Page 5: Table 2, "Assumed crop yields per acre," states that Soy-bean seed gives a yield of 12-15 bushels per acre.

Page 5: Table 3, "Labor requirements on 10 acres of various crops by months" gives requirements for "Beans, Soy, seed" in Ashley County. In March, 3 hours of man labor and 6 hours of horse labor are required. In April, 6 hours of man labor and 12 hours of horse labor are required. In both May and June, 4 hours of man labor and 4 hours of horse labor are required. In September, 4 hours of man labor and 4 hours of horse labor are required. Thus, a total of 21 man hours and 30 horse hours are required to produce soy bean seed.

Page 19: "Soy Beans for Seed: The soy-bean crop is now grown only to a limited extent, but it promises to become much more important. (Fig. 15) Soy beans are raised extensively for hog feed interplanted with corn, but they are

also raised alone for seed and harvested with a machine of the North Carolina type. The seed crop is planted in May and harvested in September. The variety is the Mammoth Yellow. The crop can be planted at a later date, hence the labor may come later than is shown in the chart. If the crop is hogged down there will be no work in harvesting except that of looking after the hogs."

Page 61: Table 4, "Labor requirements for various crops on 1-acre basis," includes entries for peanuts, corn (shocked and shucked), corn silage, cowpea hay, etc. "Soybeans for seed" in Ashley County requires 2.1 man days and 3.0 horse days, not including hauling the crop to market. Address: Farm Management Specialist, Bureau of Agricultural Economics, USDA.

465. *Crops and Markets. Monthly Supplement* (*USDA*). 1924. Comparative stocks, shipments, and prices of soy beans, cowpeas, and velvet beans. 1(Supplement 3):104. March.
• ***Summary:*** Gives statistics for 1922-1924 for the states of Delaware, Virginia, North Carolina, Tennessee, Illinois, Indiana, Ohio, Missouri, Iowa, and others.

Columns show: Number of shippers reporting. Stocks on hand (pounds) Jan. 26, 1924. Shipments of 1923 crop: Up to Jan. 26, 1924, after Jan. 26, 1924. Total shipments: 1923 crop, 1922 crop. Average price per 100 pounds paid growers: 1923 crop, 1922 crop.

The states with the largest total shipments during 1923 were North Carolina 5,931,000 lb, Illinois 2,419,000 lb, Indiana 1,762,355 lb, and Missouri 1,198,000 lb.

466. Lehman, Samuel G.; Wolf, Frederick A. 1924. A new downy mildew on soybeans. *J. of the Elisha Mitchell Scientific Society* 39(3&4):164-69. April.
• ***Summary:*** "Summary: A leafspot disease of soybean caused by one of the downy mildews has been observed in several localities within the state. The disease may be recognized by the presence of indefinite chlorotic areas which change to grayish brown irregular lesions with well defined dark brown borders. A dense grayish coating of conidiophores may cover the lower surface of the lesions. The casual organism is a species of *Peronospora,* which when compared morphologically with previously described species on legumes is manifestly distinct. It is accordingly described herein as a new species and is given the mane *Peronospora sojae."*

Note: This is the first detailed report on occurrence of the new downy mildew disease (*Peronospora sojae* = P. manshurica) in the United States. Address: Raleigh, North Carolina.

467. *Crops and Markets. Monthly Supplement* (*USDA*). 1924. Condition of cowpeas and soy beans in southern states, June 1. 1(Supplement 6):172. June.
• ***Summary:*** Gives statistics for the percentage of normal (where 100 = normal) for 1923 and 1924 for the states of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, and Arkansas. The average for soybeans was 84.9 in 1923 and 83.6 in 1924. That means crop development is delayed on this date.

468. Wolf, Frederick A. 1924. Bacterial pustule of soybean. *J. of Agricultural Research* 29(2):57-68. July 15. [17 ref]
• ***Summary:*** This disease of the soybean is caused by a bacterium to which the name *Bacterium* [*Xanthomonas*] *phaseoli* var. *sojense* was first given by Miss Florence Hedges. She isolated the disease from specimens sent from Texas in 1917. "It forms yellowish colonies on nutrient agar, is flagellate, is unable to utilize any of the" more common carbohydrates except starch, and its group number is 5322-31135-1333 of American Bacteriological Chart of 1920. "The parasite gains entrance through the stomata and passes thence into the intercellular spaces. The pustules arise by hypertrophic changes of any of the parenchymatous tissues." They are confined to the leaves of the plant. This disease appears to be prevalent in North Carolina. It is also known to occur in Texas, Louisiana, South Carolina, Virginia, and Kansas. Address: North Carolina Agric. Exp. Station.

469. *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.

470. Cullison, W.V. 1924. The soy bean and commerce (Continued–Document part III). *Staley Journal* (*Decatur, Illinois*) 8(4):5-10. Oct.

• ***Summary:*** (Continued): "Soy Beans and the Farmer: Soy beans as a crop can be grown under very much the same climatic conditions as corn or cotton. The soy bean is less susceptible to frost than corn. Light frosts have little effect on the plants when young or even when nearly mature. The soy bean resists drought better and is less sensitive to an excess of moisture than corn. A planter in North Carolina, when asked why so many soy beans were raised in that state, replied, 'They thrive well in a season of drought, and in a wet season their growth and production is not reduced.' North Carolina has led in the acreage planted in beans until 1923, when Illinois gained first place. Although the yield in bushels may be from 15 to 20 per cent less than the yield of corn, a selling price of 20 cents per bushel over corn would make them a profitable crop, especially when the beneficial value of the soybean to the soil is considered, which is of vital importance to the farmer, and will continue to be more so as the fertility of the land is decreased by continual cropping. The acreage planted in soy beans has increased from year to year, accompanied by a similar increase in the number of inquiries concerning different points relative to the possibilities of the bean and the utilization of the products derived from it. Most of the Agricultural Experiment Stations of the middle west [Midwest] and south have issued bulletins on the possibilities of growing soy beans in their respective states.

"Growing the soy bean introduces no special difficulties. Unsatisfactory results are usually due to the lack of inoculation or else to the employment of a variety not suited to the season or locality. Harvesting the beans by machinery is not a difficult problem. Several types of machinery have been devised for threshing soy bean seeds, which reduce greatly the cost of production. The higher yield of seed obtained and the planting and harvesting of the crop by machinery should enable the American planter to compete with the Manchurian product.

"J.E. Barr, investigator in Marketing Seeds, U.S. Department of Agriculture, writing on the subject, 'Soy Beans Mean More Cash,' says: 'The value of soy beans depends upon the quality of the product and quality means sound, clean sock, free from splits, damaged and discolored beans, and foreign matter, and of low moisture content.' Discussing the subject further he says, 'Mills are more concerned at present with efforts to obtain a continuous supply than they are with fears of over-production. With sufficient soy beans available to keep the machinery in operation continually, the cost of manufacturing may be reduced, which should be reflected either in higher prices to growers for beans or lower prices for the meal, which represents a greater percentage of the total value of the products manufactured from soy beans and which must be consumed by dairy and other farmers.'

"Given care, soy bean seed can be stored for long periods without loss. The soy bean is less effected by destructive diseases and insects than are most other forage or food plants. In the last ten years the soy bean has rapidly come to the front as one of our important crops and is likely in the next ten years to go ahead of oats in acreage.

"The demand and market for soy bean products, especially the oil, is here and now. Whether or not this demand will be filled by American grown beans, or by beans and oil imported from Manchuria depends upon the American farmer.

"There is no doubt but what many new uses will be found for soy bean products. Even the Japanese have not exhausted their ingenuity in this field. A Japanese scientist, Sato, has invented a new plastic which he has called 'Satolite.' This material is made from soy bean meal and is used to make combs, buttons, and anything that is made from hard rubber or celluloid.

"Tried and proved by 5000 years of service, the soy bean and its products are ready to be tried and proved again by giving profit to the grower and manufacturer and service to the consumer–the ultimate test of commerce."

A map (p. 6) of the United States shows "localities where the soy bean is being successfully grown." Almost all soybeans in the USA are grown east of the 100th meridian.

A flow sheet (p. 7) shows the "fundamental steps in the manufacture of soy bean and meal and some of their chief uses. The oil is used for soap, paint, linoleum and edible products (butter substitutes, oil for packing sardines, and salad oil). The meal is used for cattle feed, fertilizer, [defatted] flour, and vegetable milk.

A photo (p. 8) shows "Machines which extract soy bean oil" (a group of Expellers at the A.E. Staley Mfg. Co.). Address: Research Chemist.

471. *Crops and Markets* (*USDA*). 1924. Soy bean production much less than last year: Soy bean acreage, yield, and prices. 2(19):293. Nov. 8.

• ***Summary:*** "The 1924 commercial production of soy beans is expected to be 20% less than last year, according to reports received by the Department of Agriculture. The total acreage harvested for seed is nearly equal to last year, but

in practically all the States the yield per acre was reduced, largely because of unfavorable weather conditions."

Delaware is a "heavy producer of Wilsons." "The small production of Mammoth Yellows in North Carolina may be offset by larger supplies from adjoining states..."

A table gives statistics for Delaware, Maryland, Virginia, North Carolina, South Carolina, Tennessee, Georgia, Indiana, Illinois, and Missouri. For each state is given: (1) 1924 acreage for seed compared with 1923 (%). (2) 1924 yield per acre compared with 1923 (%). (3) Prices offered growers for thresher-run soy beans (per 100 lbs.). (3a) Nov. 12, 1921. Ranges from $3.05 in Tennessee down to $2.15 in Indiana. (3b) Oct. 23, 1922. Ranges from $2.55 in Tennessee down to $1.75 in Illinois. (3c) Oct. 24, 1923. Ranges from $3.15 in Delaware down to $2.00 in Indiana and Illinois. (3d) Oct. 22, 1924. Ranges from $5.00 in Maryland down to $2.25 in Illinois. Address: Washington, DC.

472. *Crops and Markets* (*USDA*). 1924. Soy bean prices and movement. 2(22):341. Nov. 29.
• ***Summary:*** Gives statistics for Delaware, Maryland, Virginia, North Carolina, South Carolina, Tennessee, Georgia, Indiana, Illinois, and Missouri. For each state is given: (1) Prices offered growers for thresher-run soy beans per 100 lbs on Nov. 20 of 1922, 1923, and 1924. (2) Percentage of crop sold by Nov. 20 of 1922, 1923, and 1924. Address: Washington, DC.

473. Cullison, W.V. 1924. The soy bean and commerce. *Oil Miller* 20(3):17-18, 20-22. Nov. Reprinted from The Staley Journal.
• ***Summary:*** Note: This is acknowledged as a reprint of an article by the same author with the same title first published in the *Staley Journal* (Decatur, Illinois) in Oct. 1924, p. 5-10. Address: Research Chemist, A.E. Staley Mfg. Co., Decatur, Illinois.

474. *Crops and Markets* (*USDA*). 1924. Soybean movement slightly above normal: Soy-bean prices and movement by states. 2(26):405. Dec. 27.
• ***Summary:*** A table gives prices offered growers per 100 lbs. for thresher-run soy beans for 4 dates from 12 Dec. 1922 to 16 Dec. 1924, and the percentage of the crop sold by each of these 4 dates in Delaware, Maryland, Virginia, North Carolina, South Carolina, Tennessee, Illinois, Indiana, Ohio, and Missouri. Address: Washington, DC.

475. *Bean-Bag* (*The*) (*Lansing, Michigan*). 1924. Big increase in soya bean acreage. 7(7):14. Dec.
• ***Summary:*** "The acreage of soya beans grown for the grain in the northern states, where the crop is rapidly gaining in favor, as increased about 25 per cent this year according to the Federal Crop Reporting Board. The total United States acreage grown for the beans rather than for forage this year is estimated at 534,000 acres compared with 452,000 acres last year."

The following states showed the following percentage increases in the acreage grown for grain / beans: Missouri 50%. Alabama 40%. Iowa 40%. Indiana 25%. Michigan 25%. Illinois 20%. Ohio 18%. Kentucky 10%. Tennessee 10%. But a reduction of 6% for grain was shown in North Carolina, which is the leading U.S. state producing this crop.

476. Wolf, F.A.; Lehman, S.G. 1924. Report of division of plant pathology. *North Carolina Agricultural Experiment Station, Annual Report* 47:82-85. [1 ref]
• ***Summary:*** The long section titled "Soybean diseases" (p. 82-83) states: "Work on certain soybean diseases was begun at this station eight years ago and as a result several of the more important maladies of this crop are now well known."

The soybean in North Carolina was subject to at least 12 diseases, of which about half were constantly recurring and of major importance. Soybean mildew [*Peronospora sojae* (=*P. manshurica*)] has been shown to be distinct from clover mildew [*P. trifoliorum*]. Anthracnose of soybeans [*Colletotrichum glycineum* (=*C. dematium f. truncata*)], which is the previous report was believed to be due to Glomerella cingulata, has been shown to be distinct. "The results of investigation on bacterial pustule mentioned in the report of the previous year have been submitted for publication." "The root rot disease due to Pythium de Baryanum" [Soybean root rot (Pythium debaryanum?)] was recorded for the first time. "Little that is new has been added during the year to the data on brown spot disease, Septoria glycines." "Work is in progress on the root rot disease with which Sclerotium bataticola is associated." Address: Div. of Plant Pathology.

477. *Crops and Markets* (*USDA*). 1925. Soy beans selling freely in East. 3(4):61. Jan. 24.
• ***Summary:*** "The movement of soy beans from growers' hands has been below that of last year in all producing sections except North Carolina. In the latter section reports to the United States Department of Agriculture indicate that 65% of the crop has been sold by growers up to January 14, compared with 35% up to a similar date last year."

A table titled "Soy bean price and movement by states" gives statistics for Delaware, Maryland, Virginia, North Carolina, South Carolina, Tennessee, Illinois, Indiana, Ohio, and Missouri. For each state it gives: (1) Prices offered growers for thresher-run soy beans, per 10 lbs. on Jan. 18, 1924; Dec. 16, 1924; Jan. 14, 1925. (2) Percentage of each crop sold by Jan. 18, 1924; Dec. 16, 1924; Jan. 14, 1925. Address: Washington, DC.

478. *Crops and Markets. Monthly Supplement* (*USDA*). 1925. Comparative stocks, shipments, and prices of soy beans, cowpeas, and velvet beans (Compiled from seed

shippers' reports). 2(Supplement 3):99. March.
• ***Summary:*** Gives statistics for 1925 and 1926 for the states of Delaware, Virginia, North Carolina, South Carolina, Georgia, Illinois, Indiana, Ohio, Iowa, Missouri, and other districts.

479. 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.

480. Cardwell, G.A. 1925. Why not soybeans? *Farming–The Business Magazine* 23(1):8-9. April.
• ***Summary:*** Discusses the merits of the soybean in the cropping system, its superiority over the cowpea, varieties for good production, and experiences with soybeans of several producers from North Carolina and South Carolina. "Large seed varieties like Mammoth Yellow and Biloxi yield from fifteen to twenty-five bushels of seed per acre, or one to three tons of hay. O-too-tan [Ootootan] and Laredo, small seed varieties, yield from six to seven bushels of seed per acre or two tons or more of good hay on good soil." "During the past several years there has been an increasing demand for seed of a few promising varieties of soybeans such as: Laredo, O-too-tan, Biloxi and Haberlandt, or Haberlandt No. 38." Concludes that "There is a place for soybeans on every farm."

Note: The author is promoting soybeans on behalf of his railway. Address: Agricultural & Industrial Agent, Atlantic Coast Line Railroad Co.

481. *Farming: The Business Magazine.* 1925. Save soybean seed by planting in rows. 23(1):8. April.

482. Brown, B.A.; Slate, W.L., Jr. 1925. Soy beans in Connecticut. *Connecticut* (*Storrs*) *Agricultural Experiment Station, Bulletin* No. 129. p. 255-87. June. [1 ref]
• ***Summary:*** "There is a good demand for the oil [of the soybean] in the manufacture of soap, cooking fats, and paint. Large quantities of soy beans have been imported from the orient for oil extraction and in some of the Southern states, notably North Carolina, the acreage planted has increased rapidly during the last few years. As a forage crop, the soy bean is gaining each year in popularity, especially in the corn belt, where it is widely planted in corn for hogging down, and alone as a hay or seed crop. Complete statistics are not available, but the following data give some indication of the situation. In 1917, the estimated acreage of the United States was 154,000, and by 1921 had increased to 186,000 acres. This refers only to that portion of the crop threshed. No statistics are available on production for forage purposes, but all estimates indicate a rapid increase.

"In Connecticut the crop has not as yet attained any great importance. There are no statistics on acreage, and conditions have not recently been favorable for any increase in their popularity. The seed of adapted varieties has been high in price and labor very scarce. Also there is a lack of general information regarding the crop and it is the purpose of this bulletin to supply such information and to present the results of experiments at this Station."

Points out the place of soybeans in Connecticut agriculture, their uses for hay, silage, soiling, seed, pasture and as a green manure, and briefly discusses harvesting. Tables show the results of tests from 1914-1920 using many varieties to produce green forage. Address: 1. Asst. Agronomist; 2. Agronomist, Director of the Agric. Exp. Station. Both: Agric. Exp. Station, Storrs, Connecticut.

483. *Morning News* (*Savannah, Georgia*). 1925. Mortuary–Bowen. Sept. 14. p. 2. Monday.
• ***Summary:*** The friends of Mr. and Mrs. John S. Bowen are respectfully invited to attend the funeral this Monday afternoon 1 p.m. at Laurel Grove Cemetery.

484. *Morning News* (*Savannah, Georgia*). 1925. John S. Bowen buried here: Former Savannahian of well known family. Sept. 15. p. 11. Tuesday.
• ***Summary:*** John S. Bowen, a former Savannahian, died Sat. [Sept. 12] at Altapass, North Carolina. His body was brought to Savannah, arriving yesterday morning, in charge of Fox and Weeks funeral directors. The funeral took place at 1:00 yesterday afternoon. Interment was at Laurel Grove Cemetery.

The Rev. Neal L. Anderson, pastor of the Independent Presbyterian Church, officiated. Although Mr. Bowen left Savannah 25 years ago [in about 1900], he retained his membership in the church. Members of Solomon's Lodge of Masons attended the funeral.

Mrs. Bowen and Mr. Bowen's sister, Miss A.B. [Annie Beauregard] Bowen of Philadelphia [Pennsylvania] accompanied his body to Savannah.

Mr. Bowen was the son of General John S. Bowen, Confederate Army, who died soon after being wounded at the Battle of Vicksburg. He was born on 7 Sept. 1862; his mother was a Virginian. His grandfather was William Parker Bowen and his grandmother Ann Elizabeth Wilkins.

He was a member of a Masonic Lodge in Jacksonville and of recent years has been in the real estate business in North Carolina. Funeral arrangements were in charge of Sipple brothers.

485. *Country Gentleman.* 1925. Soy-bean adulteration. 90(35):52. Sept.
• ***Summary:*** An account of the South Carolina false-label soybean seed fraud (using O-too-tan [Otootan]), the worst such fraud seen to date in America. The culprit was arrested under a law that forbids use of the mails to defraud.

South Carolina was one of the slowest of all southern states "in taking up soys," though North Carolina led the USA in production of seed beans. Only four years ago, South Carolina grew but 1,000 acres soys. Then in 1921 the South Carolina extension service added to its staff an extension specialist, R.W. Hamilton, who devoted practically all of his time to selling the soy-bean idea to county agents and farmers. Acreage grew like wildfire, planted to O-too-tan, "the most wonderful bean variety yet discovered for the Southern states." The seed of this variety is very small. One bushel easily covers eight acres if planted in rows. O-too-tan makes the best hay crop of any Southern soy-bean and also a good seed crop.

"Soy acreage" climbed to over 10,000 acres in 1922, 20,000 acres in 1923, 40,000 acres in 1924, then jumped to 120,000 acres in 1925. Then Hamilton smelled a rat. He wired every county agent in the state to examine every shipment of beans coming in as O-too-san. Tests found that Ebony, Wilson, and in some cases Peking were being sold as O-too-san.

486. *Crops and Markets. Monthly Supplement* (*USDA*). 1925. Estimated crop conditions September 1, 1925, with comparisons. 2(Supplement 9):288. Sept.
• ***Summary:*** Soy beans are included in this table, and relative conditions (expressed as percentages) are given for 1924 and 1925 in 19 states: New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, South Dakota, Nebraska, Kansas, Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, New Mexico.

487. Hamilton, R.W. 1925. Seed frauds in soybean varieties. *Proceedings of the American Soybean Association* 1:106-10. Sixth annual field meeting. Held 1-3 Sept. at Washington, DC.
• ***Summary:*** "The soybean is comparatively a new crop in South Carolina. Four years ago, our acreage totaled less than 1,000 acres. The loss in production of cotton caused by the boll weevil forced our farmers to look for a supplementary cash crop. Various crops were tried. Some succeeded in one section, some in another; many were a total failure; none filled the needs of the large and small farmers alike in all sections of the state.

"Our Director of Extension, Dr. W.W. Long, is a native of the great soybean-producing section of North Carolina. He believed that the soybean would come nearer filling the needs of all our farmers for a supplementary cash, hay, grazing and soil-improving crop than any other. His belief has proven correct. He had the Trustees of Clemson College create and fill the position in the Extension Service of 'Specialist: Soybeans, Cowpeas, and Peanuts,' in 1921. The following year, our acreage jumped to 10,000; then to 20,000, last year, to 40,000, and this year to well over 100,000 acres.

We have men who raise as a side line crop and sell $12,000 to $15,000 worth of soybean seed a year."

"The Otootan is our leading variety, closely followed by the Biloxi, Mammoth Yellow, and Laredo, Ebony, Wilson... Our crop of Otootan seed last year was good, in fact, South Carolina had the only large commercial quantities of Otootan seed in the South. The demand from all of the Southern States for our seed was tremendous. The price opened in January at $9.00 per bushel wholesale and every indication pointed to a sharp advance. Those best informed looked for $15 or even $20 per bushel by June.

"Then at points in Georgia, which had been a very heavy

buyer of South Carolina Otootans at $9.00 per bushel, the price broke sharply to $8.00, $7.60, and to $7.00 and even $6.50 wholesale. Fraud had entered. On suspicion only, investigation was started; findings were startling. The Ebony, Wilson, Peking, Wisconsin Black and possibly other black seeded varieties, all worthless varieties for our conditions and purposes, were being sold under the name of Otootan. Allow me to read the headlines of clippings from the Press of South Carolina. The Press has given invaluable assistance in exposing this fraud. These clippings are largely from *The State,* Columbia, S.C., our leading daily paper, and from the *South Carolina Gazette,* a weekly paper of great influence.

"First, here is a list of names of 166 farmers in the South who were defrauded in the purchase of soybeans by a man who is now serving eighteen months in the Atlanta Penitentiary, thanks to the Post Office inspectors.

"(1) Federal Agencies Probe Fraud in Otootan Seed.

"(2) Seedsmen of Orangeburg to Help Prevent Frauds.

"(3) Fraud in Otootan Seed Described by Specialist.

"(4) Probe of Otootan Fraud Goes Beyond This State.

"(5) Service Agents Consider Fraud.

"(6) To Prosecute Seedsmen.

"(7) Nationwide Clean-up of Fraudulent Seed Sales Which Have Cost South Carolina Farmers Untold Thousands This Year Expected to Result.

"(8) Low Grade Soys Widely Planted.

"(9) Perpetrators of Soybean Fraud Now Face Prosecution.

"(10) Charges 'Cow Pea King' with Illegal Use of Mails.

"(11) Pure Seed Needed Says Sumter Agent.

"(12) Real Pure Seed Act Needed and Efficient Enforcement.

"(13) Growers of Soys Called to Meet in the Capital City.

"(14) Producers of Soybeans Form State Association.

"(15) Soybean Growers' Rules Are Drafted.

"(16) Throw Full Force in Soybean Fight.

"Gentlemen, I hope this has given you an idea of the soybean fraud and of what we have done and are doing in regard to it. It has cost South Carolina farmers alone hundreds of thousands of dollars in crop loss and millions of dollars in the Southern States. I know from personal investigations that this fraud extends into North Carolina, Georgia, Alabama, Mississippi and Louisiana. I have some very interesting evidence as to what the agricultural authorities of some of these states did after being notified of the fraud, which I might present here, but I will leave this exposure to the farmers of their respective states. The soybean industry has been set back years in its development." Address: South Carolina Agric. Exp. Station.

488. 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.

489. 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.

490. 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.

491. 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."

492. North Carolina State Board of Health, Bureau of Vital Statistics. 1925. Certificate of death for John Sydney Bowen. Mitchell County, North Carolina. 1 p.
• ***Summary:*** John Sydney* Bowen died on 12 Sept. 1925 in the township of Grassy Creek* (no city is given; Altapass is not mentioned), Mitchell County, North Carolina. The informant is his wife, Clifford V. Bowen. Note the spelling of his middle name.

He was born on 6 Sept. 1866* and is now aged 59 years and 6 days. His profession is real estate in the insurance investment industry. He was born in the town of Edwards, Mississippi. His father was J.S. Bowen, who was born in Savannah, Georgia. His mother was Mary Kennerly, who was born in St. Louis, Missouri. The cause of his death was asthma. He will be removed for burial in Savannah, Georgia. Undertaker: McCall Bros. Address: Marion?

Note 1. Terms followed by an asterisk differ from later, second-hand accounts. His name was also spelled Sidney. He is also said to have died at Altapass, North Carolina. Other accounts give his birth date as Sept. 2 or 6, 1862. Note 2. Edwards is in Scott County, Mississippi, directly east of Vicksburg. Later accounts state that he was born at Camp Sterling Price, Mississippi. Note 3. He was buried at the Laurel Grove Cemetery in Savannah, Georgia. Note 4. He could not have been born in 1866, since his father died on 13 July 1863. According to other accounts he was born on Sept. 2, 6, or 7, 1862. Address: Mitchell County, North Carolina.

493. Wand, F.A. 1925. Relation between the soybean grower and the oil mill. *Proceedings of the American Soybean Association* 1:104-06. Sixth annual field meeting. Held 1-3 Sept. at Washington, DC.
• ***Summary:*** "A large number of farmers in Illinois are growing soybeans in place of oats and are more concerned with having the manufacturer handle their beans for a small margin of profit rather than take a long chance on disposing of their beans for seed purposes... During the fall of 1924, we were led to believe that the soybean crop should go for seed purposes. As a result, we did not operate our mill, but devoted our time to promoting an increased acreage of soybeans...

"We are processing from 40,000 to 42,000 bushels of corn a day and are looking forward to the time when we will handle 10,000,000 bushels of soybeans a year...

"Mr. A.E. Staley, our President and General Manager, was born and raised on a farm in North Carolina, and was growing soybeans before our agricultural experiment stations promoted the general use of the crop. Needless to say, Mr. Staley is an authority on the growing as well as the processing of the beans. In fact, he stands alone as the greatest authority on soybeans at the present time."

Note: This article says nothing about when, how, or why the A.E. Staley Mfg. Co. began crushing soybeans in Decatur. Address: A.E. Staley Mfg. Co., Decatur, Illinois.

494. Winters, R.Y. 1925. Breeding soybeans for oil. *Proceedings of the American Soybean Association* 1:70-71. Sixth annual field meeting. Held 1-3 Sept. at Washington, DC.
• ***Summary:*** "The breeding work with soybeans for the purpose of increasing the oil content was started in the fall of 1916. At that time, the importation of foreign vegetable oils was considerably reduced. This, accompanied by increased demand for vegetable oils, made it necessary to turn to other domestic sources of oil. Sufficient preliminary work had been done to indicate the value of soybeans as a source of vegetable oil. In fact, a few of the cotton oil mills had begun to crush both imported and domestic beans. Fortunately, the price of oil and meal was sufficient to make it possible for the mills to pay a price sufficient to compete with the prevailing market price of beans. This condition has not, however, continued in the southeast.

"In North Carolina, the price and demand for seed beans has prevented the crushing of domestic beans except for a very short period during the war. This condition, however fortunate for our state, cannot be expected to continue always.

"Looking forward to the more general use of soybeans as a source of oil, seed-selection work was started to study the possibilities of increasing the oil content by pure line selection. In the fall of 1916, seed from 152 plants was saved. The plants were selected for yield of seed. The seed of each plant was analyzed for protein and oil content. The oil content of these plants ranged between 13.63 and 22.86 percent, dry basis. The seed of each plant was planted in plant-to row plots, a composite sample of the general crop seed being used as a check. In the fall of 1917 composite samples were taken from each progeny row and the fat and protein determinations again made. Two rather discouraging features came out in the results of 1917. First of all, the analysis of the parent plant did not predict with any certainty the oil content of the offspring. When composite samples of the progeny were used, the range in oil content was not

so great as that secured from the parent plants. This may be due to the fact that considerable natural crossing takes place in soybeans and the progeny rows did not represent pure lines. The work has now been conducted seven years and the conclusions that may be drawn from it are as follows:

"Among the strains selected for a high and low oil from the original 152, the average difference in oil production due to selection was very small.

"As the oil content was increased, the protein content was decreased and vice versa.

"The increase in yield had more to do with oil production per acre than increase in oil content.

"Future progress will depend upon making a much larger number of selections and growing only those that stand high in oil content." Address: North Carolina Exp. Station.

495. *Crops and Markets. Monthly Supplement* (*USDA*). 1925. Soybean crop expected to be about same as last year: Soybean acreage, yield, and prices. 2(Supplement 11):369. Nov.

• ***Summary:*** A table gives 1925 acreage for seed compared with 1924, 1925 yield per acre compared with 1924, and prices offered growers for thresher-run soybeans (per 100 lbs.) for Oct. 1922, Oct. 1923, Oct. 1924, and Oct. 1925–for the following states: Delaware, Maryland, Virginia, North Carolina, South Carolina, Tennessee, Georgia, Indiana, Illinois, and Missouri. Prices were highest in South Carolina, Tennessee, and Georgia, where $4.00 to $6.65 was offered.

496. *Crops and Markets. Monthly Supplement* (*USDA*). 1925. Soy bean prices unchanged: Soy-bean prices and movement. 2(Supplement 12):424. Dec.

• ***Summary:*** A table gives prices offered growers per 100 lbs. for thresher-run soy beans for 4 dates from 17 Dec. 1923 to 15 Dec. 1925, and the percentage of the crop sold by each of these 4 dates in Delaware, Maryland, Virginia, North Carolina, South Carolina, Tennessee, Georgia, Indiana, Illinois, Ohio, and Missouri. Address: Washington, DC.

497. 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.

498. McAuliffe, J.C. 1926. The soya bean as a new world food crop. *Manufacturers Record* 89:100-01. April 1.
• ***Summary:*** A brief overview. "Dr. Horvath, of the Rockefeller Foundation, at work in Pekin, declares that the soya bean is the most complete vegetable food in the world– that it has all the elements of bread and butter, milk, eggs and meat combined into one bean.

Moreover, a milk made from the soya bean is "said to serve all the purposes of cow's milk, simply by the addition of a little sodium chloride..." Investigators says that soya bean milk can be produced at one-tenth the cost of cow's milk. It "is both chemically and actually of the same constituent quality, possessing the vitamines and at the same time eliminating all dangers of contamination in the way of tuberculosis, typhoid fever and other dangerous diseases."

A large photo shows a large field of O-Too-Tan variety soya beans in South Carolina. Two men, wearing hats, are standing in the field; one is holding uprooted soya bean plants. Address: Augusta, Georgia.

499. *Crops and Markets. Monthly Supplement* (*USDA*). 1926. Comparative stocks, shipments, and prices of soy beans, cowpeas, and velvet beans (Compiled from seed shippers' reports). 3(Supplement 4):132. April.
• ***Summary:*** Gives statistics for 1924-1926 for the states of Delaware, Virginia, North Carolina, South Carolina, Georgia, Illinois, Indiana, Ohio, Iowa, Missouri, and other districts. Address: Washington, DC.

500. Lehman, Samuel G.; Wolf, Frederick A. 1926. Soy-bean anthracnose. *J. of Agricultural Research* 33(4):381-90. Aug. 15. [7 ref]
• ***Summary:*** This is the first description of soybean anthracnose in North America; it was first observed in North Carolina in 1920, and is believed to be the same as the ascogenous stage of *Colletotrichum glycines* [=C. dematium var. truncata], G. glycines. The ascogenous stage of *Colletotrichum glycines* was found on diseased stem of soybean and also in culture. It differs from *Glomerella cingulata* in morphology and was named *G. glycines.* The symptoms are numerous black acervuli uniformly scattered over affected area. the organism is seed-borne, existing as a mycelium in the seeds. Address: 1. Plant Pathologist, North Carolina Agric. Exp. Station; 2. Office of Fruit Diseases, Bureau of Plant Industry, USDA.

501. Wolf, Frederick A.; Lehman, S.G. 1926. Diseases of soy beans which occur both in North Carolina and the Orient. *J. of Agricultural Research* 33(4):391-96. Aug. 15. [19 ref]
• ***Summary:*** "Introduction: A number of the more important diseases of soy bean, *Soja max* (L.) Piper have been investigated in the last 10 years at the North Carolina Experiment Station" (nine papers are cited).

"The most significant result of this work, which has arisen both from the laboratory studies and the field survey, has been the establishment of the fact that certain

of these diseases are seed-borne. This fact accounts for the distribution of the diseases throughout the States in which soy beans are grown, serves as a basis for control, and suggests that some of the diseases probably were introduced into the United States with the seed. It is the primary purpose of this report to present such evidence as bears on the last phase of this problem and to give a brief account of the diseases which are common to the Orient and to North Carolina.

"As is well known, the soy bean is native to eastern Asia and is a crop of great importance in Japan, Manchuria, Chosen (Korea), and Mongolia. It has been a major crop of the Orient since ancient times, but was of no importance as a farm crop in the United States until about 1880.

"In the last 10 years there has been a progressive increase in soy-bean acreage in this country, especially in North Carolina and in several States of the Corn Belt. To-day soy beans are a major crop in the United States.

"Apparently the fact that soy beans have only recently become of commercial importance in this country is responsible for the lack of knowledge of soy-bean diseases as found in the United States. A survey of available literature on soy-bean diseases in eastern [Asia] shows that a similar condition exists there, and that such information as has been recorded on soy-bean diseases in Asia has been contributed largely by Miura (13), Hemmi (6, 7, 8), Takimoto (16), and Nakata. The present writers' knowledge of soy-bean diseases in the Orient is limited by the fact that a considerable part of the work done there has been published in Japanese. Collections of diseased plants and unpublished manuscripts and additional notes sent by Miura, Hemmi, and Nakata have been of invaluable service to the present writers in their work."

The following diseases occur in both North Carolina and eastern Asia: Wilt (*Fusarium tracheiphilum*). Mildew (*Peronospora manshurica*). Brown-spot disease (*Septoria glycines*). Pod-and-stem blight (*Diaporthe sojae*) [=*D. phaseolorum* var. *sojae*]. Cercospora leaf spot (*Cercospora diazu*) [=*C. sojina,* Frog-eye leaf spot]. Anthracnose (*Colletotrichum glycines*) [=*C. dematium f. truncata*], and *Glomerella glycines.* Bacterial blight.

Xanthomonas phaseoli var. *sojense* and *Sclerotium rolfsii* are found in North Carolina but not in Asia. *Sclerotinia libertiana* (=*Whetzelinia sclerotiotum*), *Hypochnus centrifugus, Uromyces sojae* (=*Phakopsora pachyrhizi*), and *Phyllosticta sojaecola* occur in eastern Asia but not in North Carolina. Address: 1. Plant Pathologist, Office of Fruit Diseases, Bureau of Plant Industry, USDA; 2. Plant Pathologist, North Carolina Agric. Exp. Station.

502. Wolf, Frederick A.; Lehman, S.G. 1926. Brown-spot disease of soy bean. *J. of Agricultural Research* 33(4):365-74. Aug. 15. [6 ref]
• ***Summary:*** This disease was first described in Japan in 1915 by Hemmi, and later in North Carolina (USA) in 1922 by the authors. The causal fungus, *Septoria glycines,* reproduces by conidia; no ascogenous stage is known. Brown spot causes brown or reddish spots upon the blades of the leaves and sometimes also upon the stems and pods. It appears to be seed-borne and attacks the cotyledons and then the foliage. The disease has been established by artificial inoculation. The spores may pass through the stomata and the mycelium is intercellular. Address: 1. Office of Fruit Diseases, Bureau of Plant Industry, USDA; 2. North Carolina Agric. Exp. Station.

503. Barr, J.E. 1926. The soybean industry and United States standards. *Proceedings of the American Soybean Association* 1:154-59. Seventh annual field meeting. Held 9-12 Aug. in Mississippi.
• ***Summary:*** Gives definitions related to soybean standards (e.g. damaged and split soybean, foreign matter), defines the 5 classes of soybeans (yellow, green, brown, black, and mixed), describes the five grades (No. 1-4, plus sample grade), and how they shall be designated.

"The phenomenal increase in the production of soybeans during recent years has created widespread interest in this commodity. Production in the United States increased from about 2,500,000 bushels in 1920 to 9,500,000 in 1924. With this increased production, the saturation point in the demand for soybeans for seed purposes has been reached, especially of the most widely grown varieties.

"Those in close touch with the developments, however, are convinced that we have only 'scratched the surface' so far as the agricultural and commercial possibilities of the soybean are concerned. Its commercial possibilities offer a broad outlet for large supplies above seeding requirements. Several mills are now crushing soybeans for oil and oil meal and others are being built or equipped for this purpose. Research chemists are studying the value of the soybean and its products for food and other uses, together with methods of converting them into the proper form for such uses. The extent of these commercial uses seems to be limited principally by the supply of the raw product. Production above seeding requirements is increasing steadily and with the general employment of more efficient and economical methods of growing and harvesting the crop and preparing it for market the commercial supply should be increased many fold and sold at prices profitable to both grower and manufacturer.

"It is the policy of the Bureau of Agricultural Economics, U.S. Department of Agriculture, to establish uniform standards for all agricultural products. In accordance with this policy, United States Standards for soybeans were issued in September 1925 and recommended for use in the grading and marketing of this commodity. These standards were used as a basis for Federal inspection of soybeans at original shipping points in North Carolina the past season

U. S. Grade	Condition and General Appearance	Minimum test weight per Bu.	Maximum limits of Moisture	Splits	Damaged Beans	Foreign Material
		Pounds	Percent	Percent	Percent	Percent
Extra No. 1*	Shall be cool and of natural odor, plump, well screened and of good color	56	15	0.5	1.0	0.2
No. 1	Shall be cool and of natural odor and good color	56	15	1.0	2.0	0.5
No. 2	Shall be cool and of natural odor and may be slightly stained or mottled	54	16	10.0	3.0	2.0
No. 3	Shall be cool and of natural odor and may be stained or mottled	52	17	20.0	5.0	5.0
No. 4	Shall be cool and may be badly stained or mottled and may be slightly frostbitten or immature	50	18	30.0	8.0	10.0
Sample Grade	Shall be soybeans which do not comply with requirements of any of the above grades or which have any commercially objectionable foreign odor or are sour, heating, hot, moldy, infested with live weevils or other insects injurious to stored soybeans or are of otherwise distinctly low quality.					

*The Grade Extra No. 1 shall apply only to soybeans of the classes: Yellow Soybeans, Green Soybeans, Brown Soybeans, and Black Soybeans containing not more than one percent (1 percent) of soybeans of other Classes, either singly or in any combination, and shall not apply to the Class, Mixed Soybeans, except when such "Mixed Soybeans" are composed of 98 percent or more of the Black Eyebrow variety.

with gratifying results. The reaction from growers, shippers, large wholesale seedsmen, and oil mills to the use of the standards in the purchase and sale of soybeans is altogether favorable and there is a demand that the inspection service be expanded in North Carolina and that it be extended to other producing sections the coming season.

"The use of the standards and further studies of the soybean industry with respect to the requirements of consumers and the abilities of the producers seemed to warrant slight revisions in the standards. The only effective change is the addition of a super grade, designated 'U.S. Extra No. 1,' to take care of extra high grade stock for which there is a demand, especially from the seed trade, at a premium over U.S. No. 1 and which the grower is now producing under normal conditions. The U.S. No. 1 grade also is a good quality seed grade measured by the percentage of physical defects allowed, such as splits, damaged beans and foreign material." Address: USDA.

504. Lehman, Samuel G.; Wolf, Frederick A. 1926. Pythium root rot of soy bean. *J. of Agricultural Research* 33(4):375-80. Aug. [1 ref]

• ***Summary:*** The authors describe a wet rot disease of the roots induced by *Phythium de Baryanum* (Hesse) [*Pythium debaryanum*] in North Carolina. It causes the roots to decay and the plants to wither and die. Note: This is the earliest document seen (Feb. 2002) worldwide that mentions Pythium root rot. Address: 1. Plant Pathologist, North Carolina Agric. Exp. Station; 2. Office of Fruit Diseases, Bureau of Plant Industry, USDA.

505. 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.

506. Williams, C.B. 1926. Producing soybean seed for the oil mills. *Proceedings of the American Soybean Association* 1:137-45. Seventh annual field meeting. Held 9-12 Aug. in Mississippi.

• ***Summary:*** "According to the most reliable information available, the total acreage in soybeans in the United States, on an average, for the years 1922, 1923, and 1924 was utilized primarily 28% for seed, 46% for hay, and 26% for grazing. In the older producing states, like North Carolina, this crop for the same three years was used primarily 47% for seed, 29% for hay, and 24% for grazing...

"During the past season, something like 200,000 bushels of soybeans have been bought and presumably crushed by a few cotton oil mills in eastern North Carolina...

"At the present time, soybean oil is used in this country chiefly in the manufacture of soaps, varnishes, paints, enamels, linoleums, and water-proofing materials. It has entered, also, to some extent in the manufacture of edible salad oil and butter substitutes... The untreated oil may replace linseed oil completely, with quite satisfactory results, in the manufacture of soft soaps; but it can only partially take the place of cottonseed oil in making hard soaps...

"Based upon statistics for 1924, soybeans produce the largest amount of oil (86 lb) per acre of the three major oil-producing crops grown in the United States." Note: The other two crops are cotton and flax. Address: North Carolina Agric. Exp. Station.

507. Lehman, S.G.; Wolf, F.A. 1926. Soybean anthracnose (Abstract). *Phytopathology* 16(9):640. Sept.

• ***Summary:*** This is an abstract of a paper read at the meeting of the southern section of the American Phytopathological Society, with the Twenty-Seventh Annual Convention of the Southern Agricultural Workers, at Atlanta, Georgia, February 3-5, 1926.

The complete paper was published in the *J. of Agricultural Research* 33(4):381-90. Aug. 15.

508. Lehman, S.G.; Wolf, F.A. 1926. Pythium root rot of soybean (Abstract). *Phytopathology* 16(9):640-41. Sept.

• ***Summary:*** This is an abstract of a paper read at the meeting of the southern section of the American Phytopathological Society, with the Twenty-Seventh Annual Convention of the Southern Agricultural Workers, at Atlanta, Georgia, February 3-5, 1926.

The complete paper was published in the *J. of Agricultural Research* 33(4):375-80. Aug.

509. *Phytopathology.* 1926. Abstracts of papers read at the Southern Section of the American Phytopathological Society

with the twenty-seventh annual convention of the Southern Agricultural Workers, at Atlanta, Georgia, February 3-5, 1926. 16(9):639-41. Sept. [3 ref]

• ***Summary:*** Three abstracts concern soybeans: (1) Brown spot disease of soybeans, by F.A. Wolf and S.G. Lehman. (2) Soybean anthracnose, by S.G. Lehman and F.A. Wolf. "Soybean anthracnose was first observed at Raleigh, North Carolina, and has reappeared repeatedly since then." (3) Pythium root rot on soybean, by S.G. Lehman and F.A. Wolf.

510. Wolf, F.A.; Lehman, S.G. 1926. Brown spot disease of soybean (Abstract). *Phytopathology* 16(9):639-40. Sept.

• ***Summary:*** This is an abstract of a paper read at the meeting of the southern section of the American Phytopathological Society, with the Twenty-Seventh Annual Convention of the Southern Agricultural Workers, at Atlanta, Georgia, February 3-5, 1926.

The complete paper was published in the *J. of Agricultural Research* 33(4):365-74. Aug. 15.

511. *Crops and Markets. Monthly Supplement* (*USDA*). 1926. Soy beans. 3(Supplement 12):394. Dec.

• ***Summary:*** This is the earliest document seen (Dec. 2004) that gives such detailed nationwide statistics on soy beans as follows: Total acres, acres harvested for the beans, yield per acre, production of beans (see also text p. 421), price Dec. 1, and total farm value of the beans. It also gives these statistics, for the years 1924, 1925, and 1926, for each of the following states (in this order): Ohio, Indiana, Illinois, Michigan, Wisconsin, Missouri, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, and Oklahoma

The following statistics are for the entire United States: Total acres planted to soy beans: 1924–2,303,000. 1925–2,237,000. 1926–2,602,000.

Total acres harvested for the beans: 1924–490,000. 1925–431,000. 1926–521,000.

Yield per acre (bushels): 1924–11.6. 1925–11.9. 1926–12.5.

Production of soy beans (bushels): 1924–5,680,000. 1925–5,102,000. 1926–6,517.

Price of soy beans Dec. 1 (per bushel): 1924–$2.21. 1925–$2.21. 1926–$2.02.

Total farm value of the beans based on Dec. 1 price: 1924–$12,547,000. 1925–$11,283,000. 1926–$13,180,000.

In 1926 the following states were the leaders: Total acres: Illinois 550,000. Acres harvested for beans: Illinois 149,000. Yield per acre: Maryland 17.0 bu. Production of beans: Illinois 1,862,000 bu. Lowest price: Delaware $1.60/bu, Illinois $1.65/bu. Total farm value of the beans: Illinois $3,072,000.

512. United States Tariff Commission. 1926. Certain vegetable oils. I. Costs of production. II. Economic study of the trade in and the prices and interchangeability of oils and fats. Washington, DC: U.S. Government Printing Office. 174 p. See Part I, p. 55-71, 77; Part II, p. 114-17, 138-40, 159-61. Tables. Diagrams. 31 cm. [6 ref]

• ***Summary:*** This document gives the best picture of the soy oil industry and market in the U.S. and worldwide up to this time. Part 1. Costs of production, Section 4, titled "Soya-bean oil" (p. 55) has the following contents: Rates of duty. Uses. Raw material and its sources: Foreign production, domestic production. Joint products. Domestic production and consumption: History, production statistics, geographic distribution of mills, domestic consumption. Imports. Principal competing country (Manchuria). Exports of domestic and foreign oil. Foreign production and consumption: Production (China [Manchuria], Japan, Europe), consumption. Costs of production: United States (proportion of the industry covered, cost data by companies, shipping charges), China (Manchuria; Introduction, verification of cost data, Dairen, shipping charges from Dairen to the U.S., Harbin, Newchwang, Antung), Japan, Great Britain, comparison of these cost data.

The Act of 1921, an emergency tariff that went into effect on 28 May 1921, placed the first tariff on soya-bean oil, at the rate of 20 cents per gallon (2.67 cents per pound). The Act of 1922 (which went into effect on 22 Sept. 1922) reduced this slightly to 18.75 cents per gallon (2.5 cents per pound). "For a number of years prior to 1921 soya-bean oil was used in the United States chiefly in the manufacture of soaps, and to a lesser extent in paint, varnish, and lard compounds... Since 1921 the domestic consumption of soya-bean oil has been chiefly in the manufacture of paints and varnishes and in foundry core oils. In lesser quantities it finds use in the manufacture of linoleum and of printing inks" (p. 55)

"Foreign production.–Chinese official statistics estimate that the area under soya beans in the whole of China in recent years has been 12 million acres (*Chinese Economic Monthly,* June 1924). Generally accepted show that China produces about 80 per cent of the world's production of [soya] beans, or from 3 to 4 short tons annually, of which Manchuria produces from 2 to 3 million tons. Japan and Chosen [Korea] grow the beans in about equal quantities, each producing approximately 600,000 tons per year or about 15 per cent of China's production. Some soya beans are grown in Central European countries, but there, as in the United States, they are used mainly for forage. Japan, Chosen, and the interior of China consume practically all of the beans they produce, but Manchuria, which is less densely populated, exports in the raw state or as manufactured products about 60 percent of its production. It is from Manchuria that the other nations of the world obtain their supply for crushing.

"Domestic production [USA].–The domestic soya bean crop is grown primarily for forage. The chief States

harvesting soya beans in 1923 and 1924 were North Carolina, with 2,675,000 and 2,560,000 bushels, Illinois, with 1,722,000 and 1,548,000 bushels, and Indiana, with 790,000 and 650,000 bushels, respectively. Sixteen other States, of which Ohio and Missouri were the most important, produced soya beans in much smaller quantities... The total harvest in the United States was 8,944,000 bushels (268,320 short tons) in 1923 and 9,567,000 bushels (287,010 short tons) in 1924. Only about 20 per cent of the acreage planted is harvested, and of the quantity harvested less than 2 per cent is crushed for oil. This is because the seed necessary for the next crop of beans requires nearly all the beans that are harvested" (p. 55).

Note: This is the earliest document seen (Jan. 2005) that gives total soybean production or area statistics worldwide. However the information lacks detail, except for the USA.

Table 82 (p. 56) shows that the amount of soya beans crushed in the U.S. increased from 2,978 tons in 1922 (1.70% of the total soya beans harvested), to 3,724 tons in 1924 (1.3% of the total). Imported soya beans were first crushed in about 1910 on the Pacific Coast.

Table 83 (p. 57) shows that production of crude soya-bean oil in the U.S. rose from 751,108 lb in 1922, to to 1,404,035 lb in 1923, to 950,437 lb in 1924, to 1,406,112 lb in 1925. "Domestic production has at all times been small compared with imports. In 1923 the domestic output was 4 per cent of imports; in 1924 and 1925 about 8.5 per cent."

The soy oil tariff of 1921 led to a rapid increase in soybean crushing in the U.S. "The commission's investigators interviewed the managers of eight domestic oil mills–all that had produced soya-bean oil since 1921. Four of these mills were located in Illinois, three in Indiana, and one in North Carolina. Of these, two had used the benzine extraction process and after extracting a few tons of beans had closed down because of mechanical difficulties, high cost of operation, and high cost of beans. Nearly all the other mills used Anderson expellers, although a few of them used hydraulic presses."

Table 86 (p. 58) shows imports of soya-bean oil into the U.S. by countries, 1918-1925. In 1918, the peak year for imports (335,984,143 lb), 68.7% came from the Kwantung Leased Territory (principally from Dairen on the southern tip of the Liaotung Peninsula in South Manchuria), 27.2% came from Japan, and 4.0% came from other parts of China. In Japan 19 mills are known to be crushing soya beans. Their production of soya-bean oil in 1922 was 44,714,000 pounds.

Table 88 shows imports of soya beans into Germany, United Kingdom, Denmark, and Holland 1919-1925. In 1925 Germany was by far the largest importer (370,585 short tons), followed by the UK (181,420), Denmark (121,389), and Holland (39,301).

Part I, Section 5, titled "Interest on capital invested in crushing vegetable oils," has a passage on soya-bean oil which gives that information for 1924.

Part 2. Economic Study of the Trade in and Prices and Interchangeability of Oils and Fats, includes references to the domestic production of soybean oil, net imports of oils, including soybean oil, into the United States 1910-1924; and 1916-1924; international supply and consumption of soybeans and soybean oil; price changes of soybean oil and beans; statistics of these price changes. The Interchangeability of Oils and Fats in Consuming Industries has scattered references to soybean oil, and a special section on soybean oil giving data received from questionnaires on the interchangeability of oils and fats.

This is the earliest document stating that soy oil, itself, is used in printing inks. Address: Washington, DC.

513. 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.

514. *Wall Street Journal.* 1927. Large increase noted in soy-

bean planting: Acreage of 500,000 in 1917 has grown to 2,600,000, principally in the corn belt states. May 26. p. 15.
• ***Summary:*** "Largely increased acreage and production of soybeans in the United States in the last decade indicate that the crop is destined to become of great economic importance." Of the more than 2,600,000 soybean acres last year, about 520,000 acres [20%] were for seed production. Total soybean production last year was 6,517,000 bushels. "No other crop has advanced so rapidly from a position of minor to major importance."

The most dramatic increases in recent years have been in the corn belt states and in a few southern states, according to the United States Department of Agriculture. Illinois, the leading state in soybean acreage, with more than 700,000 acres, is followed by Missouri, North Carolina, Indiana, and Tennessee.

In the future, soybeans will be used increasingly for the production of oil and meal. Soybean oil can be used like almost all other vegetable oils. Oil mills in the major production centers "now crush large quantities of domestic beans, and find ready markets for oil and meal."

Companies making soybean food products have recently increased greatly; the beans can be processed to make breakfast foods, crackers, soy sauce, bean curd, wafers, soy flour, and special flour preparations. Soy sauce is now widely sold in the USA. Soybean oil is increasingly used to make soaps, paints, varnishes, lubricating oils, linoleum, waterproof goods, printing ink, and solid oils [by hydrogenation]. Oil cake, which remains after the oil is extracted from the beans, is a valuable livestock feed.

Note: This is the earliest document seen (April 2013) that contains the term "soybean food products."

The discovery that soybeans can be efficiently harvested using a "combined harvester and thresher" has given addition impetus to soybean production. Its value in crop rotations insures the soybean an increasing role in American agriculture.

515. Associated Press (AP). 1927. Growers of soy beans in annual convention. *Washington Post.* Aug. 10. p. 5.
• ***Summary:*** "Washington, North Carolina, Aug. 9–The three-day annual convention of the American Soy Bean Association opened today in this territory of northern North Carolina, the soy bean center of the world [sic].

"The convention proper began tonight with an address by Representative Lindsay C. Warren and David R. Coker, plant breeder and seed specialist of Hartsville, South Carolina." Tomorrow the meeting will be held in Hyde County; on Thursday it will move to Elizabeth City, with meetings at Windsor, Williamston, and other towns along the way.

516. Associated Press (AP). 1927. Soy bean growers end convention. *Washington Post.* Aug. 12. p. 2.
• ***Summary:*** Elizabeth City, North Carolina, Aug. 11–Nearly 200 members of the American Soy Bean Association gathered tonight "in Elizabeth City for their concluding session for election of officers and choosing the 1928 convention city chief matters for consideration." The delegates have spent the last three days traveling through the eastern counties of North Carolina. These growers come from as far north as Indiana and Illinois and as far south as Mississippi and Louisiana.

517. 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.

518. 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.

519. *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.

520. Winters, R.Y. 1927. The soybean's contribution to North Carolina agriculture. *Proceedings of the American Soybean Association* 1:187-90. Eighth annual field meeting. Held 9-12 Aug. in North Carolina.
• ***Summary:*** Contents: Introduction. The soybean as a money crop. A legume in the rotation. A source of feed (and total hay acreage). Future of soybeans.

"Just when the soybean came to our state is not recorded. Those most familiar with its history place the time at approximately fifty years ago [i.e., about 1877]. One of the first authentic records of its growth in the state was written by Dr. Chas. W. Dabney, Jr., in the annual report of the State Agricultural Experiment Station for 1882. In his discussion of varieties grown at that time, the following is of interest:

"'Between varieties the yellow bean (palinda) [sic, pallida], the brown bean (castanea) and the black, round bean (astroperma) [sic, atrosperma], there is really little difference. The yellow bean has been the most popular, however, and is said to be a little heavier than the other varieties. This the variety we have tried in North Carolina'

"The above descriptions would naturally lead one to believe that he was discussing our old stand-bys, the Mammoth Yellow, Mammoth Brown, and Tar Heel Black."

The soja bean or Japan pea first became a popular crop in the eastern part of North Carolina. "The introduction of soybeans into other sections of the state was not accomplished until the extensive campaign led by Mr. C.B. Williams in 1916, and following years." Address: North Carolina Experiment Station.

521. Meharry, Charles L. 1927. Eighth annual business meeting. Chicago, Illinois–1927. *Proceedings of the American Soybean Association* 1:34-39.
• ***Summary:*** "Only a few members of the Association met, November 28, 1927, in Room 9 of the Administration Building of the Union Stock Yards, Chicago, for the annual winter business meeting. Vice-President Taylor Fouts

presided in the absence of President F.P. Latham who was unable to attend. Secretary W.E. Ayres could not be present and had suggested in a letter to Mr. Fouts that past Secretary-Treasurer, Charles L. Meharry, be appointed Acting Secretary.

On a motion of Professor K.E. Beeson, the officers for 1928 were elected unanimously: President–Taylor Fouts, Indiana. Vice-President–Walter Godchaux, Louisiana. Secretary-Treasurer–W.E. Ayres, Mississippi.

Includes a detailed discussion of resolutions passed by the Association at its Eighth Annual Convention, held in Eastern North Carolina, 1927. These included: "Be it resolved that this Association take all steps in its power to secure additional State and Federal aid for such experimental and research work, and particularly in connection with the growing and utilizing of the soybean; and that all the members of the Association be urged to do all in their power to secure the support of their Representatives and Senators to such end.

"2. Whereas there is a discrimination against growers in the import duties on soybeans and soybean products;

"Be it resolved that this Association take all steps in its power to secure fair and just protection for the soybean industry in all its phases, in any tariff schedules that may be imposed."

It was also decided that "the winter meetings be discontinued and the business meeting be combined with the summer field meeting." Prof. Beeson gave a report of the field meeting in North Carolina. Mr. Wand and Mr. Meharry discussed the need for stronger protective tariffs on soybeans and its products. Address: Acting Secretary-Treasurer, American Soybean Assoc.

522. Goshen Prolific: New U.S. domestic soybean variety. 1927. Seed color: Brown, hilum brown.
• ***Summary:*** Sources: Morse, W.J. 1927. "Soy beans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520. 34 p. April. See p. 7. "This variety is said to have originated as a sport or natural hybrid from the Otootan variety in eastern North Carolina... Seeds brown with brown hilum, about 6,3000 to the pound; germ yellow; oil 12.7%." Address: USA.

523. Herman: New U.S. domestic soybean variety. 1927. Seed color: Yellow (straw), hilum dark brown.
• ***Summary:*** Sources: Morse, W.J. 1927. "Soy beans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520. 34 p. April. See p. 7-8. "Herman–Introduced by the North Carolina Agricultural Experiment Station as Haberlandt No. 38... Seeds straw yellow with dark-brown hilum, about 2,450 to the pound; germ yellow; oil 18.5 %."

Morse, W.J.; Cartter, J.L. 1937. "Improvement in soybeans." *Yearbook of Agriculture* (USDA). p. 1154-89. For the year 1937. See p. 1187. Selection by Herman (name of breeder), North Carolina, 1915.

Morse, W.J.; Cartter, J.L. 1939. "Soybeans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520 (Revised ed.) 39 p. Nov. See p. 10. "Herman.–Selection from the Haberlandt variety by the North Carolina Experiment Station in 1915 and first introduced as Haberlandt No. 38. Maturity, about 135 days; pubescence, tawny; flowers, purple, appearing in 55 to 60 days; pods, two- to three-seeded; seeds, straw yellow with dark-brown hilum, about 2,450 to the pound; germ, yellow; oil, 21.79 percent; protein, 42.22 percent." Address: USA.

524. 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.

525. Williams, C.B. 1927. History and achievements of research in agronomy in North Carolina during fifty years (1876-1927). Raleigh, North Carolina: North Carolina Experiment Station. 36 p. Unpublished typescript.

• ***Summary:*** "During the early years of the North Carolina Experiment Station, its work in the field of Agronomy was carried on mainly by the Director and his assistant chemists. Later on the efforts of the Botanist, Gerald McCarthy (1888-1897), and of the Horticulturist, W.F. Massey (1889-1905), were devoted to some problems in this particular field.

"On Agronomy subjects, McCarthy devoted himself mainly to laboratory studies on the purity and vitality of farm seeds and to the preparation of bulletins on "Lucerne as a Forage Crop" (No. 60), "Indian Corn" (No. 65), "Weed Pests of the Farm" (No. 70), "Best Agricultural Grasses" (No. 73), and "Grass and Forage Crops" (No. 80a); While Massey confined himself chiefly, outside of his special field of Horticulture, to publicity and to the preparation of bulletins or general agricultural subjects such as "Agricultural Suggestions to the Waldesians" (Special Bul. No. 28) and "Farming in North Carolina" (No. 162).

"At its December meeting in 1885, the State Board of Agriculture, under which the N.C. Experiment Station operated from its establishment on March 12, 1877 until the passage of the Hatch Act on March 2, 1887, purchased for field experimental purposes a ten-acre farm, located one and a half miles northwest of Raleigh and adjoining the property of the State Agricultural Society. To this was added 25 acres more by a gift from said Society, making 35 acres for buildings and for field experiments with different crops and fertilizers. During April of the following year, Milton Whitney assumed charge of the experimental field as superintendent. He remained with the Station in this capacity until December 1887, at which time he resigned to take up work with Clemson College, South Carolina, and later with the Maryland Experiment Station, U.S. Weather Bureau and Federal Bureau of Soils. It was while connected with this Station that Whitney started his studies on the physical properties of soils and the relation of meteorology to plant growth.

"During 1887, J.R. Chamberlain became connected with the Station as Agriculturist. He was succeeded by

F.E. Emery, three years later, who remained Agriculturist until 1899. Associated with him part of the time was J.M. Johnson, as assistant in livestock work, who remained in the Department from July 1897 to July 1901. During the period covered by Chamberlain and Emery, the Agriculturist had charge of all the work now embraced in the Departments of Agronomy and Animal Husbandry. Following Emery as Agriculturist came B. Irby who acted in this capacity from August 1899 until July 1901; and C.W. Burkett, from July 1901 to July 1906.

"In July 1906, C. B. Williams, entered upon the duties of the first Agronomist of the Station, which position he has held up to the present, except for one year.

"Early History of Agronomy Work: From the time of its establishment, the study of value of different fertilizing materials, and fertilizers, and the plant-food requirements of the different soils of the State has occupied a prominent place in the work of the Station. Director Dabney in the Station Report for 1881 stated that 'the subject which most interests our people is that of fertilizing the soil.' The earliest publications dealt mainly with formulas for making composts, where to buy and how to make bones useful, the most reliable fertilizers, the use of different fertilizing materials, experience with homemade manures, finely ground phosphate rock, value of Peruvian guano, value of marl, and how to use cotton seed, ashes (leached and unleached),... the growing of soybeans, alfalfa, cowpeas, and crimson clover.

Page 3: Field Experiments with Farmers: During the first year after the establishment of the Station, field experiments with different fertilizing materials were conducted with six farmers living in Orange and Chatham counties, using cotton, Irish potatoes, oats and turnips as crops for the studies. In 1889, a number of forage crops, including soybeans, sugar cane, sorghum, pearl millet, Canada field pea, sunflower, flax, broom corn, Kaffir corn and ramie were tested out on the farms of farmers in various localities of the State with very satisfactory results."

Pages 6-7: "Since 1900 to the present, Agronomy work has been conducted continuously on the College farm, the main lines having been in soil fertility investigations; a comparison of various carriers of lime, phosphoric acid, potash and ammonia; regular fertilizer experiments; variety tests of cotton, corn, soybeans, cowpeas, alfalfa, wheat, oats, rye and barley; crop rotations, grasses and grass mixtures for hay and pasturage; value of corn suckers; spacing tests with cotton and corn; rata and date of seeding tests with small grains; method of fertilizer application to different crops; and the improvement of staple crops by seed selecting."

Page 14: "5. Very extensive field trials of all obtainable varieties of cowpeas, soybeans, cotton, oats, wheat, rye, corn, barley, tobacco and peanuts have been carried on and the results made available to farmers."

"8. Promoted the wider growth and use within North Carolina of the soybean crop.

"12. Injury to corn and soybeans has resulted from liming some of the sandy soils of the Coastal Plain to neutrality. This injury is independent of the form of lime used."

Page 15:

"16. Inheritance of certain characters in cotton and soybeans have been studied.

"18. Through variety tests and selection work the yielding powers of corn, small grains and soybeans have been greatly improved on farms of the State.

"19. The best rates of seeding for small grains and soybeans have been determined by careful field tests.

"21. The best planting dates for small grains for Piedmont soils and for soybeans and cotton for different sections of the State.

"27. Shows that usually soybeans is [sic] a larger yielder of seed and hay than cowpeas."

Page 16:

"V–On Methods of Harvesting and Utilizing Crops."

2. By analyzing the corn plant, cowpea and soybean vines at different stages of growth to determine the beet time to cut each of these for obtaining the greatest amount of food material per acre of best quality."

"VI–On Farm Drainage, Machinery, and Buildings."

"3. Made known to farmers the different makes of soybean harvesters manufactured in the State and given a brief description of the special features of each."

Pages 20-25: Contains a complete bibliography of all serial publications issued by the North Carolina Experiment Station and the State Department of Agriculture–Bulletins, Circulars, Press Bulletins, etc.

Source: Charles Burgess Williams Papers, MC 00016, Special Collections Research Center, North Carolina State University Libraries, Raleigh, North Carolina. Address: Chief, Div. of Agronomy, Raleigh, North Carolina.

526. Hankins, O.G.; Ellis, N.R.; Zeller, J.H. 1928. Some results of soft-pork investigations, II. *USDA Department Bulletin* No. 1492. 50 p. Feb. Research done in cooperation with 6 state experiment stations. [9 ref]

• ***Summary:*** Contents: The soft-pork problem: Cooperation in the investigations, Fundamentals of the problem, Broadened scope of the work. Relation of composition of fat to firmness of carcass. Results of the investigations: A. Corn with nonsoftening supplements following peanuts. B. Corn with tankage following soy beans. C. Corn with tankage following soy beans supplemented with a medium ration of shelled corn. D. Soy beans with corn in definite proportion. E. Rice bran with tankage. F. Rice bran with tankage followed by corn with tankage. G. Rice polish with nonsoftening supplements followed by corn and brewers' rice with nonsoftening supplements. Summary. Literature cited. Address: 1. Animal Husbandman; 2. Assoc. Biological

Chemist; 3. Asst. Animal Husbandman. All: Animal Husbandry Div., Bureau of Animal Industry, USDA.

527. Lehman, Samuel G. 1928. Frog-eye leaf spot of soy bean caused by *Cercospora diazu* Miura. *J. of Agricultural Research* 36(9):811-33. May. [14 ref]

• ***Summary:*** Note: This is the earliest detailed report of this disease in the USA. The species name "diazu" is probably a misspelling of "daizu," which means "soybean" in Japanese. Contents: Introduction. Historical account (very detailed; the earliest reported occurrence of a Cercospora on soy bean in America was reported by George Washington Carver in Alabama in 1901). Description of frog-eye leaf spot. Distribution of the disease (in 12 counties of North Carolina, and in South Carolina, Georgia, Louisiana, Mississippi, Manchuria, and Japan). Economic importance. Varieties (of soybeans) attacked. Etiology: Isolation of the pathogene. Description of the causal fungus (with illustrations). Germination of the conidia. Inoculation. Identity of the causal fungus (including a translation Miura's 1918 description of the fungus, Cercospora diazu M. Miura, n. sp., found in south Manchuria). Pathological anatomy. Cultural characteristics. Dissemination and control. Summary.

The fungus injures the host by means of some substance acting in advance of the hyphae as evidenced by the alteration in the staining reaction of the host cells. It overwinters on diseased stems, leaves, and seeds. Control measures include ploughing under of the crop after harvest, rotation, and the use of early maturing varieties. Address: Plant pathologist, North Carolina Agric. Exp. Station.

528. Willis, L.G. 1928. Response of oats and soybeans to manganese on some Coastal Plain soils. *North Carolina Agricultural Experiment Station, Bulletin* No. 257. 13 p. July. [4 ref]

• ***Summary:*** Chlorosis in soy beans (but not stunted growth in corn) is remedied by application of manganous sulphate to the unproductive area. Injury to oats by lime or calcium phosphate applications to a soil deficient for soy beans in manganese can be prevented by addition of manganous sulphate. Address: Dep. of Agronomy, North Carolina Experiment Station, Raleigh, NC.

529. 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.

530. Hostetler, Earl H. 1928. Soybean oil meal for fattening pigs. *North Carolina Agricultural Experiment Station,*

Bulletin No. 259. 12 p. Sept. [5 ref]
• ***Summary:*** "There were two main objects in view at the time this work was begun. First, it was desired to compare soybean oil meal with fish meal as to its value as a protein supplement when fed with corn to fattening pigs. Second, data were needed with reference to the practicability of producing and fattening pigs, in the blackland section of the State, in numbers sufficient to make a car load or more." Address: In Charge, Swine Investigations, Animal Husbandry Dep., Agric. Exp. Station, North Carolina State College of Agriculture and Engineering, Raleigh.

531. Lehman, Samuel G. 1928. Department of Botany: Division of Plant Pathology. *North Carolina Agricultural Experiment Station, Annual Report* 50:95-96. For the fiscal year ended June 30, 1927.
• ***Summary:*** "A brief statement of the progress of the work conducted by the Division of Plant Pathology in the study of the nature and control of plant diseases during the past year is herein presented.

"Soybean Diseases: Studies of the Cerosporo disease of soybean ascribed to *Cercospora Daizu* Miura are nearing completion. A paper setting forth the results of these studies is now in course of preparation. This disease, originally found in Currituck County, is now known to be widespread in the State. The chief symptom is a spotting of the leaves and when infection occurs in some susceptible varieties the area effective for photosynthetic production of carbohydrates is often greatly reduced. The value of the leaves for forage and the yield of beans on infected plants decrease with increase in severity of the disease.

"The presence of another disease due apparently to a second species of Cercospora (probably *Cercospora kikuchii*) has recently been discovered in the State. This fungus grows between the layers of the seed coat and on light colored seeds produces a purplish or lavender discoloration [purple seed stain]. The infected bean appears to be sound, but the discoloration gives it the appearance of a hybrid and for that reason is undesirable to the producer of pure strains of varieties with light colored seeds. Our information retarding this disease is as yet very meager but observations will be continued with a view to learning more of the life history of the parasite and the nature and control of the disease.

In an effort to determine the value of seed treatment in control of seed-borne diseases of soybeans Mammoth Yellow seeds from plants diseased with mildew (*Peronospora manshurica*) and bacterial blight (*Bact. sojae*) were treated with various chemical disinfectants. No mildew developed on either treated or untreated seed. Bacterial blight was absent from most of the treated lots but appeared in very moderate amount on plants from untreated seed and from certain of the treated lots. While it is believed that the treatment reduced the amount of the bacterial blight disease, no satisfactory conclusion can be drawn from the test owing to the fact that development of the disease was greatly hindered by the unusually dry weather which prevailed during the time the beans were growing.

"The tests to determine the effect of various disinfectants on the germination of soybean seed have been continued using seed of the Mammoth Yellow and Biloxi varieties. Formaldehyde when used in such concentrations and for such periods of time as would be effective in killing seed-borne parasites reduced the germination of the seed. Mercuric chloride reduced germination slightly in some tests but not in all. The organic mercuries, such as Semesan and Uspulun, showed no injurious effects. These materials can undoubtedly be used on the above mentioned varieties for reasonable lengths of time without fear of injury to germination.

"Soybean and Cowpea Wilt: Comparative tests are being made with strains of wilt producing fungi isolated from cowpea and soybean. In farm practice it is important to know if one can safely substitute soybeans for cowpeas on land where cowpeas die of the wilt disease. Pot cultures on Norfolk sandy loam indicate that blackeye cowpeas are more readily attacked by Fusaria isolated from wilted cowpea plants than by Fusaria obtained from wilted soybeans. On the other hand under the same test conditions neither the strains isolated from soybean nor cowpea produced wilt of soybean. It appears that the soybean plant is markedly more resistant to wilt producing Fusaria than is the cowpea. When Norfolk sandy loam was compared with coarse sand a much greater number of cowpea plants succumbed to wilt on the latter than on the former soil. There appears also to be a positive relation between the amount of root infestation with larvae of the bean beetle and the amount of wilt which develops on cowpea when grown on infested soil. A number of soybean plants likewise showed root infestation with bean beetle larvae, but none of these plants, although growing on coarse sand inoculated with Fusaria from wilted cowpeas, showed infection with the cowpea wilt fungus."

Note: This is the earliest document seen (May 2017) concerning purple stain disease of soybeans in North Carolina. Address: In charge, Div. of Plant Pathology, Dep. of Botany.

532. Ruffner, R.H. 1928. Soy bean hay versus alfalfa hay for winter maintenance of sheep. *North Carolina Agricultural Experiment Station, Annual Report* 50:48-50. For the year 1927.
• ***Summary:*** Feeding experiments show soy bean hay gives good results.

533. Lehman, Samuel G. 1929. Studies on bacterial pustule of soy bean (Abstract). *Phytopathology* 19(1):96. Jan.
• ***Summary:*** An abstract of "Observations and experiments relating to the bacterial pustule disease of soybean." Address: North Carolina.

534. 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 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.

535. Williams, C.B. 1929. Soybean growing in North Carolina. *North Carolina State College of Agriculture, Extension Circular* No. 127. 19 p. Jan. Revised.

• ***Summary:*** Contents: Introduction. The growing plant. Distribution in North Carolina. Soybeans vs. cowpeas. Soybeans compared with peanuts. Suitable varieties of soybeans (for seed and for hay; in the mountains, piedmont, or coastal plain: Biloxi, Herman, Laredo, Mammoth Yellow, Otootan Southern Prolific, Tokyo, and Virginia). Selection and preparation of the soil. Inoculation essential. Kinds of fertilizer to use. Seeding and cultivation. Rotations with soybeans (for coastal plain soils, for piedmont soils, for mountain soils). Soybeans in mixtures (with sweet sorghum, millet, or corn). Harvesting for hay. Harvesting for seed. Soybeans soil improvement. Soybeans for soiling purposes. Soybeans for pasturage. How soybean crop is utilized (in the United States and in North Carolina by percentages). Cost of growing the beans. Crushing beans from the standpoint of millmen and farmers. Products secured by oil mills in crushing (oil, meal). What can oil mills afford to pay for beans. Possibilities as indicated by important uses of soybean products (soybean oil and meal). Some advantages to farmers of soybeans over other oil-bearing seed crops.

"North Carolina produces from 18 to 20 per cent of the soybean crop of the United States grown for all purposes including seed, hay, and soiling. Approximately 19 per cent of all soybean seed is produced by North Carolina Growers. The acreage planted annually in the state is now about equal to that of cowpeas and the crop from year to year is finding favor with growers in new territory."

"Inoculation essential: Soybeans, like other legumes, are characterized by their ability to take free nitrogen from the air, if the soil is inoculated with the proper bacteria for this crop. In growing soybeans on land for the first time, especially in a locality where this crop has not been grown previously, it will pay to inoculate the soil by either using soil from an inoculated field or one of the commercial cultures. The latter may now be secured at very reasonable prices. In some parts of the state I would say, however, that the bacteria suitable for inoculating this crop seem to be quite widely distributed in the soil. When soybeans are planted on many soils, it will usually be found that nodules are present on the roots in large numbers by natural inoculation. Experiments have shown that something like 50 per cent more nitrogen was found in the stems and leaves of soybeans which were planted on inoculated soil than in those grown on uninoculated soil.

"Kinds of fertilizer to use: As soybeans on inoculated soil will be able largely to gather their nitrogen from the atmosphere, it will not be necessary to add but little, if any, commercial nitrogen. However, if the soil is poor it will pay to make an application of barn-yard manure or add sufficient cotton-seed meal, nitrate of soda, sulphate of ammonia, or other commercial carriers of nitrogen to give the fertilizer mixture 1 to 2 per cent nitrogen. Ordinarily from 200 to 300 pounds of 16 per cent acid phosphate and 25 to 50 pounds of muriate of potash will supply the necessary amount of phosphoric acid and potash needed by this crop when grown on average soils in the eastern part of the state. The acid phosphate alone will be sufficient to add on average soils in the piedmont and mountain sections. With poor soils, 25 to 30 pounds of nitrate of soda or sulphate of ammonia per acre will supply sufficient nitrogen if the crop is inoculated." Address: Chief, Div. of Agronomy, North Carolina State College of Agriculture and Engineering, Raleigh.

536. Eisenschiml, Otto. 1929. History and prospects of domestic soya bean oil. *American Paint Journal* 13(22):22, 24, 26, 28, 30. March 18. [2 ref]

• ***Summary:*** Soya beans were first brought to America in 1804 and "were grown as a curiosity until 1880, when commercial crops began to appear here and there. In 1914 only 2,000 acres were planted in beans in the state of Illinois, but by 1927, this acreage had increased to 776,000. In the entire United States 50,000 acres were planted in 1917, 2,500,000 in 1924, and the acreage for 1928 was 2,847,000. Figuring an average yield of 18 bushels to the acre, it can readily be seen that the soya bean crop is fighting its way through to the smaller major crops of our country with a rapid stride."

"North Carolina led the way and produced a small amount of [soya] oil in 1916 and intermittently from then on. The first oil was produced in a cotton oil mill with the existing machinery and during a time when the mill otherwise would have been idle.

"Pioneers of the industry: So far as I have been able to ascertain, the first soya bean oil made outside of North

Carolina was made at Chicago Heights, Illinois, in 1920 by the Chicago Heights Oil Manufacturing Company. An Anderson expeller was used, and I bought and sold the first 20 barrels made. In 1922 oil was made by the A.E. Staley Manufacturing Company, of Decatur, Illinois. At that time only one expeller was installed by this concern, but two more were installed shortly afterwards and 90,000 bushels of beans were crushed. The capacity of this mill today is over a million bushels per year. Mr. A.E. Staley, a North Carolinian by birth, is taking an active interest in all developments pertaining to soya beans. In 1923 the Blish Milling Company, of Seymour and Crothersville, Indiana, also began to crush soya beans, and their production rose to 317,000 pounds in the season 1927-28.

"In 1924 Funk Brothers, of Bloomington, Illinois, joined the ranks of these pioneers, engaging the services of I.C. Bradley, of the Chicago Heights Oil Mfg. Co., and one of the greatest living authorities on soya beans and their allied lines. Mr. Bradley today has under his supervision mills that will crush in the season of 1928-29 a probable total of 700,000 gallons. This compares with a total of 20,000 gallons made by him in Chicago Heights in 1921.

"The total domestic production of oil was too small to be tabulated by the Bureau of the Census in Washington until the year 1922, when the production was given as 751,000 pounds. Since that time it has risen in 1928 to 4,716,000 pounds as may be seen from the following table:

"1922–751,000 pounds.

"1923–1,404,000 pounds.

"1924–950,000 pounds.

"1925–2,520,000 pounds.

"1926–2,645,000 pounds.

"1927–3,088,000 pounds.

"1928–4,716,000 pounds (estimate).

"The greatest handicap the soya bean oil industry has had to combat has been the scarcity of mill beans. Only one or two mills have ever been able to run the year through. The farmers would either feed the beans to live stock or else they would hold them for seed purposes so that the mills could not work continuously and therefore economically. Last year Funk Brothers, in connection with the American Milling Company, at Peoria, offered the farmers a base price of $1.35 a bushel for a quantity up to a million bushels received for crushing purposes, and thereby seem to have stabilized their source of supply.

"At the present time new mills for the crushing of beans are springing up everywhere and others are planned in various localities. Soya beans are now being grown in practically all states east of the Mississippi, and the erection of oil mills appears quite a logical sequence, especially in the South where existing facilities could be utilized to good advantage."

In crushing soya beans, "some producers are using expellers; others are using hydraulic presses. One mill, at Monticello, Illinois, used an extraction plant, but apparently not with good success. The solvent used was benzol, and difficulties were encountered in removing the last traces of solvent from the meal."

A table shows imports of Manchurian soya bean oil from 1918 (335.98 million lb) to 1928 (13.12 million lb), and exports of soya bean oil from the USA during the same period. "A 2½ cents per pound duty on foreign soya bean oil has been in effect since 1922 which makes it impossible for it to compete with domestic products of a similar nature except in localities where the freight rate offsets the duty, principally on the Pacific Coast."

"Soya bean oil can be used in unlimited quantities for soap making purposes; it can also be used as an edible oil, but is not particularly well adapted for that purpose." Other uses are those in the paint and varnish industry, in which field soya bean oil has a well-defined place.

Footnote on page 26: "Crop Reporting Board, Washington, D.C.–According to its official figures the [soybean] acreage for the whole United States in 1927 was 2,815,000 with the following disposition:

"Hay, 1,653,000;

"grain, 621,000;

"grazing, hoggings [hogging down], silage, etc., 541,000.

"For 1928 the figures show a total crop of 2,847,000 acres with the following disposition:

"Hay, 1,725,000;

"grain, 651,000;

"grazing, hogging, silage, etc., 471,000.

"For the state of Illinois the total acreage in 1927 of 776,000 was divided as follows:

"429,000 acres grown alone;

"347,000 acres grown in corn.

"The Government board allows the latter 1/10 equivalent of solid acreage which would make a total solid acreage for Illinois of 464,700."

Note: This paper was first read before the Northwest Paint & Varnish Production Club, Minneapolis, Minnesota, on 11 March 1929. It was next read before the annual meeting of the American Soybean Association, on 10 Sept. 1930, at the University of Illinois at Urbana.

A small portrait photo shows Otto Eisenschiml. Address: President, Scientific Oil Compounding Co., Chicago, Illinois.

537. 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.'"

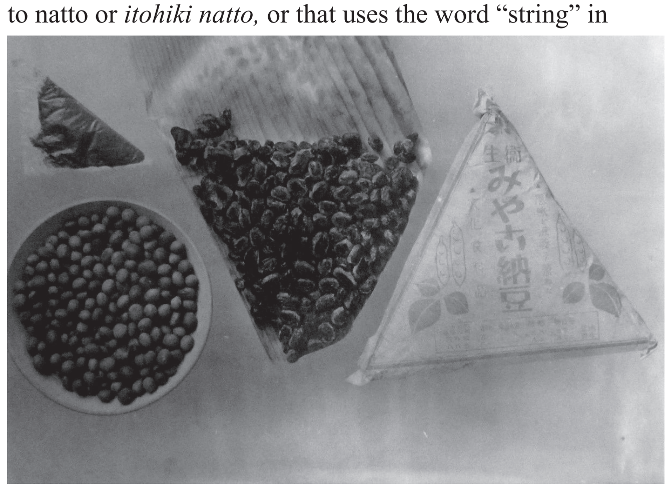
Mr. Morse added: "A visit was first made to the Saitama Experiment Station located at Urawa, Saitama Prefecture. We met here Mr. Tadashi Hashigawa, Agricultural Engineer, who is in charge of the soybean work of the Saitama Prefecture, which is the third in acreage of soybeans in the Japanese Empire. 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.

538. Sweeney, O.R.; Arnold, L.K.; Arnold, J.H. 1929. Processing the soybean. *Iowa State College of Agriculture and Mechanical Arts, Official Publication* 28(7):1-46. July 17. [23 ref]

• ***Summary:*** Also catalogued as: *Iowa State College, Engineering Extension Service, Bulletin* No. 103.

Contents: Introduction. The soybean and the farmer: Characteristics of the soybean, uses of the soybean, soybeans in Iowa, cost of growing the soybean, the soybean and the nitrogen problem, the soybean and the protein problem.

The soybean and the vegetable oil problem.

Methods of producing soybean oil: The hydraulic press method, the Anderson Expeller method, the solvent extraction system (the stationary extractor, the large-scale Soxhlet extractor, the rotary extractor, extraction solvents).

Plant design. Production costs: Operating costs, calculation costs.

Table 28, titled "U.S. soybean oil mills" (p. 43) lists 10 establishments that "are, or have been, processing soybeans for the production of soybean oil: (1) The A.E. Staley Co., Decatur, Illinois. (2) Funk Bros. Seed Co., Bloomington, Illinois. (3) The Chicago Heights Oil Co., Chicago Heights, Illinois. (4) The Elizabeth City Oil and Fertilizer Co., Elizabeth City, North Carolina. (5) The Winterville Cotton Oil Co., Winterville, North Carolina. (6) The New Bern Cotton Oil and Fertilizer Mills, New Bern, North Carolina. (7) The East St. Louis Cotton Oil Co., East St. Louis, Illinois. (8) The Peru Products Co., Peru, Indiana. (9) The Eastern Cotton Oil Co., Elizabeth City, North Carolina. (1) The Havens Oil Co., Washington, New Jersey." Address: 1. Dr., Head, Chemical Engineering Dep.; 2. Asst. Chemical Engineer, Engineering Experiment Station; 3. Research Fellow, Engineering Experiment Station: All: Iowa State College, Ames, Iowa.

539. *Plainfield Messenger* (*Indiana*). 1929. Obituary: Adrian A. Parsons. 50(32):2. Aug. 8.

• ***Summary:*** Parsons was born 7 Nov. 1846 in Greensboro, North Carolina, the son of Nelson Yancy Parsons and Elvira Swain Parsons. At age six, he moved with his parents to Indiana and settled in Hendricks County. His sturdy physique during his early years "stood him in good stead in the performance of the endless work of that time." His respect for the dignity of labor followed him through life.

At an early age he developed a desire for education. Throughout his life he was a zealous student, and always deeply religious.

During the Civil War, at age 17, he enlisted in Company I, 9th Indiana Cavalry, and served with distinction. On 16 Nov. 1864 he was wounded on the field of battle in Franklin, Tennessee, and left for dead. Nine days passed before he received surgical attention. So great were his physical powers that he survived. He was honorably discharged on 13 Aug. 1865. He returned home and attended Earlham College for two years.

On 10 April 1870 he was married to Mary Ann [sic, Mariah] Fox [in Washington Township, Hendricks County. The daughter of Barney Fox and Hannah Gossett, she had been born on 19 Dec. 1850 in Washington Township]. They had nine children. Their youngest child died in the world war on 21 Oct. 1918. Mary Ann Parsons departed this life at the old family home, WaPeKeWay Farm on 27 Oct. 1922. Their surviving children are Lester W., Norman E., William N., Ethyl, Edith, Gilbert R., Mary, and Chester. Also 34 grandchildren mourn his death.

In 1886 Adrian purchased and moved into his late home, and from that time until the time of his death he was deeply interested in agricultural development. At about that time he was united with the Friends Church [Quaker] at Plainfield.

Adrian departed this life on 1 Aug. 1929 at the age of 82 years and 8 months. "Adrian Parsons never followed the beaten path. He thought, he planned, he originated, and always for the betterment of mankind, with no consideration for his own remuneration.

"His entire life was marked by a deep reverence for God. His eyes were ever open to God's miracles in the workings of nature. His heart was filled with love for all mankind and especially little children. And when the call came to him to cross into the Great Beyond, his last words and the smile on his face gave evidence of a triumphant

entrance there–the temple finished."

Lee Parsons, a great-grandson of Adrian, adds (letter of 23 Aug. 2000 to William Shurtleff): "Dad told me that this obituary was written by Ethan Kendell, a Danville attorney and old family friend. It is interesting that no specific mention is made of his work with soybeans."

Adrian spelled the name of his farm Wa-Pa-Ka-Way Farm, but nowadays everyone else spells it Wa-Pe-Ke-Way; it is the Miami Indian name of White Lick Creek.

Adrian bought this farm, the family home place, in 1884 while he was living in Danville. It was about one mile away from his former home. He moved onto that farm in 1886.

Concerning religion: Adrian's mother was a Quaker from North Carolina and his father was a Methodist–at the time of their marriage. His mother was "separated from fellowship" from marrying a non-Quaker. Adrian's religious upbringing is not clear, but he could not have been a Quaker at the time he enlisted to fight in the Civil War since most Quakers refuse to fight in any war. Lee believes that he did not join a Quaker church until about 1900.

Adrian generally worked to improve agriculture and for the betterment of others–but he did sell the soil from his farm to those wanting to inoculate soybeans, which indicated some "consideration for his own remuneration." He also had a temper with those he felt had wronged him–especially J.B. Edmondson and Doc Holdley, his neighbor.

He was loved by children, and was a living legend among his many grandchildren. Lee's dad and the others "all had wonderfully warm memories of Adrian." He was a great family man. Adrian had the habit of giving his grandchildren books for Christmas. In the front he would inscribe: "For the Parsons Boys' Library." There were five boys in Lee's father's family. Lee still has many of those books. Lee Parsons still has books he inscribed This obituary and the story of his death are the two best obituaries of Adrian Parsons.

540. 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.

541. *Daily Advance* (*The*) (*Elizabeth City, North Carolina*). 1929. Story of how soy beans were introduced here is told by Mrs. Outlaw, Sr. C. Wilson Hollowell recalls how they were planted at Bayside; Production of soy beans as farm crop increasing tremendously in America. Nov. 2. p. 1.

• ***Summary:*** "The production of soy beans, first grown as a farm crop in this country in North Carolina 50 years ago, is increasing tremendously according to an article by Harry R. O'Brien in the November [1929] issue of the Country Gentleman.

"In 1917 it was estimated that there was a total acreage of 500,000 which by 1928 had grown to 3,000,000...

"The story of the introduction of the first soy beans into the Albemarle is told by Mrs. E.R. Outlaw, Sr., of Riverside Drive [Elizabeth City], whose husband received some which had come from Japan in the 1880's, and began to raise them on his farm in Bertie County. Japan peas is what they were called then and Captain Outlaw sent a flour bag full of them to C.W. Hollowell of Bayside [on "Dec. 23, 1886" is penned in by hand by Margaret Hollowell].

"C. Wilson Hollowell of this city [Elizabeth City] remembers when his father first received the seed and planted them on his farm. He thinks that it was in about 1885. Mr. Hollowell raised soy beans every year afterward, and as there were no harvesting machines for them then they were cut and threshed in a cradle, and the beans used for feeding the farm mules through the winter, it being found that with the beans it was unnecessary to use corn."

Note: At the bottom of the article pasted in her scrapbook titled "Who am I?" Margaret Hollowell has written: "Lucy R. Outlaw (now Mrs. Samuel Wheeler Worthington) brought the bag of 'Japan peas' to C.W. Hollowell when she came to spend Christmas holidays with Mr. H."

542. Lehman, Samuel G.; Woodside, James W. 1929. Varietal resistance of soybean to the bacterial pustule disease. *J. of Agricultural Research* 39(10):795-805. Nov. 15. [4 ref]

• ***Summary:*** Fifty-five soybean varieties are listed showing their reaction to the disease. The causative agent, *Bacterium phaseoli sojense* Hedges, is widespread and occurs in a majority of soybean fields in North Carolina. Columbia variety possesses greatest resistance. Other highly resistant varieties include Mandarin and Dominion. Address: 1. Plant Pathologist; 2. Asst. in Pathology. Both: North Carolina Agric. Exp. Station.

543. O'Brien, Harry R. 1929. Soy beans for profit: Combines and a cash market cause acreage to mount. *Country Gentleman* 94(11):19, 120-21. Nov.

• ***Summary:*** "While soy beans have been known in this country for 125 years, it was about fifty years ago that they were first grown in North Carolina as a farm crop and about 25 years ago when they were first introduced into the Middle West. In 1917 it was estimated that perhaps 500,000 acres were being grown for all purposes. Since then the acreage has increased annually until in 1928 around 3,000,000 acres were being grown in twenty or more states. Rapid as this growth may seem, it has been handicapped by difficulties of harvesting and lack of a commercial market for the beans.

"But within the past two years the situation has been radically changed" because of the combine harvester and the new cash market provided by the Peoria Plan and A.E. Staley. "These things I learned when late in the past summer I drove my car for more than 1200 miles through the Midwest to get the details of what was stirring in soy beans... There are soy beans everywhere, I found."

A star performer in many roles, "Soy beans offer another cash crop for the farmer. They are about immune to chinch bugs and the corn borer. Planted in corn, they shade the ground and protect the corn from the chinch bugs.

"Then there is the use being made of soy beans in industry, as beans, as oil, as meal. The oil is expressed out of the beans by the same process used with cottonseed. A ton of beans yields roughly from 1600 to 1700 pounds of cake or meal and from 250 to 300 pounds of oil.

"The beans are usable for coffee substitutes, soups, baked beans, confections, meat substitutes, vegetable casein, vegetable milk and cheeses. There are now several factories in this country making soy sauce. I know of one plant making chocolate out of soy beans.

"The oil is suitable for use in soap stocks, enamels, varnishes, paints, rubber substitutes, linoleum, waterproof goods, celluloid, explosives, glycerin, salad oil, lard substitutes and edible oils.

"Soy-bean meal, in addition to use as livestock feeds, is used for flour, diabetic foods that are supplanting gluten flour, infant foods, macaroni, breakfast foods, fertilizers and adhesive glue. Much of the glue used in furniture veneering is coming from soybean meal.

"Such are some of the qualities of this many-sided farm legume." The author then gives five reasons why soy beans have made such rapid growth in the past ten years: 1. Farmers have tried them and liked them, and the news has spread. 2. The influence of the agricultural colleges, experiment stations, extension services, and county agents. Experiments have been conducted on varieties, and methods of growing and feeding. 3. There have been "certain focal points where a few farmer pioneer enthusiasts grew them for seed and from these points the acreage has spread in concentric circles. There are a dozen of these points."

4. Improved harvesting methods; "and this is a story that is tied up with that of another focal point, Christian County, Illinois, where Claire E. Hay was county agent from 1918 to 1928. Hay knew beans from boyhood. When he came to

Christian County chinch bugs had been bad for several years. So Hay began boosting soy beans as a means of outwitting the bug.

"Now in Christian County among the biggest growers of soy beans are the Garwood brothers, Frank and Harry. They had heard of combine harvesters being used out West for harvesting and threshing wheat in one operation in the field. They had a hunch that maybe this same machine would work with soybeans. Some Indiana farmers had rigged up a homemade affair that had already been used.

"But the manufacturers were skeptical. Two firms turned them down, refused to sell a combine for such a purpose. But a third did sell, and in 1924 what was possibly the first combine ever used in Illinois for any purpose, surely for beans, came to the Garwood farms and a public demonstration was held.

"To most people's surprise, the combine worked. So in one day the Garwood brothers had revolutionized soy-bean harvesting. Other growers were quick to seize on the idea, as were wheat and oat farmers too."

5. The newest development is the creation of a commercial market for soy beans. "Lack of a market was holding back farmers from growing the soys. So a committee of three count agents, headed by Hay, called on A.E. Staley, a feed manufacturer of Decatur, and asked him to use soy beans in his feeds. Staley built an oil mill, began buying beans and a commercial market was opened up.

"Oil mills were built later at Peoria and Bloomington. These mills have bought the beans and thus Illinois has taken the lead in growing them.

"The next step in the story came when along in 1927 Hackleman at the University of Illinois figured out that the marketing of soy beans would be much more stabilized if farmers could grow them on contract for the mills. He and Doctor Burlison, chief in agronomy, suggested this plan to H.A. Atwood, a feed manufacturer in Peoria. The idea simmered on and several conferences were held.

"In the spring of 1928 Illinois farmers were faced with a wholesale killing out of their winter wheat. A conference was called at Urbana in April to consider what to recommend as an emergency crop, to which farmers, county advisors and feed manufacturers were invited. The advisors said that soy beans was [sic] the logical crop but there was no use to urge them because of a lack of a market.

"Mr. Atwood announced that his firm stood ready to contract at a guaranteed price for a million bushels of beans or the crop from 50,000 acres. A firm at Bloomington was associated with him in the offer.

"Back of the offer was the Grange-League-Federation, representing New York dairy farmers, which farm organization buys its feeds from Mr. Atwood's firm. The G.L.F. representative said in effect that if the Illinois farmers would grow the beans, the farmers of New York would buy the feed made out of them.

"The outcome was that a minimum price of $1.35 per bushel was set, based on farm cost-account records from four states in comparison with the price the G.L.F. had been paying for other protein feeds. County advisors circulated blank contracts through Farm Bureau membership lists, and 1344 farmers signed up to deliver beans from 48,444 acres, which, when marketed, totaled about 1,200,000 bushels of beans [24.77 bu/acre yield]. After paying freight and handling charges, the crop netted farmers around $1.20 a bushel."

A large photo shows two farmers, each with a team of four horses pulling a piece of farm machinery, on the farm of Finis Fouts, Deer Creek, Indiana. The first is cutting soy beans with a binder. The second, 10-15 feet behind, is drilling wheat for the next crop. Address: Central Ohio.

544. Lehman, Samuel G. 1929. Research in botany. Division of Plant Pathology: Soybean diseases. *North Carolina Agricultural Experiment Station, Annual Report* 51:59-61. For the year 1928. [1 ref]

• ***Summary:*** Discusses: Frogeye leaf spot *Cercospora daizu Miura* (=C. sojina), Downy mildew (*Peronospora manshurica*), and Bacterial pustule (*B. phaseoli var. sojense*).

Cercospora daizu may remain alive on moist diseased leaves until next planting season, but is unable to survive the disintegration of the leaves. Seed treatment proved unavailing.

A test was made to determine the value of seed treatment in the control of downy mildew. Seed of the Herman variety was used. These seed had come from a field in which 50 to 75 per cent of the plants were infected with mildew in the previous season. Different lots of these seed were treated with solutions of mercuric chloride, semesan, and uspulun, while some of the seed were planted untreated for comparison. At the height of the growing season mildew was found to be present on 50 per cent of the leaves of the plants grown from untreated seed, while on the plants growing from treated seed the percentage of infected leaves varied from a minimum of 1 to a maximum of 10. The treatment with semesan and uspulun were slightly more effective than with mercuric chloride.

Note 1. This is the earliest document seen (Aug. 2009) that contains the term "seed treatment," which it describes seed treatment as a means of preventing seed disease.

Note 2. This is the earliest document seen (Aug. 2009) that mentions semesan, which appears to be a generic fungicide.

The bacterial pustule organism was found to remain viable in dry diseased leaves as well as partially decayed leaves left out-of-doors form one season to another. Columbia variety of soybean was practically immune.

545. Kime, P.H. 1930. I. Factors in soybean production: II–Variety recommendations and characteristics. *North Carolina*

Agricultural Experiment Station, Agronomy Information Circular No. 49. 6 p. March.
• ***Summary:*** The following is probably a summary of this Circular No. 49 from the *Fifty-Third Annual Report of the North Carolina Agricultural Experiment Station* (p. 30, 71-72, for the year ending Dec. 1930).

"Soybean Varieties. Tests, including a large number of varieties, were conducted at the Central Station and at four of the branch station farms during the summer of 1929. The highest yielding varieties for seed and hay on the three farms representing the Coastal Plain. Piedmont, and Mountain sections of the State are given in the following table:

At the Central Farm (Raleigh) (6 years average): The best soybean varieties for seed yield are Tokyo, Herman, Virginia, and Mammoth Yellow (21.6 to 17.3 bu/acre). The best varieties for hay yield are Otootan, Laredo, Herman, and Chiquita (4,910 to 4,148 lb/acre).

At the Coastal Plain Farm (Willard) (5 years average): The best soybean varieties for seed yield are Herman, Tokyo, and Mammoth Yellow (25.5 to 23.2 bu/acre). The best varieties for hay yield are Otootan, Biloxi, and Laredo (5,380 to 5,026 lb/acre).

At the Mountain Farm (Swannanoa) (8 years average): The best soybean varieties for seed yield are Herman, Southern Prolific, and Virginia (23.0 to 21.3 bu/acre). The best varieties for hay yield are Herman, Laredo, Herman, and Virginia (no yields given).

"Other promising varieties are the George Washington, a medium early non-shattering type; the Chiquita, a good hay variety; and the Dixie, an early, heavy seed producer which is adapted to the tipper Piedmont and Mountain areas. A large number of new introductions have been tried out during the past few years. Some have shown considerable promise but none have shown up superior to these varieties now being grown by farmers of the State."

546. Mann, H.B. 1930. Availability of manganese and of iron as affected by applications of calcium and magnesium carbonates to the soil. *Soil Science* 30(2):117-42. Aug. [53 ref]
• ***Summary:*** "One of the first great contributions to plant production was the establishment of the fact that certain elements are essential to plant growth, which culminated in Liebig's complete list, from which he erroneously omitted iron. With this change, the original 10 essential elements have remained intact for about three-quarters of a century, although many investigators have produced evidence favorable to the inclusion of others.

"The importance of manganese has been stressed, but until recently it has received little consideration. Within the past few years the coincidence between response to manganese fertilization and the alkalinity of certain naturally calcareous and limed soils has indicated a probable relation between soil reaction and the availability of manganese similar to that which has been apparently established for iron."

Note: This article is taken from a thesis presented to the graduate faculty of Cornell Univ. in partial fulfillment of the requirements for a PhD degree. Address: North Carolina Agric. Exp. Station.

547. Meharry, Chas. L. 1930. Seeing soybeans on Illinois farms: Stop No. 3–A.P. Meharry Farm [American Soybean Assoc. annual meeting]. *Proceedings of the American Soybean Association* 3:103-08. Eleventh annual field meeting. Held 10-12 Sept. 1930 in Illinois.
• ***Summary:*** Sept. 11, 1930. Thursday morning, 12:30–2:00. This farm is located one mile south and two miles east of Tolono. Lunch was prepared by the Ladies' Aid of the Tolono M.E. [Methodist Episcopal] church. The tour shows large scale production of soybeans, illustrating farm practices and inoculation studies.

After lunch, at 2:00, the author begins: "Fellow soybean enthusiasts: This is the third time that our farms have had the privilege and pleasure of welcoming the American Soybean Association. I believe that considering its youth and small numerical strength, the Association has accomplished more than any other farm organization. The American Soybean Association held its first meeting in Indiana in 192o. Practically all nearby states were represented and Hoosierdom turned out in force. So much enthusiasm and inspiration resulted from this meeting that a decision was reached to hold a meeting each year in a different state. Meetings have accordingly been held each succeeding year as follows:

"1920 Fouts Bros. Farms, Camden, Indiana

"1921 Illinois Agricultural Experiment Station, Urbana-Champaign, Illinois.; and A.P. Meharry Farm, near Tolono, Illinois

"1922 Missouri Agricultural Experiment Station, Columbia, Missouri

"1923 Wisconsin Agricultural Experiment Station, Madison, Wisconsin

"1924 Iowa Agricultural Experiment Station, Ames, Iowa

"1925 (Our first three-day meeting)

"1st day, U.S. Department of Agriculture, Washington, D.C.; and Arlington Experiment Station

"2nd day, farm of Harvey S. Clapp near Accotink, Virginia (this was part of George Washington's estate)

"3rd day, Maryland Experiment Station, College Park, Maryland

"1926 Delta Branch Experiment Station, Stoneville, Mississippi; and several Yazoo-Mississippi Delta counties

"1927 North Carolina–Washington, N.C.; and Beaufort, Hyde, Martin, Bertie, Chowan, Perquimans, and Pasquotank counties

"1928 Purdue University Experiment Station, Lafayette,

Indiana; and four regional meetings

"1929 Guelph, Ontario, Canada, Experimental Station and surrounding territory

"1930 Illinois Agricultural Experiment Station; the Robeson Farm near Champaign; the John T. Smith and the A.P. Meharry Farms near Tolono; Funk Brothers Oil Mill, Bloomington; and Allied Mills, Peoria [Illinois]

"If any of you can mention another field crop, the growers of which maintain an international association which has held a big field meeting like this each year for eleven consecutive years in nine different states, the District of Columbia, and one Canadian Province, you will prove yourselves better informed than I am.

"The Association and the soybean crop owe a debt of gratitude to many experiment stations, corporations, organizations, and individuals who have contributed liberally both in funds and energy.

"Assisted by other organizations, one accomplishment of this Association perhaps not yet widely known was the raising of the tariff on soybeans from 30 cents to $2.00 per bushel and on soybean oil from 2½ cents to 3½ cents, while soybean meal and cake which, under preceding tariff acts had been on the free list, were given a protection of $6.00 per ton.

"Truly remarkable teamwork has always characterized the efforts of the American Soybean Association. Experiment stations have always helped the growers to a most remarkable extent; in fact they should receive the major share of the credit for these meetings. Such wonderfully successful meetings could never have been without their loyalty.

"This farm has a total of a little more than 1400 acres under Mr. Riegel's management, and I believe you will agree with me that appearances indicate that it has been efficiently handled this dry year.

"The home farm consisting of this Section 5 and the diagonal quarter section to the southwest was entered from the U.S. Government by my grandfather, Thomas Meharry, in 1855 and 1857. When grandfather, Thomas Meharry, acquired the land, it was wild, wet prairie. My father, Abraham P. Meharry, settled here as a young man and later brought his Hoosier bride to live here. They spent the best of their lives right here, and the place is still best known as the A.P. Meharry farm.

"Prior to 1909 this farm was farmed by very good tenant farmers as a rule. Father told me that for a period of about seven years he spent practically all the earnings of the farm for tile, and there are many carloads buried in the farm; still there are not enough, as there are wet spots left yet to drain. Father believed in clover and insisted upon sowing clover seed with the small, grain crops. Small grain meant oats almost invariably, for I remember only one or two wheat fields on this farm prior to 1909. So while this farm was in better state of productivity than many in the county, it had fallen far below its virgin state of fertility.

"The farm was put under the management of Mr. C.H. Oathout in the fall of 1908. In the spring of 1909 we found that clover had failed on a part of the farm where it was most needed. This was a block of thin, white, sour land. Mr. Oathout therefore proposed that we substitute soybeans where clover had failed. A few acres of 'Black Beauty', probably Ebony, were sown and about nineteen acres of 'Early Yellow', which were really Ito San. We knew nothing about the crop, so like many beginners, we simply sowed the seed and left the plants to the tender mercy of the weeds. We had plenty of foxtail, of course, but the land was too thin to be very foul. Consequently we had 'fool's luck' and harvested 19 bushels per acre of Ito San. The Black Beauty was all cut for hay.

"Three hundred sixty-one bushels of soybean seed seemed like a prodigious amount to us, and we succeeded in peddling out in little dribs of a few pounds to a few bushels all the seed we could spare at $1.75 per bushel. Before it was all gone we resolved to plant beans again and even to increase our planting to thirty whole acres! Again we had a good crop and sold it without much difficulty.

"We had found the farm divided into eight fields and taking the course of least resistance, adopted an eight-year rotation to fit the fields. It was as follows: corn, corn, oats, clover, corn, oats, wheat, clover. Soys at first were used merely as a clover substitute. Besides this major rotation we ran a minor one on several small fields of irregular size and shape which results from an effort to get the larger fields squared up. By the time Mr. Oathout left the farm both he and I had begun to acquire some rather widespread notoriety as 'soybean cranks'. As yet we were among a very few soybean growers in this county.

"Mr. Riegel came here in the fall of 1913. He seemed to be easily inoculated with soybean enthusiasm, and so the program grew. We both suspected that oats were not a highly profitable crop and just on suspicion we substituted soys for oats in the last half of the rotation, and tried sowing wheat in soy stub without plowing. It worked, altho folks thought we were crazy. Our rotation thus became: corn, corn, oats, clover, corn, soybeans, wheat, clover.

"We had begun to keep an accurate cost account of our fields, largely to give ourselves the courage of our convictions. A few years of that proved conclusively enough for our purpose that oats were unprofitable, on this farm at least, so out went the other oats field and we changed our rotation to corn, soybeans, wheat, and clover, there now being two fields of each crop annually. This was continued for several years, during which our average crop yields, particularly of corn and beans, gradually improved.

"During these years we had been applying limestone and phosphates, particularly raw rock phosphate, tho occasionally bone meal was used. These helped us to get sweet clover, as well as the other clovers, and some of the

old, sour, white spots began to yield almost as well as the better land.

"We have concluded that about the fastest way to rejuvenate an old, worn-out farm is to combine-harvest two or three successive crops of soys, returning the straw to the land. After such treatment we find that corn becomes a very satisfactory crop even on badly worn soil. For this kind of a program I suggest using a variety like Harbinsoy which utilizes the entire growing season and makes a big growth and satisfactory yield on thin land where earlier varieties commonly dwarf badly. Inasmuch as the soys are to be followed by a spring-planted crop, somewhat later maturity of the soys is not so important as it is when wheat is to be planted.

"By this time we had started using the four-row corn planter and cultivator and had learned more than ever to appreciate the importance of large fields and long "throughs" in the economical management of land. Therefore, we rearranged the field division of the whole farm. Three fields on this section are a mile long and the fourth about three-quarters of a mile long.

"Much of the value of such a meeting at this time comes from the discussion which is ordinarily prompted by it. If there are any questions regarding the management of these farms, we will endeavor to answer them." Continued. Address: Meharry Farms near Tolono, Illinois.

548. Meharry, Charles L. 1930. Report of Legislative Committee (Continued–Document part II). *Proceedings of the American Soybean Association* 3:114-20. Eleventh annual field meeting. Held 10-12 Sept. 1930 in Illinois.
• ***Summary:*** (Continued): "In this struggle for duty on soys and their products, many friends were helpful. Nothing could have been done without the assistance of the Farm Bureau Federation, the National Grange and the Dairyman's League. We also gratefully acknowledge the help of the Corn Growers Association of Indiana and the Crop Improvement Associations of Virginia and Illinois, and the Louisiana Sugar Planters. Many Congressmen, both Republicans and Democrats, fought valiantly for the cause. We hesitate to name them for fear some of the hardest workers may be omitted. Your committee is proud of this achievement of the Association and hopes that the membership of the Association may appreciate that in all such matters toleration of the opinions and wishes of related associations and groups is essential, and compromise amounts to victory when it is obtained from much more powerful and influential organizations than our own.

"During the three days your Committee was in Washington their time was occupied from morning until two or three o'clock at night with only brief intermissions for food and sleep. If the brief they wrote seems to our membership poorly prepared, we would plead for some leniency of judgment, for with five on the Committee, each with his own ideas, constant change and compromise was necessary. While this may have destroyed to some extent the homogeneity of our effort, yet we each believe that the brief was probably more satisfactory as a whole than if any one of us had composed it without help.

"The Grange was well enough satisfied with our brief and they not only accepted the rate we asked for on oil meal and cake and appealed for it in their own brief, but voluntarily suggested that they would gladly attach a copy of our brief to their own as a supplement to it. We were very grateful for this kind and extremely helpful consideration and left them a copy of our brief for that purpose. This summer we were authoritatively informed that this forward-looking attitude on the part of the Grange has actually cost that organization about five hundred of its Pacific Coast members who violently opposed the duty on soybean meal. Many hundred copies of our brief were printed and sent to the county agricultural agents of the principal soybean states with special letters requesting that the farm organizations be advised of the matter and that these organizations co-operate by communicating with their Congressmen in behalf of these tariffs. Replies were received from only two widely separated places, but we sincerely hope that we are more indebted for help from county agents and county farm organizations than we know. Our appreciation of the action of the two county agents and their farmers is intensified by the fact that their activity was so unusual.

"The Illinois Agricultural Association exerted a rather belated but vigorous influence just at the close of the campaign, for which we are duly grateful.

"I would like to read two or three sections from the Brief which was submitted by the committee prior to the hearing which was held Saturday, January 26, 1929.

"Brief submitted to the Ways and Means Committee of the House of Representatives of the United States, supplementing the appearance of Walter Godchaux, of Napoleonville, Louisiana, official representative of the American Soybean Growers' Association, Illinois Crop Improvement Association, Indiana. Corn Growers' Association, Virginia Crop Improvement Association, The American Sugar Cane League, The White Clover Seed Producers of Louisiana, Wisconsin and Idaho, The Livestock Farmers of Louisiana, credentials for which are attached.
"Soybeans are a new, yet old, crop in the United States. They were introduced in 1804 but were given only passing notice. During the past fifteen years they have attained the status of an important crop in this country; first, in the rotation of our corn belt and other staple crop territory; second, as a leguminous crop which improves the fertility of the soil upon which it is grown; and in this respect it is evidently destined in the relatively near future to occupy an acreage and be of an importance comparable with our great staples, such as wheat, corn, cotton, tobacco, sugar beets, sugar cane, and other basic crops.

"Reasons Why Soybeans Are an Important and Necessary Crop:

"1. More land devoted to the growing of soybeans means less land devoted to the growing of the staple crops having an exportable surplus, such as corn, oats, tobacco, rice, wheat, potatoes, etc. The disappearance of the exportable surplus of these crops will make the tariff on such crops immediately effective.

"2. Soybeans, by providing an abundant and cheaper, source of home-grown protein, will increase the supply of meat and dairy products to consumers, at the same time making their production profitable to producers.

"3. Soybeans provide an available emergency source of home grown material for the manufacture of war munitions. Soybeans also form a potential source of human and animal food supply, should an emergency occur.

"4. Soybeans can be made a profitable leguminous substitute for a cereal crop, such as oats, that have become undeniably unprofitable due to the smaller consumption of oats owing to the diminished horse population.

"5. Soybeans are the most widely adaptable protein and oil producing crop grown in the United States. They are successfully produced from Wisconsin in the north to Louisiana in the south, and from North Carolina in the east to Missouri and Oklahoma in the west.

"6. Soybeans have proven to be one of the few crops that can be successfully grown in the corn borer infested area.

"Production of Soybeans in the United States:

"The supply of soybean seed during the early years of the crop's popularity was all absorbed by the seed demand due to the rapidly increasing acreage, which at first was largely consumed upon the farms as feed for livestock.

"Imported beans were very undesirable for seed, due to mixture of varieties, lack of viability, and uncertainty of adaptability to given localities. Prices for domestic seed beans were, therefore, unaffected by importation and no tariff protection was needed.

"As soon as the commercial demand began to control the price, growers began to realize that a tariff was necessary to protect the industry from the competition of coolie-produced soybeans from the Orient. An import duty was asked and received in 1922. For a time this was a relief because it gave renewed confidence to the farmers and expanded the demand for seed beans, leaving industry with only a mediocre supply for a year or two, so that seed demand again governed the price for a time.

"Now, production has again overtaken and passed the seed demand and the grower realizes that the import duty provided by the Tariff Act of 1922 is inadequate to maintain profitable production and the crop is faced with the alternative of gradual extermination or rescue by increased tariff.

"The Cost of Producing Soybeans in the United States:

"According to Bulletin No. 165, University of Missouri, a copy of which is submitted herewith, the average cost of producing soybeans in the years 1910, 1911, 1914, 1915, 1916, 1917, was $14.28 per acre, the average cost per bushel was $2.30. In Indiana, according to Bulletin No. 306, December, 1926, a copy of which is submitted herewith, issued by Purdue University, Agriculture Experiment Station, the average cost of growing and marketing per bushel was $1.46. The average yield per acre in bushels in the United States in 1927 was 12 bushels.

"The University of Illinois has stated that it requires a yield of 20.6 bushels of soybeans per acre at $1.20 per bushel for the Illinois farmer to break even on his cost of production. The average commercial farm price for the Illinois farmer is considerably less than $5.20 per bushel."

"The Measure of Relief Needed:

"The following proposed rates, for which we ask, are arrived at after consultation with those who have studied the subject with a consideration for all industries affected, and it is believed they will work no substantial injury to any interest, and will substantially aid in building up and increasing the soybean industry of America.

"These rates are:

"Soybean seed, 2 cents per pound.

"Soybean oil cake, $6.00 per ton.

"We have not attempted to advance the many plausible, and often irrelevant arguments, that might be advanced in support of what we seek, nor have we attempted to refute the same class of arguments that may be raised against us.

"We stand on the fundamental points that we outlined in the beginning. We want protection for a growing agricultural industry, that will supplant crops having an exportable surplus, with a crop that has unlimited outlets.

"Signed

"Walter Godchaux, Vice-President American Soybean Association, 1927

"Harvey S. Clapp, President Virginia Crop Improvement Association

"W.E. Riegel, President Illinois Crop Improvement Association

"John T. Smith, Former Director American Soybean Association, Former Secretary Illinois Crop Improvement Association." Address: Attica, Indiana.

549. *American Thresherman.* 1930. Combining soybeans in the South: Atlantic Seaboard states find use for the combine. 33(8):7. Dec.

• ***Summary:*** "North Carolina, once the country's larger producer of soybeans for seed, is again turning to" the combine, which enables the farmer to harvest a much higher percentage of the seed he grows. B.G. Locher, a Virginia farmer, is "convinced that the combine is the practical and economical way in which to harvest soy beans."

Photos show: (1) A large combine in a field of soybeans. Caption: "Negro laborers kept this combine humming in the

bean fields of North Carolina." (2) A pile of sacked soybeans in a flat field.

550. Arny, Albert C.; Hodgson, R.E. 1930. Grow more soybeans in Minnesota. *Minnesota Agricultural Extension Division, Special Bulletin* No. 134. 12 p. Dec. Revised in 1934, 1935, 1936, and 1937. [1 ref]
• ***Summary:*** "Production in the United States: Soybean seed was introduced in the United States in 1804. Since 1900, seed of a large number of varieties have been brought in, but the crop was not important, except in limited areas, until about 1912. With the introduction and development of varieties maturing in from 90 to 160 days, production of soybeans became practical in the United States, as it requires almost the same climate and soil as corn.

"At first the crop was grown largely for seed, for hay, and in combination with corn for silage. During the last few years, the growing of soybeans with corn as a silage crop has decreased materially, whereas their production for planting as hay and pasture crops and for seed from which oil is extracted has increased rapidly. The states leading in soybean production, with acre yields, December price per bushel, and value per acre at December 1 farm prices are given in Table 1.

"Soybean acreages in 1929 were: Illinois, 240,000 acres; North Carolina, 162,000; Missouri. 161,000; Indiana, 100,000; and Ohio, 49,000. This is a marked increase in each state over the six-year average. Values of corn per acre for the period 1924-29, at December prices were: Illinois. $24.80; North Carolina, $20.60; Missouri, $20.80; Indiana, $22.70: and Ohio, $26.80.

"In these states the values of soybeans per acre have compared favorably with those for corn, and the cost of production per acre is not far different. Considering all this, there are advantages in favor of growing soybeans, one of which is the effect on crops that follow." Address: 1. Div. of Agronomy & Plant Genetics; 2. Southeast Exp. Station, Waseca.

551. Lehman, S.G. 1931. Powdery mildew of soybean. *J. of the Elisha Mitchell Scientific Society* 46(2):190-95. June.
• ***Summary:*** The causal fungus was identified as *Erysiphe polygoni,* but the strain from garden bean was unable to infect soybeans. Address: Plant Pathologist, North Carolina Agric. Exp. Station, Raleigh, NC.

552. Lehman, S.G. 1931. Observations and experiments relating to the bacterial pustule disease of soybean. *J. of the Elisha Mitchell Scientific Society* 46(2):179-89. June. Abstracted in Phytopathology. [5 ref]
• ***Summary:*** Discusses *Bacterium phaseoli* var. *sojense* (=Xanthomonas phaseoli var. sojense). *Bacterium phaseoli* var. *sojense* was isolated from lesions on soybean showing no sign of pustular development, which was believed not a necessary concomitant of the infection. The infection was heavier on plants kept at a constant temperature of 30º-33º C. than on those exposed to fluctuations between 22º and 30º C. The fungus was able to survive on dry leaves from one season to another. Address: Plant Pathologist, North Carolina Agric. Exp. Station, Raleigh, NC.

553. Lehman, S.G. 1931. The soybean disease situation. *J. of the American Society of Agronomy* 23(12):1065. Dec. Presented as part of Symposium on Soybeans. Leader: W.J. Morse.
Address: North Carolina State College.

554. Kenneth, H. Myers. 1932. Adjusting Corn Belt farming to meet corn-borer conditions. *Farmers' Bulletin* (*USDA*) No. 1681. 26 p. Feb. See p. 8, 11-12.
• ***Summary:*** "Introduction: The European corn borer has continued to spread in the United States until it is now known to be at the edge of the important areas of surplus-corn production" (see Fig. 1, map).

In the section titled "Supply of cash crops grown in the Corn Belt in relation to consumption requirements," figure 4 (p. 8) shows the seasonal distribution of man labor used in growing and harvesting 10 acres of four grain crops (corn, oats, wheat, and soybeans) in east central Illinois. For both soybean and corn, labor is needed at about the same times–for planting (April-June) and harvesting (Sept.-Oct.), but the soybean harvest is usually finished at about the same time the corn harvest begins. In this same section is a subsection titled "Soybeans" (p. 11) which states: "Soybeans have been grown for hay or as an interplanted crop in the Corn Belt for several years. Until recently the production of beans for grain, however, has been limited to those needed for seed, only the beans of poor quality being fed to livestock. Practically no soybean oil was manufactured in the United States until after 1921, when a tariff of 2½ cents per pound was put on imports. In 1922-23 about 1,482,000 pounds of oil was made form soybeans, and in 1928-29 this quantity had increased use of soybeans for the manufacture of oil and for feeding has resulted in a larger acreage of beans being grown. Illinois, Missouri, Indiana, and North Carolina are the leading States in soybean production.

"A considerable increase in soybean acreage may be profitably made in districts that are well adapted to the crop."

"Although limited quantities may be fed to hogs the tendency of the whole grain toward producing soft pork makes the oil-meal cake, a joint product of the oil industry, more desirable.

"The distribution and amount of labor required in the production of soybeans for grain is similar to those needed for corn, and no additional equipment is needed on the acreage farm. The total acreage of soybeans harvested for grain in 1928 was only 656,000 acres; if in the near future it were increased by only a very small part of the present

corn acreage in the Corn Belt, the price of soybeans would be decreased." Address: Assoc. Agricultural Economist, Div. of Farm Management and Costs, Bureau of Agricultural Economics.

555. *Flour & Feed.* 1932. Soybeans for oil and meal, 1932: Oil meal feeds. 32(10):24. March.
• ***Summary:*** The price of soybeans from the 1931 crop was lower than those in any year of the last decade. The decrease in the price of vegetable oils and their accompanying protein concentrates, such as soybean meal, put downward pressure on the price of soybeans.

"The commercial production of soybeans has increased rapidly since 1924." Of the 14.917 million bushels harvested in 1931, about 87% were contributed by only six states: Illinois, Indiana, North Carolina, Missouri, Iowa, and Ohio.

Soybean acreage grew a remarkable 40% in 1930, but only 10% in 1931.

Soybean yields in the leading states have averaged 12-16 bushels per acre, however yields of 20-25 bushels have been recorded in central Illinois.

Includes crop and yield figures for flaxseed in the U.S.

556. 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].

557. Stewart, C.L.; Burlison, W.L.; Norton, L.J.; Whalin, O.L. 1932. Supply and marketing of soybeans and soybean products. *Illinois Agricultural Experiment Station, Bulletin* No. 386. p. 425-544. Dec. [34 ref]
• ***Summary:*** Loaded with statistics, graphs, tables, maps, and photos, this is one of the best reports on soybeans in America published to date. Contents: Introduction. The supply of soybeans and soybean products: Domestic production of soybeans, production of soybeans in Illinois, soybean varieties in Illinois, costs and returns in producing soybeans, imports of soybeans and soybean products (soybeans, soybean oil meal and cake, soybean oil, net imports, exports including reexports, export-import balance), import duties levied on soybeans and soybean products, supply of soybean oil and competing oils and fats. Consumption of soybeans and soybean products: Disposition of the domestic crop, utilization as beans, utilization of soybean oil meal, utilization of soybean oil (in food and industrial products), methods of processing soybeans for consumption (expeller, hydraulic press, solvent extraction), competition from other oils, distribution of gathered soybeans by uses. Practices in marketing soybeans and soybean products: Sources of market information, time of movement, varieties marketed in different sections of Illinois, selling soybeans for seed, selling soybeans for industrial uses (the Peoria Plan of 1928-29, Grange League Federation Exchange of Ithaca, New York, the Soybean Marketing Association of Illinois formed in Oct. 1929 {p. 490-91}), selling soybean oil and oil meal (National Soybean Oil Manufacturers Association of Chicago). Elements of cost in marketing soybeans: Marketing mill beans, processing beans, marketing seed beans, exporting beans. The inspection system and soybean grades. Special considerations applying to the valuation of soybeans and soybean products: Use-values of soybeans and soybean products in feeding, derivative products as factors in the market valuation of soybeans. Prices of soybeans and soybean products: Prices of seed beans, prices of soybean oil, prices of soybean oil meal, use as affected by prices. Meeting the price risks in marketing. International trade in soybeans and soybean products. Summary. Literature cited. Sources of data.

"In Manchuria in 1930 there were 13 districts in which over 40% of the crop land was devoted to soybeans, the highest proportion being 65%. The proportions for the three Manchurian provinces as units were as follows: Kirin (eastern) 33.2%; Hailungkiang [Heilungkiang] (northern) 30.7%; and Liaoning (southern) 22%." Some soybeans were grown in Inner Mongolia.

Illinois was the largest soybean producer in 1924, followed by North Carolina, Missouri, and Indiana. "Few soybeans were grown in Illinois previous to 1890, when J.C. Utter of Mt. Carmel, Wabash county, began production of this crop. Frank Hurrelbrink of Taylorville, Christian county, known because of his work with the Hurrelbrink variety of soybean, started his work in 1897. He has grown soybeans continuously since that time, experimenting with many varieties. C.A. Rowe and his father, of Jacksonville, Morgan county, grew soybeans about 1899. Somewhat earlier than this the late Ralph Allen of Delavan, Tazewell county, became interested in soybeans and furnished seed beans to Illinois farmers as well as to interested persons in other states, in Hawaii, and in Alaska. C.L. Meharry of Attica, Indiana, who owns a large tract of land near Tolono, Champaign county, Illinois, has been an active soybean grower since 1909. The year following the Meharry venture, John T. Smith, also near Tolono, began to grow soybeans on a very limited scale, and in 1921 undertook active production. During the last decade soybeans have become an

increasingly popular crop on Illinois farms."

Of the 1915 U.S. soybean crop, 52% of the entire crop acreage was used for hay, 15% was grazed, 4% was plowed under, and only 29% was harvested for beans; 18.2% was used for seed, 0.9% for human food, and 9.9% as beans for feed.

In 1930 some 11,975,000 bushels of soybeans were gathered or harvested in the U.S. Of these soybeans, 40.1% were crushed, 33.6% were used as seed, 23.0% were used whole directly as feed, 1.7% were ground and used as feed, and 1.7% were ground and used as food.

From the soybeans crushed in 1930, some 37,200,000 lb of soybean oil were produced. Its four main uses were: (1) Paint and other industries: Paint and varnish 24.2% of the total oil, linoleum and oil cloth 10.8%, other uses 9.4. (2) Soap kettle 22.8%. (3) Edible uses: Oleomargarine 2.0%, lard substitutes 1.3%, other food products 12.8%. (4) Increased stocks including oil equivalent 16.7%.

In 1930 some 110,000 tons of soybean meal resulted from crushing. Of this, 76.5% was used in commercial feeds, 13.6% in other feeds, 0.8% as soybean flour for food, 0.045% as infant and diabetic foods, and 9.0% as other uses including glue.

Page 460 lists the types and brand names of many commercial soybean food, feed, and industrial products. Consumption of soybeans as foods has increased appreciably since 1930. U.S. food products include chocolate bars (30% soybean flour), cocoa (up to 60% soybean flour), sausages (up to 50% soybean flour), bread (7½% soybean flour), soybean cheese, soybean milk, soybean ice cream, Soya Cream Biscuits, La Choy Soy Sauce, Soyolk (flour), V-Zoy, Lektizoy, Zoy Soup, Zoybeans (cooked soybeans), Bacon and Zoy Beans, Zoy Bouillon, Soy Bean Biscuit, etc. Canadian food products are: Milqo (soy milk), Vi-tone (chocolate), Soya Flour, Soyex-Malt-Cocoa Drink, Soyex, Macaroni.

"In the foreign trade of the United States imports of soybean oil have appeared since 1910 and of soybeans since 1914. The United States exported domestic soybeans to Europe in quantity for the first time during the fall of 1931, more than 2 million bushels being shipped from the 1931 crop." Address: 1, 3-4. Dep. of Agricultural Economics; 2. Dep. of Agronomy. All: Univ. of Illinois.

558. Stewart, C.L.; Burlison, W.L.; Norton, L.J.; Whalin, O.L. 1932. Supply and marketing of soybeans and soybean products: Tables 1-19 (Document part). *Illinois Agricultural Experiment Station, Bulletin* No. 386. p. 425-544. Dec.
• ***Summary:*** Tables show: (1) Value of the soybean crop in Illinois, 1928-31. (2) Soybean production in selected countries, average 1909-13, annual 1920-31 (in tons of 2,000 lb). The countries: Manchuria, Korea, Dutch East Indies, Japan, United States, total for these 5 reporting countries. (3) Soybean production in the United States by geographic divisions, 1929. The greatest production was in the "East North Central" states; 4.977 million bushels comprising 57% of total U.S. production.

(4) Production of gathered soybeans in selected states and in the United States, 1922-1931 (thousand bushels). In 1922 the top six soybean producing states were North Carolina (1,600), Illinois (812), Ohio (465), Indiana (240), Virginia (208), and Missouri (165). Total USA: 4,333. In 1924, Illinois (1,380) passed North Carolina (1,160) to become the leading U.S. producer. In 1931 the top six states were Illinois (6,055), Indiana (3,062), North Carolina (1,498), Missouri (1,080), Iowa (578), and Ohio (560). Total USA: 14,917.

(5) Total equivalent solid acreage of soybeans grown in selected states and in the United States in 1922-1930 (thousands of acres). In 1922 the top 4 states were North Carolina (224), Illinois (169), Tennessee (154), and Indiana and Alabama (113, tie). Total USA: 1,226. In 1923 Illinois passed North Carolina to take first place. In 1930 the top 4 states were Illinois (719), North Carolina (478), Iowa (463), and Indiana (402). Total USA: 3,758. (6) Yield per acre of gathered soybeans in selected states and in the United States, 1922-1931 (bushels per acre). In 1922 the U.S. average was 13.8 bushels. Iowa had the highest: 22 bushels. In 1931 the U.S. average was 15.6 bushels. The top 4 states were Ohio (20), Indiana (17.8), Illinois (17.5), and Iowa (17).

(7) Proportion of soybean acreage gathered for beans, cut for hay, and interplanted with other crops, Illinois, 1922-1931. Gathered for beans rose from 32.1% in 1925 to 55.7% in 1930. Cut for hay rose from 41.4% in 1922 to 54.4% in 1931. Interplanted with other crops dropped from 20.1% in 1922 to 1.3% in 1931. (8) Production of soybeans in twelve leading Illinois counties, with rank by years, 1929-1931. The top four counties were Christian (692,200 bu in 1931), Champaign, Piatt, and Moultrie. (8A) Soybean varieties in Illinois: Varieties gaining favor: Illini, Manchu, Dunfield, Mansoy, Laredo. Holding their own: Ebony, Virginia, Ilsoy, Peking, Black Eyebrow, Wilson V [Wilson-Five], Hurrelbrink. Losing favor: Haberlandt, Mammoth Yellow, Hamilton (Ohio 9035), Ito San, A.K., Midwest.

(9) Varieties of soybean seed offered for sale by growers, in order of frequency of offers printed in Farm-Bureau publications, Illinois, 1921, 1925, and 1931. For each year the varieties are listed under nine crop reporting districts, and also for the entire state. In 1921 for the entire state, in descending order of frequency: Midwest, Ebony, A.K., Peking, Ohio, Ito San. In 1925: Manchu, Midwest, A.K., Ebony, Virginia, Ilsoy, Ohio, Black Eyebrow, Haberlandt, Peking, Wilson, Ito San. In 1931: Illini, Manchu, Virginia, Ilsoy, Ebony, A.K., Mansoy, Dunfield, Peking, Wilson, Midwest, Black Eyebrow, Haberlandt. (10) Average cost of producing soybean in Illinois and Indiana for specified periods, 1921-1930. The highest return above computed cost per acre (profit) is from soybeans gathered for seed using a

combine: $9.55/acre. When soybeans are cut for hay, a loss usually results.

(11) Imports of soybean oil, soybean oil meal and cake, and soybeans, United States, 1915-1931. (12) Duties levied on soybean oil, soybean oil meal and cake, and soybeans under recent tariff acts, United States, 1909-1930. In 1909 and 1913 all three commodities were on the "Free list." In 1921 oil the tariff on oil was 20 cents per gallon (2.67 cents per lb); the other two were free. In 1922 the tariff on oil was reduced to 18.75 cents per gallon (2.5 cents per lb), the tariff on soybeans was ½ cent per lb (30 cents per bushel), and meal was free. In 1930 the tariff on oil was increased to 26.25 cents per gallon (3.5 cents per lb, not less than 45% *ad valorem*), the tariff on meal and cake was $6/ton, and the tariff on soybeans was increased fourfold to $1.20/bushel.

(13) Domestic production of soybean oil and other vegetable oils from domestic materials, United States, 1912-1931 (thousands of pounds). Statistics are given for cottonseed oil (the leader by far during the entire period), peanut oil, olive oil, corn oil, linseed oil, soybean oil, and total vegetable oil. Soybean oil rose from 751,000 lb in 1922 (the first year for which figures are given) to 39,129,000 lb in 1931. The ranking in 1931 was: Cottonseed oil (1,417,226 x 1,000 lb), linseed oil (203,613), corn oil (113,145), soybean oil (39,129), peanut oil (13,730), and olive oil (1,509).

(14) Imports of foreign vegetable oils, oil equivalent being used for oil-bearing materials, United States, 1910-1931 (thousands of pounds). Statistics are given for soybean oil, coconut oil and copra, peanut oil, olive oil (edible), olive oil (inedible, including olive oil foots), palm oil (incl. palm kernel), linseed oil and flaxseed, all other vegetable oils and materials, total vegetable oils and materials. For net soybean oil imports, the earliest figure is 24,784 in 1912; it peaked at 335,439 in 1918, and had fallen to 4,018 in 1931. Total vegetable oils and materials imported increased from 440,412 in 1910 to 1,525,114 in 1931.

(15) Exports of soybean oil and five other leading vegetable oils, United States, 1919-1931 (thousands of pounds). Statistics are given for soybean, cottonseed, coconut, linseed, corn, and peanut. The leading export throughout this period was cottonseed oil. For soybean oil exports, the figure for the last half of 1919 is 27,715 and fir 1920 it is 43,512. Thereafter the amount exported each year is very small, rising from 1,944 in 1921 to 5,448 in 1931.

(16) Total production, imports, exports, and net balance of vegetable oils and animal fats, exclusive of butterfat but inclusive of fish oils, United States, 1912-1931. (17) Use of soybeans, by acreage, United States, 1915, 1929, and 1930 crops. The percentages of the entire crop acreage in 1915 are: Hay 52%, grazed 15%, plowed under 4%, and gathered for beans 29% (of which: Seed 18.2%, human food 0.9%, and feed 9.9%). In 1930: Hay 56%, grazed 14%, plowed under 4%, and gathered for beans (11,975,000 bushels) 30% (of which: Seed 10.5%, crushed or ground 11.5%, and feed 8.0%).

(17A) Commodities in which soybeans or soybean products are used (p. 460): Food products (USA and Canadian), feed products, industrial products. (18) Soybean oil meal produced and imported into the United States, 1922-1930 (tons of 1,000 lb). Domestic production increased from 3,811 tons in 1922 to 110,000 tons in 1930. Imports increased from 15,612 tons in 1922 to 55,107 tons in 1930. Total of domestic production + imports increased from 19,423 tons in 1922 to 165,107 tons in 1930.

(19) Adaptability of soybean oil to use in various products (p. 464): The products are: Drying products (paint, varnish, linoleum and oil cloth, waterproof goods), soap products (hard and soft soaps), edible products (Lard compounds, cooking oils {if odor permanently eliminated}, salad oils, fountain drinks, candy, mayonnaise, margarin), miscellaneous (core oil, printer's ink). Four levels of adaptation and a maximum percentage are given for each use: Probable, inferior, satisfactory, and superior. The two superior adaptations are paint (to prevent yellowing), and soft soaps. Note: "The margarin industry was one of the first to use considerable amounts of soybean oil and at present it absorbs in the United States approximately 750,000 pounds annually."

559. Stewart, C.L.; Burlison, W.L.; Norton, L.J.; Whalin, O.L. 1932. Supply and marketing of soybeans and soybean products: Tables 20-49 (Document part). *Illinois Agricultural Experiment Station, Bulletin* No. 386. p. 425-544. Dec.
• ***Summary:*** Tables show: (20) Total industrial utilization of soybean oil and percentages used in specified industries, United States, 1916-1931. The total pounds used rose from 143.34 million in 1916 to a peak of 335.44 million in 1918, then fell to a low of 7.53 million in 1924, rising slowly to 35.50 million in 1931. In 1917 (the peak year) soybean oil comprised 10.3% of all oils used in soap industry. In 1918 it comprised 4.6% of all oils used in the lard-substitute industry and 2.6% of all oils used in the margarin industry.

(21) Iodin [iodine] numbers, saponification numbers, acid numbers, and uses of oils and fats (p. 471). Values are given for: Chinese tung or wood oil, coconut oil, corn oil, cottonseed oil, fish oil, linseed oil, palm oil, palm kernel oil, peanut oil, soybean oil, tallow, whale oil. For soybean oil: Iodin number 124-148. Saponification number 189-194. Acid number 2-7. Uses: "Considerable quantities go into paint, varnish, enamel, linoleum, and waterproofing products. Used in soaps. Utilized in a large variety of food products. Used in core oils."

(22) Utilization of soybeans and soybean products by amounts, United States, 1930 crop: Beans (bushels)–Feed, seed, ground (for food {200,000 bu}, for feed), crushed, total (11.975 million bu). Oil (lbs): Edible purposes (Oleomargarine {750,000 lb}, lard substitutes {500,000 lb}, other food products {4,750,000 lb}), paint and other

industries (paint and varnish, linoleum and oil cloth, other uses), soap kettle, increased stocks including oil equivalent, total (37.2 million lb). Meal (tons): Feed (commercial feeds, other feeds), food (flour {850 tons}, infant and diabetic foods {50 tons}), other uses including glue, total (110,000 tons).

(23) Estimated distribution of gathered soybeans according to use, Illinois, 1926-1931 crops. The four categories for each year are (with figures for 1931): Used by oil mill and feed manufacturers (50%), used for seed in state (22%), used for seed outside state (13%), used for feed on farm (15%).

(24) Extent to which soybeans came from local sources or were shipped in from outside the locality, and extent to which beans sold went to local purchasers or were shipped out of the locality, 151 identical country elevators and local seed dealers, Illinois, 1930 and 1926 crops. (25) Soybeans purchased by 151 country elevators and local seed dealers, Illinois, 1931 crop. Gives figures for 10 crop reporting districts. (26) Proportion of soybean crop leaving growers' hands that was out of their hands by middle of November, December, and January, Illinois, 1922-1932 (crop storage). Typically about 60% (range 30-70%) was out of their hands by Jan. 15.

(27) Estimated proportion of soybean seed shipped out of the locality by wholesale dealers and jobbers before specified dates in January, selected states and United States, 1919-1931 crops. The states are: Illinois, Indiana, Missouri, and North Carolina. For the USA, 38.9% on average had been shipped by Jan. 26. (27A) Soybean varieties marketed in different sections of Illinois, 1926 crop (11 localities) and 1930 crop (13 localities). The leading varieties of soybeans marketed in Illinois are Illini, Manchu, Midwest, A.K., Virginia, and Ebony.

(28) Estimated costs (cents per bushel) of handling soybeans for all purposes by 166 identical country elevators and local seed dealers, Illinois, 1930 and 1931 crops. For 9 crops reporting districts gives the percentage recleaned (23-30%) and the costs of recleaning and other costs. (29) Costs of handling soybeans other than cleaning by identical country elevators and local seed dealers in leading producing counties, Illinois, 1926, 1930, and 1931 crops. Costs 3.2 to 4.4 cents per bushel.

(30) Costs of raw materials and other items of soybean oil production, United States and selected foreign countries, 1923-1924 (per bushel of soybean crushed). The foreign countries are Manchuria (All Manchuria, Dairen only), Japan, Great Britain. The total cost is lowest in all Manchuria (6.26 cents) and highest in the USA (10.21 cents). (31) Estimated cost of handling soybeans used mainly for seed, 151 identical country elevators and local seed dealers, Illinois, 1926 and 1930 crops. (31A) Cost per bushel of moving soybeans from central Illinois on board boat at New Orleans [Louisiana], 1931 crop.

(32) Carloads of soybean federally inspected in leading soybean producing states, 1928-1932. The states are Illinois, Missouri, Indiana, North Carolina, Ohio, and Virginia. The most carloads were inspected in Illinois (in Peoria (2,412) and Chicago (1,284)). (33) Federal grade requirements for yellow, green, brown, black, and mixed soybeans (Grades 1-4 plus sample grade and Extra No. 1).

(34) Digestible nutrients in feed products of soybeans (soybean hay, seed, straw, seed and straw, oil meal; incl. yield per acre and digestible protein). (35) Digestible nutrients in soybean oil meal and other protein feeds (Incl. linseed meal {old process}, cottonseed meal {41%}, gluten meal, wheat middlings, wheat bran, tankage). Only tankage has a higher "feeding value" than soybean meal. (36) Total gross value of products obtained from a bushel of soybeans at different prices of oil and meal. Gives figures when the price of a pound of soybean oil ranges from 2½ cents to 10 cents per pound, and the price of meal ranges from $15 to $40 per ton.

(38) Average farm prices of soybeans by seven selected crop reporting districts, Illinois, January-May, 1925-1931. The average price over the years ranges from $1.70 to $2.07 per bushel. The lowest price in one year was $0.97/bu in 1931 in Champaign. (39) Average monthly farm prices of soybeans in three crop reporting districts important in soybean production, Illinois, October-June, 1925-1930 crops. The price is always lowest in October and highest in June. So storage pays.

(40) Average prices paid to producers for soybeans by 151 identical country elevators and local seed dealers, Illinois, October-July, 1930 and 1926 crops (Dollars per bushel). (41) Average yearly wholesale selling prices of soybean seed, selected markets; quotations given for first five months of the following year, 1919-1931 crops. The places are: Chicago, Illinois; Louisville, Kentucky; Kansas City, Missouri; Minneapolis, Minnesota; and Baltimore, Maryland. The average price of the ten year period at various cities ranged from $2.25 (Baltimore) to $2.80 (Minneapolis). Prices were highest in 1920, lowest in 1932.

(42) Retail selling price of good-quality soybean seed in selected states, March-May, 1926-1932. The states are: Illinois, Indiana, Iowa, Kentucky, Missouri, Ohio, Tennessee. (43) Average prices paid to producers for thresher-run soybeans and average wholesale and retail selling prices, Illinois, 1925-1931 crops. Prices were highest in 1925, lowest in 1930. In 1925 the average price paid to farmers was 63.6% of the retail price, and the average wholesale price was 90.9% of the retail price.

(44) Average advertised price of soybean seed offered for sale by producers, by varieties, Illinois, March-June 1920-1930. The varieties are: Illini, Manchu, A.K., Midwest, Ebony, Virginia, Wilson, Black Eyebrow, Peking, Ito San, Ilsoy, Haberlandt, Ohio, Dunfield, Mansoy.

(45) Exports of soybeans from eight selected exporting countries, 1923-1930. Gives figures (1,000 lb) for total,

China, Japan incl. Chosen [Korea], and Netherlands. (46) Imports of soybeans into selected countries 1913, and 1919-1931. Gives figures (1,000 lb) for total, Denmark, Japan incl. Korea, France, Germany, Netherlands, United Kingdom, United States. Figures in footnote for Sweden and Italy. The leading importers are now Germany, Denmark, and United Kingdom.

(47) Imports of soybean oil into seven selected countries, 1913 and 1919-1931. Gives figures (1,000 lb) for total, Denmark, Japan (incl. Chosen), France, Germany, Netherlands, United Kingdom, United States. Gives figures in footnote for Algeria, Austria, and Sweden. (48) Exports of soybean oil from eight selected countries, 1913 and 1919-1931. Gives figures (1,000 lb) for total, China, Denmark, Japan incl. Chosen, France, Germany, Netherlands, United Kingdom, United States. Figures in footnote for Algeria, Sweden, Austria, and Italy.

(49) Exports of soybean cake from Manchuria as a whole and from the port of Dairen, with destination of bean cake from Dairen, 1926-1931 (tons of 2,000 lb). Exports from Dairen to Japan, Korea, Europe, United States, China, Other destinations.

560. Stewart, C.L.; Burlison, W.L.; Norton, L.J.; Whalin, O.L. 1932. Supply and marketing of soybeans and soybean products: Figures (Document part). *Illinois Agricultural Experiment Station, Bulletin* No. 386. p. 425-544. Dec.
• ***Summary:*** Figures show: (1) Shaded map–Percentage of cultivated acreage in soybeans in Manchuria and in adjacent provinces of Inner Mongolia [both part of China]. The percentages for the three Manchurian provinces are: Kirin (eastern) 33.2%, Hailungkiang [Heilungkiang] (northern) 30.7%, and Liaoning (southern) 22%. (2) Bar chart–Average acreage and value of soybeans compared on a percentage basis with selected harvested crops, Illinois, 1929-1931. The main crops are corn, oats, all wheat, and tame hay. Soybeans comprise only about 3.1% of total acreage and value.

(3) The soybean plant (*Soja max*) at two stages of growth (photos). (4) Shaded map–Percentage of farms in the principal soybean producing areas in the United States growing soybeans, by counties, 1929. "Nearly all the soybeans grown in the United States in 1909 were found in the southern states." By 1919 "soybeans had considerable prominence in New England and in Texas, Oklahoma, New Mexico, Arizona, Colorado, Utah, Idaho, and Montana.

(5) Dot map–Acreage of soybeans grown in principal soybean producing areas in the United States, by counties, 1929. Most soybeans are grown east of the Meridian 100. In the South, they are typically planted in a row alternating with a row of some other crop. (6) Dot map–Acreage of soybeans grown in principal soybean producing areas in the United States, by counties, 1924. In 1924 there was less acreage in the important regions of soybean production. (7) Dot map–Production of gathered soybeans grown in principal soybean producing areas in the United States, by counties, 1929. "No state gathered as much as 50,000 bushels of soybeans in 1909. Two states, Virginia and North Carolina, produced more than 100,000 bushels in 1919, and the latter approached 500,000 bushels. By 1924 four states, Illinois, North Carolina, Missouri, and Indiana, produced more than 500,000 bushels and two states, Illinois and North Carolina, produced more than 1,000,000 bushels each. By 1929 Iowa was producing 500,000 bushels, Indiana 1,000,000 bushels, and Illinois 3,250,000 bushels."

(8) Graph of production of gathered soybeans in six leading states, 1924-1931 crops. The states, listed in descending order of their production in 1931, are: Illinois, Indiana, North Carolina, Missouri, Iowa, Ohio. (9) Graph of total equivalent solid acreage of soybeans in five leading states, 1922-1930 crops. The states, listed in descending order of their acreage in 1930 are: Illinois, North Carolina, Missouri, Indiana, Tennessee. (10). Map of acreage, yield, and production of soybeans in Illinois, by crop reporting districts, average of 1929-1931 crops. Gathered: 48.6%. Cut for hay: 51.4%. Yield: 17.2 bu/acre.

(11) A field of soybeans cut with a binder and threshed with a regular grain thresher (photo). This method makes straw available for feeding. (12) Harvesting soybeans with a combine (photo). "The combined harvester and thresher, or combine, has made great headway since 1927 as a means of harvesting the soybean crop, especially in Illinois." This method of harvesting is usually less expensive that the use of both binders and threshing machines.

(13) A large barn and other farm buildings covered with paint containing 25% soybean oil. The paint was not tacky, and was holding up well after one year. (14) Equipment and supplies in soybean paint tests.

(15) Four soybean crushers of the expeller type. The oil is removed by pressure under very high heat. (16) Filter presses used after the expeller-type crusher. The oil goes through a filtration process to clarify it. (17) Four pie charts showing proportion of gathered soybeans utilized for seed, feed, and crushing in the United States and Illinois, 1926 and 1930 crops. In 1930 in the USA and Illinois: Crushed: 38% / 52%. Seed: 35% / 37%. Feed: 27% / 11%. A rapid increase in crushing (and decrease in percentage used for seed) took place between 1926 and 1930, and Illinois emerged as the leading state.

(18) Four bar charts showing monthly movement of soybeans by local handlers in Illinois, 1920 and 1926 crops. The four graphs show: Purchased locally, shipped in, shipped out, and sold locally. (19) Map of Illinois showing areas served by six leading receiving markets for soybeans produced in Illinois, determined mainly by freight costs. Illinois is well supplied with crushing mills. (20) Terminal storage elevator at Peoria, Illinois, used by the Soybean Marketing Association for the storage of soybeans (photo).

(21) A ship loaded with soybeans for export movement.

Shows the first cargo of soybeans exported from Illinois by way of the Great Lakes. This cargo of 205,000 bushels left Chicago during April, 1932. (22) Soybean meal being fed to beef cattle (photo). (23) Graph of the average price of five soybean varieties in Illinois, 1921-1930 crops: The varieties are Virginia, Midwest, Manchu, Ebony, and A.K. Prices dropped during this time. (24) Graph of prices of soybean oil and four other leading vegetable oils at New York, by months, 1920-1932. The other four are linseed oil, corn oil, coconut oil, and cottonseed oil. Prices dropped during this time. (25) Four graphs showing the price of soybean oil compared prices of four other leading vegetable oils at New York, by months, 1920-1932. The other four are the same as above. (26) Graph of prices of soybean oil and five other leading vegetable oils at important milling centers, 1928-1932. Peanut oil is included. Linseed oil was generally the highest in price and cottonseed oil the lowest. (27) Graph of prices of soybean oil at Dairen (Manchuria), Hull (England), and New York, 1919-1932. The price was lowest at Dairen and highest at New York. (28) Graph of prices of soybean oil meal and two other leading vegetable meals at Chicago, by weeks, April 1931 to Aug. 1932. The other two are linseed meal and cottonseed meal. Linseed meal was generally the highest in price and cottonseed meal the lowest. (29) Graph of prices of soybean oil meal at five important markets, by weeks, April 1931 to Aug. 1932. The markets are Boston [Massachusetts], Minneapolis [Minnesota], Kansas City and St. Louis [Missouri], and Chicago [Illinois]. The price at Chicago is generally the lowest.

561. Woodward, Carl Raymond; Waller, Ingrid Nelson. 1932. New Jersey's Agricultural Experiment Station, 1880-1930. New Brunswick, NJ: New Jersey Agric. Exp. Station. 645 p. See p. 15, 29-30, 105, 163, 167-69, 179, 182, 268, 357-58, 414, 418, 421, 444, 446, 448, 508-09. [30+ ref]

• ***Summary:*** Dr. George Hammell Cook (born 1818) was the first director of the New Jersey Agric. Exp. Station. His photo, taken on 9 Oct. 1887, is shown opposite the title page, and his biography appears on pages 14-22. "One of Dr. Cook's chief contributions during the early days was his share in the introduction of the soybean into America. While visiting Europe in 1878 in company with James Neilson, he saw the plant under cultivation at the Bavarian Agricultural Experiment Station at Munich, and believed that it would probably be a desirable addition to our forage crops. A few seeds were given him, and Mr. Neilson procured seeds of several other varieties in Vienna. The seeds were planted at the College Farm in May 1879, and harvested in October, with encouraging results. Dr. Cook obtained data on their composition from Munich and, in reporting on the test, pointed out their superior food content. Three-fourths of an acre was planted to the crop in 1880. Only a few earlier introductions of soybeans into the United States have been recorded" (p. 30).

"An elaborate series of experiments with forage and soiling crops was begun in 1896. Fifty acres were laid out in acre plots and planted the first year to rye, wheat, crimson clover, oats and peas, corn, cowpeas, soybeans, and barley and peas. Other crops were subsequently included. Annual observations were taken of each crop, its yield, composition, place in the rotation, and adaptability to the system of dairy farming. These experiments proved that soiling crops could be grown with profit to supplement pasture (Bulletins 130, 158). A marked increase in the flow of milk resulted from the feeding of green fodders to the Station herd" (p. 358).

"In 1923 a survey of the growing of soybeans in New Jersey was begun. The majority of the 42 farmers interviewed, growing altogether 512 acres of soybeans, reported that they were pleased with the crop" (p. 418).

Through the pioneering efforts of Dr. Cook, an experiment station was finally established in New Jersey in 1880. "New Jersey thus became the third state to establish an Agricultural Experiment Station by special act of Legislature, being preceded only by Connecticut in 1875, and North Carolina in 1877. Experiment stations had been

begun in three other states, though not under legislative enactment. In California, agricultural research was initiated in 1875 with the use of funds appropriated by the Regents of the State University. In 1878 the Trustees of Massachusetts Agricultural College started an agricultural experiment station, which after three years ceased to function until placed on a permanent basis by act of legislature in 1882. In New York State the experiment station at Cornell University was begun informally in 1879, and operated two years without any special funds."

Note 1. This document contains the earliest date seen for soybeans in New Jersey, or the cultivation of soybeans in New Jersey (May 1879).

Note 2. This document describes the earliest cultivation of soybeans by a U.S. land grant institution (in May 1879) or by an agricultural experiment station (in 1880).

Note 3. "The Grange had its birth in the aftermath of the Civil War and the unrest among farmers who believed they were not getting a square deal from the railroads and the manufacturers. At first, cooperation in buying and selling was one of the major objectives; social and educational features were also emphasized" (p. 11) The first Grange in New Jersey was formed on 26 Nov. 1871. Address: 1. Asst. to the president, Rutgers Univ.; 2. Formerly Assoc. Editor, New Jersey Agric. Exp. Station.

562. Horvath, A.A. 1933. The soy-bean industry in the United States. *J. of Chemical Education* 10(1):5-12. Jan. [19 ref]

• ***Summary:*** This is an excellent overview. Contents: Introduction: Soybean acreage in the USA in 1917 (50,000 acres) and 1931 (3,497,000 acres), production in bushels of seed for the top 22 states in 1931. Oil milling: Solvent or new process, hydraulic or old process, expeller method, the pioneering work of North Carolina (1916), Chicago Heights Oil Manufacturing Co. (1920), A.E. Staley Mfg. Co. (1922; starting with one expeller. Today capacity is over 1 million bushels/year), the Blish Milling Co. of Seymour and Crotersville, Indiana (1923; they crushed 317,000 pounds of soy beans in the 1927-28 season), current U.S. production of soy bean oil (13.5 million lb in 1930, up from 11 million lb in 1929), the problem of disposing of soy-bean oil meal. Soy bean oil for food. Lecithin. Bleaching properties (J.R. Short Milling Co. and Wytase). Soy beans for food: Use in China, Prof. L. Berczeller and soya flour, the Soyex Co. of Nutley, New Jersey. Glue: I.F. Laucks of Seattle, Washington (Research began in 1923 but the year "1926 proved to be the turning point in the life history of soy-bean glue").

"The maintenance of the soy-bean milling industry at a high level of production is dependent upon the consumption of soy-bean oil meal. And heretofore, according to W.H. Eastman [president of the National Soy-bean Oil Manufacturers Association], this consumption has been disappointingly small, despite the fact that the meal has no superior as a protein concentrate." The American livestock feeder "has not come to realize the value of the meal, nor to utilize its qualities to the same extent as the Danish farmer. In the year 1930 something over 100,000 tons of the meal were manufactured in this country [USA] from our domestic beans. Yet the little country of Denmark is consuming considerably more than we produce in the United States, while our milling industry is forced to store a good share of its production, unable to dispose of it... The demand for soy-bean cake is the limiting factor for the industry."

"Soybean oil has certain properties which make it more valuable to the paint and varnish industries than it would be as a mere diluent for linseed oil. For instance, it is particularly well adapted for grinding pastes... Soybean oil further has the property of mitigating the after-yellowing of a white paint or enamel, and in this respect it is without a peer. The trade would pay a considerable premium over the price of linseed oil to obtain soy-bean oil for this purpose."

"It is estimated that 75 per cent. of the soy-bean oil consumed in the United States is being used by paint and varnish industries and in the manufacture of linoleum, oilcloth, and artificial leather. Lesser quantities are utilized in printer's ink and soap."

Lecithin: "Up to the present time all the soy-bean lecithin used in this country [USA] is being imported from Germany and Denmark. The commercial product is a dark brown paste or heavy viscous liquid, containing about 60 to 70 per cent. of lecithin, the remainder being pure soya oil, cocoanut oil, etc... The margarine industry absorbs a considerable amount of this lipoid, as its incorporation overcomes many of the differences between butter and its substitute–*e.g.,* it binds the water and prevents spitting when frying. Lecithin is of great interest in the chocolate and cocoa industry..." Discusses many applications of lecithin but does not give statistics concerning imports or domestic consumption / utilization.

"A new era dawned in the possibilities of the soy bean for food with the discovery in 1923 by Prof. L. Berczeller of the University of Vienna of a special process which eliminated the beany flavor from the soy bean and produced a nutty-tasting soy-bean flour capable of being stored for years without marked deterioration. Its principle consists in the subjection of the beans to the action of saturated steam for a short period of time, followed by vacuum distillation. It is to the credit of the Soyex Company that this process was brought over to the United States with the establishment in 1930 of a plant in Nutley, New Jersey. A high standard for soy-bean flour was established."

Soy-bean exhibit at the Chicago World's Fair: "The soy-bean industry of the United States will be adequately represented at the 1933 'Century of Progress' exposition in Chicago in the Agricultural Division under the title 'Century Soy-bean Exhibit.' On July 9, 1931, an organization meeting of representatives of the soy-bean industries was held in

Chicago, where a committee was elected for the sections: producing, marketing, and utilization, the latter section being subdivided into human utilization, livestock utilization, the arts, paints and oils, and milling. The 'Century Soy-bean Exhibit' is an excellent opportunity for the domestic soy-bean industries to display their products and it is undoubtedly going to stimulate further developments.

"Conclusions: As Henry Ford recently said, 'The dinner table of the world is not a sufficient outlet for the farmer's products; there must be found a wider market if agriculture is to be all that it is competent to become. And where is that market to be found if not in industry?... For several years we have been running large crops of everything from sunflowers to soy beans through our chemical laboratory, in an effort to find an annual market for the farmer's produce. There can be no doubt that the soy bean is one of the most promising of all agricultural plants for an almost unlimited variety of industrial uses, and that it is going to play an outstanding role in the future economic life of this country.'"

Photos show: (1) A hydraulic process [press] mill (William O. Goodrich Co., Milwaukee, Wisconsin [subsidiary of ADM]). (2) Equipment for soy-bean oil refining process (A.E. Staley Mfg. Co., Decatur, Illinois). (3) Steam aspirator for producing high vacuum for deodorizing vegetable oils (Staley). (4) Soy-bean flour mill (The caption reads: Soyex Company, Inc., Nutley, New Jersey). (5) Baking Laboratory (The caption reads: Soyex Company Inc., Nutley, New Jersey. This photo may contain a photo of Charles E. Fearn, the man to the right in the two-piece suit, with both sleeves rolled up).

Note 1. This is the 2nd earliest document seen (Nov. 2013) stating that the Soyex Company is located in Nutley, New Jersey.

(6) Plant making soy-bean adhesives (I.F. Laucks, Inc., Seattle, Washington). (7) Tank for adhesives (as high as the chin of a man standing next to it; Laucks).

Diagram: "Exploitation of the soy bean, according to the processes of Hansa Muehle G.m.b.H., Hamburg, Germany. Those derivatives representing products ready for sale are marked by circles." The process uses solvent extraction. On the oil side: There is a "distillation" step before the crude oil, which is refined to make edible oil. Crude lecithin is refined to make finished lecithin. On the meal side: First step is removal of solvent and drying of meal. Then cooling by air to give finished meal. It undergoes grinding, milling and sifting to give grits, hull meal, and edible flour.

Note 2. A footnote on the first page states that Horvath is a "Special Associate Member of the National Soy-bean Oil Manufacturers Association. (P.O. Box 331, Oakland Station)."

Note 3. Talk with Bob at the Map Room of the University of Chicago. 1997. March 25. Oakland Station is probably in Chicago, Illinois. A railway map from the 1930s and a gazetteer from the 1920s show it to be a mail stop on the Illinois Central line at 39th Street. This is 39 blocks south of The Loop, right along Lake Michigan, south of the center of Chicago.

Note 4. This is the earliest document seen (March 2016) concerning soy lecithin industry and market information (all soy lecithin used in this country [USA] is being imported from Germany and Denmark). Address: Pittsburgh, Pennsylvania.

563. 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 [Ootootan] 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."

564. *News and Observer* (*Raleigh, North Carolina*). 1934. Food products from soy beans: Chemist from Washington makes interesting demonstration in Belhaven [North Carolina]. Jan. 21. Sunday morning.
• ***Summary:*** Belhaven, January 20, 1934. Dr. Jethro Kloss, expert food chemist from Washington, DC, gave a demonstration of food products that can be made from soy beans to a packed and enthusiastic crowd in Belhaven's City Hall Tuesday. He came to Belhaven at the invitation of F.P. Latham, Beufort County's master farmer.

"In 1932, Mr. Latham went to Washington, D.C. to a National Soy Bean Convention and witnessed Dr. Kloss making milk, cheese, buns, cakes, pies, vegetable roasts, butter, salad dressings and even a very healthful medicinal liniment from soy beans. Mr. Latham's community is a great soy bean country and he immediately had a vision of Dr. Kloss visiting his community and showing it his experiments with soy beans. After 2 years, that vision at last has materialized and the people in Hyde County and Belhaven communities not only saw and tasted delicious foods made from the soy bean, but Dr. Kloss showed them how the products can be made in any home kitchen at a nominal cost."

"Dr. Kloss's little granddaughter came to Belhaven with him. She is 4 years old and 100% perfect. She never has drunk any other milk than soy bean milk.

"Dr. Kloss says there is no limit to the delicious foods that can be made from the soy bean. He is now working on a book of recipes made from soy bean products. He uses the Mammoth Yellow soy bean for most of his products. He became interested in the soy bean food products in searching for a food for diabetics."

565. Lehman, Samuel G. 1934. Frog-eye (*Cercospora diazu* Miura) on stems, pods, and seeds of soybean, and the relations of these infections to recurrence of the disease. *J. of Agricultural Research* 48(2):131-47. Jan. [7 ref]
• ***Summary:*** "The leaf-spotting fungus, *Cercospora diazu* Miura, frequently attacks certain varieties of soybean, *Soja max* (L.) Piper, grown in the Southern States. The name 'frog-eye' has been given to the disease produced by this fungus on the soybean. The first authenticated observations of frog-eye on soybeans in the United States were made in 1925, when the disease was found in five Southern States."

The fungus was frequently observed on the stems, pods, and seeds of soybeans. In the stems, the parasite is chiefly confined to the cortex and the injury to the phloem and cambium is usually due to the diffusion of the toxic substances from the necrotic cortex. In the pods, the mycelium penetrates through the pod wall, entering the thin white membranes lining the pod and closely investing the seed. The growth of the fungus is usually superficial on the seeds and is easily controlled by seed disinfectants. The infection carries over winter on diseased leaves and stems, but ploughing in of infected stubbles is not practicable in preventing the disease. Further spread of the disease may be prevented by the use of healthy seeds. Address: Plant Pathologist, North Carolina Agric. Exp. Station.

566. Willis, L.G.; Piland, J.R.; Gay, R.L. 1934. The influence of magnesium deficiency on phosphate absorption by soybeans. *J. of the American Society of Agronomy* 26(5):419-22. May. [3 ref]
• ***Summary:*** Calcium and magnesium are equally effective in influencing the absorption of phosphate ions by soya-bean plants. If the supply of calcium is generous, the phosphate ion intake is not retarded by magnesium deficiency. Address: 1. Soil Chemist; 2. Asst. Soil Chemist; 3. Fellow. All: Dep. of Agronomy, North Carolina Agric. Exp. Station, Raleigh, NC.

567. Stitt, R.E. 1934. A comparison of the dry matter content of annual lespedezas, alfalfa, and soybeans. *J. of the*

American Society of Agronomy 26(6):533-35. June.
• ***Summary:*** Analyses of plants at varying stages of growth are recorded. Address: Asst. Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, USDA.

568. Jamieson, George S.; McKinney, Robert S. 1935. Phosphatides in American soy beans and oil. *Oil and Soap* 12(4):70-72. April. [1 ref]
• ***Summary:*** In this article, Jamieson and McKinney first studied the phosphorus and phosphatide content of crude soybean oil and used a theoretical conversion factor of 25.5, but they reported that soybean phosphatides obtained by precipitation from acetone contained 3.20% phosphorus corresponding to a factor of 31.3 (100 divided by 3.20).

The precipitate deposited in some soya-bean oils consists of phosphatides, but the tendency for precipitation to occur is not correlated with the phosphatide content of several species of beans grown in different localities, or with the phosphorus content of the corresponding oils. Specifically, the phosphatide content of soybeans from North Carolina and Virginia (1.0-3.8%) was generally higher than that of soybeans from Illinois, Indiana, and Ohio (2.0-2.9%). Appropriate analytical methods are described.

Soybean varieties analyzed from North Carolina and Virginia are: Mammoth Yellow (3.82%–the highest), Tokio Green, Mammoth Brown, Tarheel, Biloxi, Herman, Laredo, Dixie, and Haberlandt. Soybean varieties analyzed from Illinois, Indiana, and Ohio are: Illini, Mammoth Yellow, Tokio Green, Minsoy, Blackeye, Peking, Ohio No. 13, Hollybrook, Mukden, Kingwa, Macoupin. Address: Oil, Fat & Wax Lab., Bureau of Chemistry & Soils, USDA.

569. Johnson, E.F. "Soybean." 1935. Commercial soybean prices. *Proceedings of the American Soybean Association* p. 5-9. 15th annual meeting. Held 21-22 Aug. 1935 at Evansville and 23 Aug. at Lafayette, Indiana.
• ***Summary:*** "The corn belt has definitely added soybeans to its farm rotation. Soybean acreage in the last few years has grown by leaps and bounds, partly due to the increased acre return, partly due to weather and insect pests causing less injury to this legume, and partly as a result of attempts to regulate and control the acreage of other crops. Industries have put forth every effort of known science to utilize this increase...

"Previous to 1928 the supply and demand for soybean seed was the major factor in determining prices." Three graphs show the prices of various commodities from Jan. 1932 to June 1935. Fig. 1 shows the prices of linseed oil, soybean oil, and cottonseed oil. For most of this time, linseed oil was the most expensive and cottonseed oil was the least expensive, but in June 1935, cottonseed oil was the most expensive and soybean oil was the least expensive.

Fig. 2 shows the prices of linseed oil meal, soybean oil meal, and cottonseed oil meal. For most of this time, linseed oil meal was the most expensive and cottonseed oil meal was the least expensive, but in June 1935, linseed oil was the most expensive and soybean oil was the least expensive.

Fig. 3 shows the prices of soybeans, soybean oil, soybean meal. All prices have risen.

A table (p. 8) shows imports of soybean oil, soybean oil meal and cake, and soybeans [whole] from 1915 to 1934. Imports of soybean oil reached a peak of 335.9 million lb in 1918 and have fallen dramatically since. Imports of meal and cake reached a peak of 85,928 tons in 1929. Imports of soybeans have been quite steady, averaging about 50,000 bushels (peak: 89,067 bushels in 1917). Three tables (p. 9) give figures for the following areas: USA, Illinois, Indiana, Iowa, Missouri, Ohio, North Carolina for the years 1922, 1924, 1927, 1930, 1934, and 1935. The tables are: 1. Total soybean acreage. 2. Acreage from which soybean seeds were harvested. 3. Crop harvested for seed (1,000 bushels).

Photos show (1) "New expeller soybean oil meal plant, Ralston-Purina, Lafayette, Indiana." On the tall tower is written "Purina Mills." (2) "Soybean oilmeal plant, Purina Mills, Circleville, Ohio" (p. 20). Address: Ralston Purina Co., St. Louis, Missouri.

570. 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.

571. Sweeney, O.R.; Arnold, Lionel K. 1935. Processing the soybean. 2nd ed. *Iowa State College, Engineering Extension Service, Bulletin* No. 103. 59 p. 28 cm. (Ames, Iowa). First published in 1929. Official publication, Vol. 34, No. 14. 4 Sept. 1935. [42 ref]

• ***Summary:*** This is a revised version of the original 1929 bulletin. Contents: 1. The soybean and the farm problem: Characteristics of the soybean, uses of the soybean, soybeans in Iowa, the soybean and the nitrogen problem, the soybean and the protein problem, the soybean and the vegetable oil problem. 2. Methods of producing soybean oil: The hydraulic press method, the Anderson Expeller method, the solvent extraction system (stationary, large-scale Soxhlet type, rotary, continuous [Hansa Company, Ford Motor Co.], extraction solvents incl. trichloroethylene). 3. Plant design. 4. Production costs: Operating costs, calculation of costs. "The authors have endeavored to present the philosophy of small plants located close to the grower of the beans who would also be the buyer of the meal at a price not loaded by high freight costs. The farmer would thus retain on the farm the protein portion of the bean with its high feed and fertilizer values."

Page 39 notes: "A continuous process said to be suitable for a small scale plant is being experimented with by the Ford Motor Company. In this process the flaked beans are fed into the bottom of a pipe set at a 10 degree angle and fitted with a screw conveyor. The flaked beans are moved through the pipe against the solvent, which flows in at about halfway between the upper and lower end. The upper end of the pipe forms a steaming chamber where the solvent is vaporized off. A similar process has been patented by Flumerfelt."

Photos show: (1) Experimental hydraulic press. (2) An Anderson Expeller.

Table 31, titled "U.S. soybean oil mills" (p. 55), lists 22 establishments that "are, or have been, processing soybeans for the production of soybean oil: Archer-Daniels-Midland Co., Minneapolis, Minnesota. The Chicago Heights Oil Co., Chicago Heights, Illinois. The East St. Louis Cotton Oil Co., East St. Louis, Illinois. The Eastern Cotton Oil Co., Elizabeth City, North Carolina. The Elizabeth City Oil and Fertilizer Co., Elizabeth City, North Carolina. Falk and Co., Carnegie, Pennsylvania. W.F. Fancourt and Co., Philadelphia, Pennsylvania. Ford Motor Co., Detroit, Michigan. Funk Bros. Seed Co., Bloomington, Illinois. Wm. O. Goodrich Co., Milwaukee, Wisconsin [subsidiary of ADM]. W.R. Grau and Co., New York, New York. The Havens Oil Co., Washington, New Jersey. National Oil Products Co., Harrison, New Jersey. The New Bern Cotton Oil and Fertilizer Mills, New Bern, North Carolina. The Peru Products Co., Peru, Indiana. Wm. H. Scheil, Inc., New York, New York. Soybean Products Co., Cedar Rapids, Iowa. Spencer Kellogg and Sons, Inc., Des Moines, Iowa. The A.E. Staley Co., Decatur, Illinois. Standard Soybean Processing Co., Centerville, Iowa. Welch, Holme and Clark, Inc., New York, New York. The Winterville Cotton Oil Co., Winterville, North Carolina." Address: Iowa State College, Ames, Iowa.

572. 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.

573. 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.

574. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Principal states of North America where soya is grown (Document part). *Monthly Bulletin of Science and Practical Agriculture* (*International Institute of Agriculture, Rome*) 27(4):143T-49T. April.

• ***Summary:*** The leading U.S. soybean-growing states are Indiana, Illinois, Missouri, and North Carolina. The following soybean varieties (listed alphabetically) are grown in each state:

Indiana: Aksarben, A.K., Arlington, Dunfield, Early Brown, Haberlandt, Harbinsoy, Illini, Ito San, Lexington, Manchu, Mansoy, Medium Green, Midwest, Mikado, Pinpu, Sable, Sherwood, Wea.

Illinois: A.K., Black Eyebrow, Dunfield, Ebony, Haberlandt, Hamilton (Ohio 9035), Hurrelbrink, Illini, Ilsoy, Ito San, Laredo, Mammoth Yellow, Manchu, Mansoy, Midwest, Peking, Virginia, Wilson V [Wilson-Five].

Missouri: Harbinsoy, Illini, Laredo, Mammoth Brown, Mammoth Yellow, Manchu, Midwest, Morse, Virginia, Wilson,

North Carolina: Biloxi, Chiquita, George Washington, Herman, Laredo, Mammoth Yellow, Otootan, Southern Prolific, Virginia, Tokio. The main soybean-growing areas are in the north-eastern part of North Carolina. These varieties are divided into three geographical groups: (1) Varieties recommended for the coastal plain; (2) Varieties recommended for the low lands at the foot of the mountains; (3) Varieties recommended for foot-hill uplands and in mountain regions. Within each of these three groups they are further subdivided into four group by use: For seed production, for hay crops, for pig feeds, and for sowing with maize [intercropping]. Address: Rome, Italy.

575. Funk, E.D. 1936. Soy beans as a farm crop. In: Farm Chemurgic Council, ed. 1936. Proceedings of the Second Dearborn Conference of Agriculture, Industry, and Science. Dearborn, Michigan. 409 p. See p. 243-48. Soy Bean Sectional Meeting. [21 ref]

• ***Summary:*** Excellent overview. Contents: Introduction (incl. early history, Peoria Plan). Mineral elements essential. Soy bean qualities. U.S. production and imports. Bulletins and references.

"Farmers had grown late maturing varieties of the soy bean in the Carolinas for a few years prior to the war [World War I] for animal consumption and seed... The first market was for seed purposes only and those who only grew enough to secure a few extra bushels of extra seed received a handsome reward for their beans from other farmers who wished to do the same thing.

"About 1920 or '22 one or two men recognized the possibility of processing the domestic soy beans for the oil as well as for the high per cent of proteins in the meal for stock food. A few years later this led to various meetings of farmers who in cooperation with the processors worked out a plan for larger acreage of planted beans as well as a study of efficient methods of producing and harvesting the crop. For two years the American Milling Co. and Funk Bros. agreed to pay the farmers a specified price for the crop of beans

under contract at planting time."

The soy bean "is the heaviest feeder on phosphates of all our grain-producing crops." "The soy bean today is a profitable crop for the farmer to grow. It is rapidly taking the place of oats which seldom has been a profitable rotating crop, especially in the Middle West. The manufacturer developed the combine so that the soybeans are comparatively easy to harvest. Processors so far have kept up with production, thus creating a market and utilizing the surplus beans... In fact I know of no grain crop that has called forth as many questions from the farmers to seedsmen as has the soy bean."

"The surplus of corn that we have heard so much about is proportionally reduced by each acre of beans planted. Farmers have recognized that by growing soy beans they are producing a crop that they can convert into cash in the fall of the year prior to corn husking, or they can exchange their beans for soy bean oil meal to feed to their livestock during the winter months. Again, by using soy bean oil when painting their buildings they are helping themselves to consume some of their own production." #1.

"Soy beans may be seeded with a grain drill, a corn planter, or a sugar-beet drill. With the drill the beans may be put in either solid, that is from each spout in the drill, or some of the spouts may be stopped up and the seed planted in rows twenty-eight or thirty-two inches apart. With the solid planting most farmers use the rotary hoe or harrow to cultivate and kill the small weeds. When planted in rows the bean cultivator or a corn cultivator may be used in the same way as in cultivating corn."

"In 1924 there were just two mills processing soy beans, today there are about forty-five plants processing soy beans."

"I am and for years have been an enthusiast for the soy bean. I believe the soy bean has an unlimited field from the viewpoint of the farmer, research scientist, and the industrialist, and is rapidly taking its place in the economic life of the nation." Address: Bloomington, Illinois.

576. Breedlove, L.B. 1936. Soy bean–The magic plant: Picturing its multiple industrial and economic uses. Article I. *Chicago J. of Commerce and La Salle Street Journal.* June 2. p. 12.

• ***Summary:*** Contents: The soy bean–The youngest major crop. Manifold uses. Industrial uses increasing. Production greatly increased. Acreage sown in soy beans (Ohio, Indiana, Illinois, Iowa, Missouri, North Carolina, total USA). Production of gathered soy beans. The 1935 extra dividend crop. A new export crop. The change in the international soy bean map (a world map with statistics and bar charts for each major country shows imports of beans, oil, and cake for the years 1926, 1930, and 1935). World's production of gathered soy beans (1923-1935). Production of gathered soy beans in the United States (1923-1935). The change in the soy bean map: A map of the USA gives 3 statistics (arranged vertically) within each of the main producing states showing production of gathered soy beans for the years 1935, 1930, and 1926.

"Some one aptly has said 'soy beans are used for everything from hay to hairpins.'... Americans discovered practically all the industrial uses of the products of the plant."

"The uses of the soy bean plant are now truly manifold. The Chinese long ago, marveling at the foods which the soy provided for humans, called the plant 'the little honorable god,' and the western world, seeing the industrial application increase, has called the soy bean the 'wonder bean.'"

Note: This is the earliest document seen (June 2003) which uses the word "god" in connection with the soy bean, or which states that the soybean was once called "the little honorable god."

"Industrial Uses Increasing: The margarin [margarine] industry was the first of our industries to use considerable amounts of soy bean oil. In 1929 the margarin industry was using 750,000 pounds of soy bean oil annually and in 1935, consumed 1,740,000 pounds...

"The paint and varnish industries, which bought very little in 1929, purchased last year 13,003,000 pounds of soy bean oil or 14 per cent of the total sold. The makers of compounds and vegetable shortenings have increased their demand for soy bean oil in the last ten years and in 1935 purchased 52,452,000 pounds or 56 per cent of the total."

"Production Increased Greatly: Since 1924 the total acreage devoted to soy beans has expanded at a rapid rate and in the last few years has grown by leaps and bounds...

"By 1924 the farmers located in a crescent area crossing Iowa, Missouri, Illinois and Indiana were the principal suppliers of the demand for seeds from improved or purified varieties.

"The demand for seeds by 1931 was inactive but the demand for soy beans for processing was increasing..."

"The 1935 Extra Dividend Crop: Several factors lie behind the astounding increase in soy bean production. Under the AAA [Agricultural Adjustment Administration (USDA)] 'prosperity through scarcity' contracts, a reduction in corn and wheat acreage was required of contract-signing farmers. In Illinois, Iowa, Indiana and Missouri, almost all of the acreage forced out of production of bread and feed grains was planted in soy beans.

"Increased demand for soy bean oil, oil meal and food products gave the soy bean crop the role of an 'extra dividend' for agriculture, a part not contemplated by the system of 'planned crops' originated in Washington [DC]. The return per acre of soy beans to the farmers was roughly equivalent in value to that which is normally obtained from wheat. Measured as a cash producer for the farmer the soy bean crop ranked in 1935 fourth in importance among cereal grains grown in this country, exceeding rye in value."

"A New Export Crop: In 1934 the United States

exported for the first time soy bean meal and in 1935 exported soy beans to processing mills located in Europe in direct competition with other producing countries." Address: Staff member, Chicago Journal of Commerce.

577. Greene, R.E.L. 1936. Cost of producing farm products in North Carolina. *North Carolina Agricultural Experiment Station, Bulletin* No. 305. 127 p. June. See p. 85-88.
• ***Summary:*** Cost of Producing Soybeans has the following tables: Labor and material requirements per acre for production of soybeans; Cost per acre of producing soybeans; Labor requirements by operation per acre on soybeans. Figures apply to Craven County only. Address: Research Asst. in Farm Management.

578. Breedlove, L.B. 1936. Soy bean–The magic plant: Crop movements, grade requirements and federal inspection. Article XVIII. *Chicago J. of Commerce and La Salle Street Journal.* July 14. p. 12.
• ***Summary:*** Contents: Introduction. Official soy bean gradings. Standards for oil and meal. Soy bean inspection.

"The movement of [soy] beans produced in the Corn Belt states in recent years has been unusually rapid during the early part of the season. For the five crop years ending in 1934 nearly 48 per cent were out of the growers' hands by November. This was due to the special purchasing basis used by oil mills and feed manufacturers."

The U.S. Department of Agriculture announced the first standards for soybeans in Sept. 1925. The grades and classes set forth in the revised standards, effective 3 Sept. 1935, are shown in Table I. Soy beans are graded largely on two factors: foreign material and splits. There are four grades (No. 1 being the best), plus a sample grade for soy beans which do not comply with any of the above four grades. There are also five classes of soy beans. "Yellow soy beans.–This class includes all yellow soy beans of the Mammoth yellow, Illini, Manchu, A.K., Hollybrook and Haberlandt and all varieties of similar color and may not contain more than 5 per cent of beans from other classes." Green soy beans includes all green-colored [when dry] soy beans of the Morse, Tokio, Guelph, etc. varieties. Brown soy beans includes all light-brown and dark-brown soy beans the Virginia, Mammoth Brown, Early Brown, etc. varieties. Black soy beans includes all black soy beans of the Wilson, Pekin [Peking], Wisconsin Black, Tarheel Black, Laredo, etc. varieties. "Mixed soy beans.–This class includes the Black Eyebrow variety and any mixtures of beans not provided in the above classes."

"The National Soybean Oil Manufacturers Association of Chicago distributed early in 1932 revised trading rules for soy bean oil... The portion of the rules relating to the quality of the oil are summarized in Table II," which shows five quality factors: Specific gravity at 15.5 deg. C (minimum 0.9240). Iodin number (minimum 131.0). Saponification number (minimum 190.0). Unsaponifiable matter per cent (maximum 1.5% without penalty). Acid number–or free fatty acids percent. Volatile matter at 105 deg. C per cent. Foots, per cent (maximum 2.5% without penalty).

Table III shows the number of carloads of soy beans federally inspected in leading soy bean producing states (1928-35). In 1926-28 a grand total of 268 carloads were inspected, increasing to 928 in 1929, to 2,954 in 1931, and to a record 13,648 in 1935. In 1926-28 the states and cities with the most carloads inspected were: North Carolina 219 (81.7% of the total; at Elizabeth City, Raleigh, and Washington); Virginia 33 (at Norfolk and Richmond); and Illinois 26 (22 at Chicago and 4 at Bloomington). In 1935 the states and cities with the most carloads inspected were: Illinois 8,284 (60.7% of the total; 5,106 at Chicago, 1,440 at Peoria, 692 at Taylorville, none at Decatur); Ohio 1,390 (at Toledo, Cincinnati, Circleville, and Columbus); Indiana 1,388 (at Indianapolis, Lafayette, Decatur, and Evansville); Missouri 1,051 (at St. Louis and Sikeston). Address: Staff member, Chicago Journal of Commerce.

579. Melrose, Ellen. 1936. Country's largest mill grows from one man's interest in soybeans. *Staley Journal* (*Decatur, Illinois*). July. p. 3-9.
• ***Summary:*** "Editor's Note: The soybean industry in the United States–its origin, growth and success–exists because A.E. Staley had an idea and faith enough in it to develop it. How he persisted in this development, interesting the growers. then the consumers, creating a demand and then unceasingly urging the farmers to supply that demand, is told by Ellen Melrose in this article. Much of the material for this article was gathered from conversations with Mr. Staley and from letters in his files.

"This will he followed next month by an article dealing with the present-day results of his work."

"Part I: A review of the Staley company's pioneering and early promotion work in the field of soybean processing during the decade of the 1920's, is particularly impressive because of the threefold responsibility which the company was both willing and obliged to assume in those first years.

"This responsibility consisted not simply of experimenting in soybean processing, a line of production quite unknown in this country, and not simply of successful sales promotion on soybean products, but even of stimulating and encouraging the growing of the soybeans themselves. Any new industry may he obliged to solve some production problems and to educate the public to the use of unfamiliar products, but the soybean industry was in the unique position of having also to educate its source of supply.

"In fact, early records indicate that shortly before opening its soybean plant and for the first several years of operation, the Staley company found that establishing a promotional contact with the agricultural end of the soybean industry was as necessary to success as efficient

Year	Grown for Hay Acres	Grown for Seed Acres	Total Acres	Bushels Threshed	Yield Per Acre
1914	800	200	1,000		
1915	1,200	300	1,500		
1916	2,800	700	3,500		
1917	6,000	1,500	7,500		
1918	9,600	2,400	12,000		
1919	12,000	3,000	15,000	30,000	10.0
1920	12,000	4,000	16,000	46,000	11.5
1921	15,000	17,000	32,000	167,000	9.8
1922	70,000	65,000	135,000	812,000	12.5
1923	137,000	92,000	229,000	1,288,000	14.0
1924	200,000	115,000	315,000	1,380,000	12.0

production or the ultimate sales of soy bean products.

"Promotion of soybean growing: The emphasis on soybean growing, so fundamental to future growth of the soybean processing industry, perhaps resulted from the fact that A.E. Staley's first interest in soybeans was of an agricultural nature. As a boy in North Carolina, he had seen some soybeans brought from China by a missionary, had watched them grow and had noted that the crop not only furnished feed for livestock but being leguminous, enriched the soil as well. In later years. after building a plant for the processing of corn, it was natural that Mr. Staley's interest should turn to the possibility of processing other farm products also. The success of soybean processing in the Orient and in Europe, and the quantities of soybean oil and cake imported into the United States, were strong indications that this was a farm product which would be profitably processed in this country.

"The possibilities in this field were the subject of many discussions with farmers who called in the Staley company's corn buying department or who talked with the company's grain buyers in surrounding towns, during the years between 1916 and 1922. Mr. Staley's confidence that an industry would some time he established in this country made many farmers receptive to the idea of growing soybeans. Such interest began to produce tangible results in the late years of the War when the productivity of Illinois corn land had been diminished because farmers had neglected crop rotation in an effort to take greatest advantage of high wartime prices on corn. In this situation, the wisdom and expedience of growing soybeans became apparent; the number of acres planted in soybeans in Illinois and the number of bushels threshed, increased accordingly:"

A 6-column table gives the following information from 1914 to 1924. (1) Year. (2) Grown for hay (acres); it increases steadily from 800 to 200,000. (3) Grown for seed (acres); it increases the most rapidly from 200 to 115,000. (4) Total acres; increases from 1,000 to 315,000. (5) Bushels threshed; increases from 30,000 in 1919 to 1.380 million in 1924. (6) Yield [of seed] per acre; increases slowly from 10.0 in 1919 to a peak of 14.0 in 1925, then decreases to 12.0 in 1924.

"Farmers wanted mill: Just how much the marked increases between 1920 and 1922 in acreage grown for seed and in bushels threshed resulted from the casual propaganda of conversation with farmers visiting the Staley grain department or talking with the company's representatives, is an indeterminable question. In any case, Central Illinois farmers soon became anxious to have a commercial outlet for their beans and according to the Staley company's announcement that its soybean plant would he ready for the 1922 crop, the project was 'in response to the general and urgent desire on the part of the farmers of Central Illinois" for such a plant,' (See *Staley Journal,* June 1922).

Footnote: "Excerpt from letter written by Mr. Staley. November 23. 1921, in reply to inquiries from the Agricultural Department of the *Chicago Tribune* and from the *Prairie Farmer:*

"Our company has been requested and in fact urged, by the various County Farm Advisers and by delegations of farmers who have called upon us, to put in a plant for grinding and extracting the oil from the soya bean, and after making considerable investigation our Company bas decided to install a plant that will be sufficiently large to consume all of the beans that will he grown for market in Central Illinois. If this venture should prove commercially successful from a manufacturing standpoint and also from the agricultural standpoint. we will enlarge the plant from time to time sufficiently to handle all of the beans which may be grown within a reasonable distance of Decatur."

"After this announcement and the opening of the plant for operation in October, 1922, farmers were assured of a commercial outlet for their beans. It is logical to assume that the Staley company, in giving this assurance, was largely responsible for the increases in soybeans planted for seed and threshed between 1922 and 1924.

"The contacts with farmers informing them of the Staley soybean project were accomplished not only by conversation with farmers from whom the Company bought corn but also by correspondence and by a special traveling representative,

"During the latter part of 1921 and the first half of 1922, inquiries concerning the establishment of a soybean plant were received from farmers and grain dealers in some sixty or seventy Illinois towns and a few towns in adjoining states. Such inquiries were usually answered by Mr. Staley himself because of his personal interest in the subject; information was given concerning the proposed plant and probable prices of beans, and it was suggested that farmers get in touch with the Department of Agriculture at the University of Illinois to secure knowledge of soybean cultivation and the best varieties for commercial purposes.

"Reports on conditions: In the summer of 1922, when the soybean crop was well under way, the Staley company sent a representative out into the soybean growing districts to make weekly reports concerning the condition of the crop. During the course of the summer this representative also interviewed 175 farmers or producers, 137 elevator dealers, 11 seed houses, 25 county agents and a number of bankers and newspaper men, and talked before four

soybean meetings giving information about the Staley project. Bulletins and pamphlets were distributed at all these interviews and meetings. There was evidently increasing interest in soybeans for the market at this time although some carelessness and lack of knowledge concerning the handling of the crop was observed by the Staley representative.

"Early operations: Meanwhile bean driers and oil expellers had been installed at the Staley plant making a unit with capacity for 500 bushels of beans per day. The first purchase of beans was made September 28, 1922, from the Andrews Grain Company of Walker, Illinois: 1,547 bushels at a price of 99.75¢ per bushel, and on September 30, the Staley soybean mill was first put into operation.

"At this time beans could be purchased only in small lots and even sometimes by the wagon load, and all that could he obtained were processed immediately. Since a high quality product is somewhat conditioned upon a sizable volume, this scarcity, together with the fact that the quality of the beans was uneven due to farmers' inexperience in cultivating and harvesting, resulted in some production difficulties. The driers first used also proved to be unsatisfactory, but this problem was solved when beans were successfully prepared for crushing in driers constructed according to the invention of the Staley plant superintendent.

"With certain interruptions resulting from these difficulties the new mill operated only 16 days during October, 1922, crushing 5,764 bushels of beans and producing 209,300 pounds of Meal and 42,036 pounds of Oil. There is a striking contrast between this volume and the production figure 13 years later, in March, 1936, when the Staley plant crushed 317,202 bushels of beans and produced 14,725,010 pounds of Meal and 2,690,875 pounds of Crude Oil and thousands of pounds of diversified types of Soybean Oil, Flour and Grits." Continued.

580. Bradley, I.C. 1936. The processing of soybeans. *Proceedings of the American Soybean Association* p. 37-39. 16th annual meeting. Held 14-16 Sept. in Iowa.
• ***Summary:*** "About sixteen years ago [ca. 1920] considerable interest had been developed in soybeans in the United States for agriculture. As Dr. Burlison so aptly put it..., 'There was a need for more legumes in the rotation, more high-protein feeds in the feed bin, and substitutes in the rotation of red clover and oats,' These were the promising features of soybeans at that time to agriculture.

"The United States Department of Agriculture and respective State Agricultural Extension Departments together with agriculturists interested in growing soybeans appreciated there was ahead of them the problem of markets for this crop if it was to become a helpful factor in agriculture.

"On investigation it was found that a few southern cotton oil mills had processed a few small lots of beans left over from seed or not suitable for seed, which had been grown in [the] Carolinas and Virginia where practically all soybeans in United States had been grown up to this time and primarily were grown for stock feed and seed.

"At this same time there was a small flaxseed crushing plant, equipped with both hydraulic and expeller presses located at Chicago Heights, Illinois, which being close to Illinois and Indiana boundary line and both states rather predominating in their interest in soybeans could conveniently serve both. As it was soon after the World War (in the vernacular of the street) "It was all dressed up and no place to go," and glad to help solve the problem of surplus soybeans and it was so arranged.

"The simple information that a processing plant was giving its entire energy to soybeans caused so much interest in planting soybeans that the seed demand took all the soybeans, with no surplus left for processing and it became necessary to ship a few cars from North Carolina in order to get experimental mill work, from which was recovered the first tank car of domestic soybean oil sold on Chicago market so far as this speaker can learn and was the very beginning of a calculated study of procedure of domestic processing of soybeans.

"The elementary work accomplished at this plant is worthy of note, in that it proved by proper arrangement and handling that hydraulic presses and expeller type presses were adaptable to the processing of soybeans and have now become general practice.

"Following this elementary processing let us reflect on the processing picture for next few years.

"Each succeeding year found an increase in bean production and naturally increased demand for seed, also additional processing plants. Mingled with this was a few wet harvested crops–growers not familiar with handling crop for grain-soils not inoculated–and good beans being held for seed. With this picture before you, it is easy to see that the soybeans going to the processors during this period of development were in majority inferior. It seems advisable to bring this to your attention as an excuse for criticism in the past of variations in soybean by-products.

"We now come to the present period reached in processing advancement for recovery of soybean oil.

"As you probably know there are three recognized procedures for recovery of soybean oil: The hydraulic press–the expeller type of press–and the solvent extraction system, each of course, requiring its accompanying particular type of equipment incident to its use for proper functioning.

"All three of these processes are in operation on soybeans in the United States and by no means are we alone in this. In at least one of the European countries all three processes are operated at one plant. All this is substantial evidence that soybeans can be processed satisfactorily by any of the three processes.

"Without boring you with the detailed mechanics or common practices of processing, let us get a simple picture

of the three established methods of processing mentioned.

"First-Expeller Method: This is at present the most widely adopted method of oil recovery. It is continuous in operation and operates rather on the principle of a household meat grinder. The grinder develops a pressure of approximately six tons per square inch, which releases the oil, and the cake emerges from end of auger in thin sheets, carried to grinder for making meal.

"Second-Hydraulic Press Method: The most ancient method of extracting oil by expression. The plan is something like the cider press you are all familiar with. The product to be pressed is put between plates in a stand press–pressure is exerted by use of ram operated by compressor. The hydraulic press is used almost universally in linseed and cotton seed processing plants.

"Third-Solvent Extraction Method: This method has been used in European countries for a good many years. In this process beans are ground, flaked or crushed and the oil dissolved out by suitable solvent. The solvent recovered by distillation and used over and over. This method of oil recovery is gaining interest in the United States and one rather large plant of this type is in operation in this country at present time."

"This discussion is briefly the history of soybean processing from the very first to present time and it is interesting to note the advancement. Sixteen years ago the industry started from scratch, with only an elementary knowledge of how to grow beans, or varieties suitable to commercial uses, harvesting and handling a problem, no markets established for the by-products and slight knowledge of value of by-products. Today there are varieties of soybeans that will yield forty to forty-five bushels per acre, withstand weather without shattering, combines by the thousand to harvest the crop, efficient processing facilities, hundreds of products made from soybeans, a 1935-36 harvested crop of approximately 39,000,000 bushels and a market developed that absorbed the total crop without a carry over." Address: Allied Mills, Inc., Taylorville, Illinois; President National Soybean Processors Assoc.

581. 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.

582. *Proceedings of the American Soybean Association.* 1936. [Soybean production and crushing statistics in the United States, 1922-1936]. p. 63. 16th annual meeting. Held 14-16 Sept. in Iowa.

• ***Summary:*** Contains four tables covering the USA (total) and the following states: Illinois, Indiana, Iowa, Missouri, Ohio, North Carolina, and USA total: (1) Total acreage of soybeans grown for all purposes, 1922, 1924, 1927, 1930, 1934-36 (1,000 acres). (2) Acreage from which soybean seed was harvested, 1927-1935 (1,000 acres). (3) Crop harvested for seed, 1922, 1926, 1930-35 (1,000 bushels). (4) Soybean crushing in the United States (in million lb) for 3 sets of years: 1925-26, 1929-30, 1934-35. Beans crushed increased from 21.0 million lb in 1925-26 to 545.8 in 1934-35 (a 26-fold increase in 9 years!). Oil produced increased from 2.63 million lb in 1925-26 to 78.0 in 1934-35. Cake produced increased from 16.8 million lb in 1925-26 to 436.4 in 1934-35.

583. Russell, Lindsay. 1936. Beneficent soybean. *New York Times.* Dec. 6. Section 4. p. 8.

• ***Summary:*** Russell believes that "John Havens, a miller in Beaufort County, was the first to bring the soybean to North Carolina, and the experiments of August Heckscher resulted in bringing the soybean to the attention of the Midwest."

Note 1. Russell (who is probably wrong) does not say when Havens first brought soybeans to North Carolina or from whom he obtained his soybeans.

Note 2. The city of Washington is the capital of Beaufort County, in eastern North Carolina on the Pamlico River. The Havens Oil Co. in Washington, North Carolina, first crushed soybeans in 1916 (C.B. Williams, Dec. 1916; E.G. Funk, 1949).

Although the soybean originated in China, "it remained for Japan to vastly extend the use of the soy bean and introduce it to the world... In 1905 Japan turned the South Manchurian Railway into a Department of Agriculture and started a drive to develop the soy bean..." Also mentions tofu (also called "milk curd") and "mesu" (probably miso) "a six-month ferment and substitute for lactic acid milk." Address: Wilmington, North Carolina.

584. Becker, Joseph A.; Froehlich, Paul; Jackson, D.; et al. comps. 1936. Agricultural statistics 1936. Washington, DC: U.S. Government Printing Office. 486 p. Index. 24 cm. For soybeans and soy products see p. 181-84, 218-221.

• ***Summary:*** This volume presents information formerly published [until 1935] in the statistical section of the Yearbook of Agriculture" (p. 1).

Page 181: Table 257. Soybeans: Acreage, yield, production, and season average price per bushel received by producers, by States, average 1928-32, and annual 1934 and 1935.

Page 181: Table 258. Soybeans: Production in specified countries, 1924-25 to 1935-36 (in 1,000 bushels). The countries are: United States, Manchuria, Chosen (Korea), Japan, Netherland India (later Indonesia). Note: Manchuria produces about 97% of the soybeans production of China. Production figures for China are not available.

Page 182: Table 259. Soybeans: Average price per bushel received by producers, United States, 1926-27 to 1935-36. The weighted average price ranged from a low of $0.61 in 1931-32 to a high of $2.00 in 1926-27.

Page 182: Table 260. Soybeans for seed: Average wholesale selling price per bushel at Baltimore [Maryland] and St. Louis, Missouri, 1926-1925. The price ranged from a low of $0.94 in 1933 to a high of $2.99 in 1929.

Page 182: Table 261. Soybeans crushed and crude oil produced, 1925-26 to 1934-35 (in 1,000 pounds). The total soybeans crushed increased from 21.04 million lb in 1925-26 to 545.50 million lb in 1934-35. The total soybean oil produced rose from 2.638 million lb in 1925-26 to 78.033 million lb in 1934-35.

Page 183: Table 262 (full page). Soybeans and soybean oil: International trade, average 1925-29, annual 1932-34.

Page 184: Table 263. Soybean oil, domestic, crude: Average price per pound, in barrels, New York, by months, 1929-30 to 1935-36.

Page 218: Table 290. Soybeans: Acreage, yield, production, and season average price per bushel received by farmers, by States, averages, and annual 1935 and 1936 (preliminary). In 1935 the top 5 soybean producing states were Illinois (24.012 million bu), Indiana (6.970), Iowa (6.600), Ohio (2.604) and North Carolina (1.282 million bu).

Page 218: Table 291. Soybeans: Production in specified countries, 1924-36. The countries are: United States (#2 in 1935), Manchuria (#1 by far), Chosen (Korea), Japan, Netherland India. Soybean production in the United States increased from 4.947 million bu in 1924 to a peak of 44.378 million bu in 1935, falling to 29.616 million bu in 1936.

Page 219: Table 292. Soybeans: Average price received by farmers, United States, 1926-27, 1936-37.

219: Table 293. Soybeans for seed: Average selling price per bushel at Baltimore (Maryland) and St. Louis (Missouri),

by months, 1927-1936.

Page 220: Table 294. Soybeans crushed and crude oil produced, by quarters 1926-27 to 1935-36.

Page 220: Table 295. Soybean oil, domestic, crude: Average price per pound, in drums. New York, by months, 1929-30 to 1936-37.

Page 221: Table 296 (full page). Soybeans and soybean oil: International trade (principal importing and exporting countries), average 1925-29, annual 1933-35. For soybeans: The main exporting countries are China and Manchuria. The main importing countries in 1935 are Japan and Germany. For soybean oil: The main exporting countries are Manchuria, Denmark, and Germany. The main importing countries are The Netherlands and the United Kingdom. One source is the International Yearbook of Agricultural Statistics. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

585. Institut International d'Agriculture (International Institute of Agriculture). 1936. Le soja dans le monde [The soybean in various countries of the world]. Rome, Italy: Imprimerie de la Chambre des Deputes, Charles Colombo. viii + 282 p. Bibliography, p. 276-82. No index. 25 cm. [90 ref. Fre]

• ***Summary:*** A superb early work, containing extensive original information, looking at developments with soybeans and soyfoods country by country, worldwide. Contents. Preface (p. 1). A. Cultivation of soy (*soja;* p. 4): 1. Botanical description, selection, classification of the varieties. 2. Cultivation properly said. 3. Enemies and illnesses.

4. Cultivation in the various countries: 4a. The Americas (p. 38): Antigua, Argentina, Bermuda, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, USA (gives details on all varieties grown, and describes production, history, varieties, and cultural practices in North Carolina, Illinois, Indiana, Iowa, Maryland, Massachusetts, Mississippi, Missouri, New York, Ohio, West Virginia, Wisconsin, Conclusion), Guadeloupe, Guatemala, British Guiana, Dutch Guiana, British Honduras [Belize], Jamaica, Barbados, Martinique, Mexico, Montserrat, Peru, Puerto Rico, El Salvador, Trinidad and Tobago, Uruguay.

4b. Europe (p. 101): Germany, the Danubian countries, Austria, Spain, France, Great Britain, Hungary, Italy, Netherlands, Poland, Romania, Switzerland, Czechoslovakia, Turkey, USSR.

4c. Asia (p. 128): Ceylon, China and Manchuria, Cyprus, Federated States of Malaysia, British India (incl. Punjab, Bihar and Orissa, Burma, Berar, Madras Presidency, Bombay Presidency, Bengal (incl. Nepal, Bhutan, Sikkim, and the district of Darjeeling), Assam, North-West Frontier Province, United Provinces), Netherlands Indies, Indochina (incl. Tonkin, Annam, Laos, Cambodia, and Cochinchine), Japan, Palestine, Siam.

4d. Africa (p. 146): French West Africa, Algeria, Belgian Congo, Cyrenaica, Egypt, Eritrea, Madagascar, Morocco, Mauritius (Ile Maurice), Reunion (Réunion), Rhodesia, Anglo-Egyptian Sudan, Tripolitania, Tunisia, Union of South Africa.

4e. Oceania (p. 153): Australia, Fiji Islands, Hawaii, New Caledonia, New Zealand, Philippines.

B. Utilization of soya (p. 158): 1. The soybean in human nutrition and in industry: Whole soybeans, chart of the uses of whole soybeans, use of soya in the green state (green vegetable soybeans), soy sauce (*dau-tuong* of the Annamites, or *toyo,* named shoyu by the Japanese, or *chau-yau* or *chiang yoo* by the Chinese), condiments and sauces based on soya in the Netherlands Indies (*tempe, ontjom, tempemori* and *tempe kedele* [various types of tempeh and onchom, p. 168-70]), *tao tjo* [Indonesian-style miso], *tao dji* [fermented black soybeans], *ketjap, ketiap benteng* [Indonesian-style soy sauce], soymilk (*le lait de soja*)*,* yuba (*crème de lait de soja*)*,* tofu (*le fromage de soja*) and fermented tofu (*des fromages fermentés,* made by Li Yu-ying near Paris), soymilk casein (*caséine du lait de soja,* for industrial use, including vegetable albumin, or galalithe [galalith]" [isolated soy protein], and artificial wool), soy lecithin (*lécithine de soja*)*,* soy flour (*la farine de soja,* incl. soy bread, soy pastries, and soy cocoa).

Note 1. This is the earliest document seen (Sept. 2010) that uses the term *benteng* or *ketiap benteng* to refer to an Indonesian-style soy sauce.

2. Soy oil (p. 194): Food uses, industrial uses (including soaps, products resembling petroleum, paints, varnishes, linoleum, and artificial rubber), extraction, directory of U.S. manufacturers of materials and equipment for soybean processing, directory of U.S. and Canadian manufacturers of food products based on soya (*produits alimentaires à base de soja,* p. 205-06), directory of U.S. manufacturers of industrial soy products (p. 206-07).

3. Soybean in the feeding of domestic animals (p. 207): Forage, hay, silage, pasture, soybean seeds, the minerals in soybeans, soya as a feed for dairy cows, cattle, buffaloes, sheep, hogs, horses and mules, poultry.

4. Use of soya as fertilizer (p. 257). C. The trade of soya and of its by-products (p. 363): Production of soybeans in the principal countries, economic importance of soybean cultivation in the USA, soybean trade/commerce including tables of the major importers and exporters, and amounts traded annually in 1931-1934, price of soybeans, cost of production.

List by region and country of people and organizations that responded to a questionnaire sent by IIA (p. 273-76). Bibliography of main publications consulted, listed by region and country of publication.

Reunion (*Ile de la Réunion*)*:* "The soybean (Le Soja) is only cultivated as an experimental crop, on a few square meters at the agronomic station" (p. 148).

Fiji (*Iles Fidji*)*:* Soybean cultivation is not yet practiced

in this colony; however soybean seeds are currently being imported in order to conduct a trial.

New Caledonia: In 1928 soybean cultivation was introduced to New Caledonia.

Note 2. This is the earliest document seen (Dec. 2007) concerning soybeans in Bhutan, Costa Rica, Dominican Republic, El Salvador, Guatemala, Israel, Jamaica, Madagascar, Morocco, New Caledonia, Palestine, Peru, or Réunion, or the cultivation of soybeans in Bhutan, Costa Rica, Dominican Republic, El Salvador, Guatemala, Israel, Jamaica, Madagascar, Mexico, the Middle East. Morocco, New Caledonia, Palestine, Peru, or Réunion. It is also the earliest document seen (Dec. 2007) concerning soybeans in connection with (but not yet in) Cyprus; it is stated that soybeans are not grown on the island of Cyprus. Soybean cultivation is not practiced in the Italian colonies of Eritrea (Erythrée, now part of Ethiopia) or Cyrenaica (Cyrénaïque, now part of Libya).

Note 3. This document contains the earliest date seen for soybeans in Bhutan, New Caledonia, or Réunion, or the cultivation of soybeans in New Caledonia (1928), or Bhutan or Réunion (1936) (One of two documents).

Note 4. This is the earliest French-language document seen (Sept. 2011) that mentions tempeh, which it calls "tempe" (p. 168). It notes that, in general, the indigenous people of the Netherlands Indies use soybeans mainly to make *tempe,* a product which, throughout central and eastern Java, takes the place reserved for *ontjom* in western Java. Tempeh is found in two forms: either in large flat cakes which are cut at the time of sale into small square morsels, or wrapped in folded banana leaves. A detailed description of the preparation of each of these two types of tempeh is given as well as another type of tempe, called *tempemori,* which is made with soybeans and coconut presscake.

Soybean cultivation is not known to be practiced in the following countries or colonies: Antigua, Barbados, British Honduras (renamed Belize in about 1975), Trinidad and Tobago.

Note 5. The name "Georges Ray" is mentioned in this book on an unnumbered page. Address: Rome, Italy.

586. Heberer, A.J. 1937. Some uses of soybean oil in paints and varnishes. *Oil and Soap* 14(1):15-16. Jan.
• ***Summary:*** Soya oil has been used in the paint industry for about 40 years. The first Soya beans were brought to this country in 1804 and the first plantation was made in North Carolina. The value of soybeans was not appreciated until about 1908 when due to the scarcity of cotton seed, the soap and glycerin manufacturers turned their attention to its possibilities. About this time the linseed oil market fluctuated from 75 cents to $1.00 per gallon, compared to 40 and 50 cents between 1900 and 1907. The increased price of linseed led the paint chemists to investigate the oil as a possible substitute for linseed for the first time. There were many conflicting facts regarding the oil in the early investigation. This is not unusual since there are no less than 20 varieties.

Manchurian oil was primarily used during the early years of volume consumption of Soya oil and especially during the World War. The first domestic raw oils would darken under heat and break badly when kettle bodied for varnish. The break of the domestic oil, a dark orange color, is in contrast to Manchurian oil which bleaches when heated and shows either no break or only a very slight one. Consequently, in the early days the varnish maker was quite prejudiced against domestic oil.

Lead manganese and cobalt driers can be used with Soya oil, preferably in the form of resinate or linoleate. Soya oil has more properties which make it more valuable than linseed. Pigments grind easily in the oil and it is particularly well adapted for the grinding of oil colors.

Soya oil has found a definite place in the modification of synthetic resins in the past 2 decades. These resins, principally of the Glycerol Pthalate and Phenol Formaldehyde type, require certain proportions of oil as a modifying agent to make them soluble in mineral thinners. Address: The Glidden Co., Chicago, Illinois.

587. Lovvorn, R.L.; Kime, P.H.; Stitt, R.E. 1937. I. Factors in soybean production. II. Variety recommendations and characteristics. *North Carolina Agricultural Experiment Station, Agronomy Information Circular* No. 102. 6 p. Jan.
• ***Summary:*** Contents: Part I: Factors in soybean production. Introduction. Time of planting. Methods of seeding. Inoculation. Rate of seeding. When to cut for hay. Curing the hay. Seed production. Harvesting the seed. Soil improvement. Soybeans for pasturage. Soybeans for silage. Edible types.

Part II: Variety recommendations and characteristics. Varieties recommended for Coastal Plain (for seed hay, hog pasture, planting in corn). Varieties recommended for Lower Piedmont. Varieties recommended for Upper Piedmont and Mountain sections. Description of varieties. Address: 1-2. Dep. of Agronomy, North Carolina Agric. Exp. Station; 3. Div. of Forage Crops and Diseases, Bureau of Plant Industry, USDA.

588. *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."

589. *Staley Journal* (*Decatur, Illinois*). 1937. New home for processing soybeans. June. p. 9-14.
• ***Summary:*** Staley pioneered soybean crushing in 1922. But since then things have changed greatly. There are two buildings in the new unit. "When a visitor walks into our new soybean mill and looks down through the cathedral aisles formed by expellers, he probably thinks it looks like any modern, well-equipped factory. It does but the first mill was of no such grand proportions and had no such noble vistas. According to the records of the V.D. Anderson company, of Cleveland [Ohio], no other mill in the United States [in 1922] had installed expellers exclusively for soybeans up to that time. Two North Carolina cottonseed mills had expellers and used them with some soybeans but fifteen years ago soybeans were still something most Americans thought of as thoroughly oriental.

"Few expellers: Chemists were telling manuacturers that there were great possibilities in them but there seemed to be a sentiment against using the expeller method of extracting the oil. The Staley company when it installed machinery for its first plant, decided to use the expeller method. For some reason old machinery was purchased and changed here at the plant to fit our particular needs.

"Mr. E.C. Ragsdale [who was in charge of the first mill] has vivid memories of that hectic period, which fades all future worries into flurries. The machinery was set up in an old building, and because it was not manufactured expressly for the purpose for which it was to be used, repairs and alterations were many and frequent. But the plant got under way, and there was a great deal of nation-wide interest when the company finally announced that it would be able to take care of 500 bushels of soybeans a day.

"Increased capacity: Dining the fifteen years which have passed that capacity has been increased and Mr. Ragsdale, as well as Staley chemists and plant have learned much about the processing of soybeans. The new buildings are very solid proof of that. In the new mill of 20,000 bushel daily capacity, row after row of expellers extract the oil in a highly efficient manner.

"The soybeans are received, as they were in an earlier day, at the storage tanks north of the mill where Pat Mathews is in charge. But they are received more enthusiastically, as it were. The old method of shoveling went out with electrically driven shovels has given way to a more modern manner of drawing them up by suction through a large pipe. Almost with a zip the beans are transferred from the car to the storage bins. From the bins they have a short journey to the mills where they are ground and the oil extracted.

Two ways: The soybean is made into oil and oil meal. "The oil goes on its way by pipe line to the oil house, and the meal, also by pipe lines to the new soybean warehouse where it completes its education.

"In this building, where Louis Smith is in charge, the meal becomes soybean oil meal, pea size and pellets. In this building, also, the finished feed is stored and from it the feed is loaded directly into cars for shipping. The first most striking thing about this building is that it is kept so beautifully clean. There is no trouble with oil dripping constantly here, as in the mill and many other plant buildings. There is plenty of light, for there are windows on all sides, and doors to loading platforms on both sides, open up so that the first floor rooms seem to have no walls.

"Plenty of room: It is such a far cry front that first soybean mill and warehouse. There is room for everything, there is no need for confusion, and the men are all trained in this work. They even have a highly perfected fire-fighting system. In addition to regulation water pipes for such emergencies, there are steam pipes, to be used in case of small fires in bins and cyclones. Steam will quench the fire as efficiently without causing the damage that water can cause. And no excited workmen need confuse the valves, for these pipes are painted different and distinctive colors and well labeled.

"The entire soybean unit is compact and efficient and modern. A trip through the mill and the warehouse proves more conclusively than any words, that soybeans have firmly established themselves in American industrial life."

Photos show: (1) "The soybean warehouse has landing platforms on both sides. It is located just west of the mill." (2) "The new soybean mill with storage tanks in the rear. The pipe and cyclone for unloading cars is shown at the extreme left." (3) Filling sacks with Staley's Soybean Oil Mill. (4) (4) Interior of a car being loaded with sacks (by hand, with the help of a hand truck) at the warehouse. (4) A line of Expellers. (5) And of presses, which are found in the new soybean mill. (6) Horizontal driers. (7) Mills for grinding the soybeans, in the new mill. (6) Soybeans are brought into the mills on the screw conveyors.

590. True, Alfred Charles. 1937. A history of agricultural experimentation and research in the United States 1607-1925, including a history of the United States Department of Agriculture. *USDA Miscellaneous Publication* No. 251. 321 p. For soybeans, see p. 91, 94, 100, 115, 146, 222, 227. July. With subject index. [327* ref]

• ***Summary:*** Contents: Agricultural research in the United States. Beginnings in the American Colonies and early States: Significant contributions resulting from individual efforts and colonial subsidies, Washington and Jefferson among the leaders of their time in observations and experiments relating to agriculture, influence of agricultural societies in promoting agricultural investigation and improvement during the post-revolutionary period, improvement of agricultural implements. Early State geological and agricultural surveys. Relations of the National Government to agriculture, 1796-1835: Early congressional action, advancement through executive branches of the government. Agriculture promoted through the Patent Office, 1836-62: The first Commissioner of Patents (Henry Leavitt Ellsworth). Movement for a United States Department of Agriculture (USDA).

The United States Department of Agriculture, 1862-88: Administration of Commissioner Isaac Newton (1862-67), Commissioner Horace Capron (1867-71), Commissioner Frederick Watts (1871-77), Commissioner William Gates LeDuc (1877-81), Commissioner George Bailey Loring (1881-85), Commissioner Norman Jay Colman (1885-89).

Movement in the States toward the establishment of institutions for agricultural research, 1840-75: New York, Connecticut, California, Maryland, Pennsylvania, Michigan, New Jersey (Rutgers, p. 75-76), Massachusetts, Maine, Kansas, Illinois, Minnesota, Wisconsin, Iowa.

State agricultural experiment stations without federal aid, 1875-88: Connecticut Experiment Station, California (E.W. Hilgard, p. 87-89), North Carolina (soy, p. 91), Massachusetts (soy, p. 94), Cornell University (Ithaca, New York), New Jersey (Rutgers), New York, Ohio, University of Tennessee (soy, p. 100), Alabama, Wisconsin, Maine Fertilizer Control and Agricultural Experiment Station, Louisiana Experiment Stations, Kentucky, Vermont.

Agricultural experiments in States not having experiment stations, 1875-1888: Colorado, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Mississippi, Missouri (soy, p. 115), Nebraska, New Hampshire, Pennsylvania, South Carolina, Houghton Farm. History of the Hatch Experiment Station Act of 1887. Agricultural experiment stations in the States and Territories under the Hatch Act, 1888-1905: Relation of the Federal Government to the stations, relations of the stations with associations, organization of the stations, income of the stations, equipment of the stations, lines of work of the stations (agronomy, soy, p. 146). Movement for increased Federal aid, culminating in the Adams Act, 1902-6: History of the act elevating the United States Department of Agriculture to Cabinet rank, the United States Department of Agriculture under the act of February 9, 1889, 1889-97. Large development of research relating to agricultural production, 1897-1913: United States Department of Agriculture, agricultural experiment stations, 1906-1913. Development of research in agricultural economics and sociology, 1913-21: United States Department of Agriculture (Bureau of Plant Industry, soy, p. 222; Bureau of Chemistry, soy, p. 227), agricultural experiment stations as affected by the Smith-Lever Extension Act and the World War, 1914-1920. Agricultural research during the agricultural depression, 1921-25: United States Department of Agriculture, agriculture experiment stations, 1921-25. Bibliography: Biographical references. Subject index. Name index.

Photos show: Edwin West Allen (1864-1929, frontispiece). Henry Leavitt Ellsworth (p. 23). Isaac Newton (p. 41). First main building of the Department of Agriculture (p. 46). Norman Jay Colman (p. 61). Samuel William Johnson (p. 69). Eugene Woldemar Hilgard (p. 72). Wilbur Olin Atwater (p. 83). William Henry Hatch (p. 124). Henry Cullen Adams (p. 167). James Wilson (p. 186). New main building of the Department of Agriculture (p. 189).

The first move to aid agriculture in the United States was inaugurated by George Washington in his message to Congress of 1790, and more elaborately in his last message of 7 Dec. 1796 (p. 18-19). Organizations were established to collect and diffuse information. In 1797 a House of Representatives committee recommended the creation of an American Society of Agriculture, funded by the federal government, with headquarters in Washington, DC; it never happened.

Meanwhile agriculture was promoted through the patent office from 1836 to 1862. The first commissioner of patents, Henry L. Ellsworth, was very active and helped to lay the foundations of the present USDA. As commissioner (1835-1845) he immediately began to collect new and valuable seeds and plants, and to distribute these with the aid of congressmen and others. "Naval officers, consuls, and private citizens traveling abroad were frequently bringing to this country seeds and plants which might be used in our agriculture but which were largely lost because there was

no agency for their preservation and distribution. In his report for 1837 Ellsworth therefore suggests the creation of a public depository for such articles, 'whence they may be dispensed to every part of the Union'" (p. 24). "In 1840 more than 30,000 packages of seeds were distributed. That year the Commissioner urged 'the importance of an annual report of the state of the crops in different sections..." (p. 25) In 1845 Ellsworth resigned. "In 1847 more than 60,000 packets of seed were distributed, including some contributed by the French minister of agriculture commerce" (p. 27). Subsequent commissioners continued Ellsworth's work. "In 1852 Congress gave special authority for the purchase of seeds, and in 1854 included cuttings" (p. 28).

From June 1853 to 1860 the Agricultural Division of the patent office was in the charge of Daniel Jay Browne, son of a New Hampshire farmer. He emphasized the importance of the "introduction and naturalization of new and useful vegetable products, hitherto unknown in the United States," and justified the distribution of many small seed packets to encourage propagation (p. 29).

"Beginning in 1856 the language of the agricultural appropriation item was broadened to include 'the collection of agricultural statistics, investigations for promoting agriculture and rural economy and the procurement and distribution of cuttings and seeds'" (p. 31).

"In 1858 preparation was made for a propagating garden on five acres of land between Missouri Avenue and Four and a Half and Sixth Streets in Washington. This was tile drained and a hothouse was erected. Primarily it was intended to grow there the tea seeds from China and cuttings of grapevines collected in the United States" (p. 31-32).

In 1850 the Agricultural Division of the Patent Office received its first funds, $5,000, appropriated by Congress, increasing to $10,000 in 1854. "Up to that time the money had been taken out of the Patent Office fund, but in 1855 reimbursement was made to the extent of $40,078.78. After that, the agricultural appropriation was paid directly from the Treasury. Between 1856 and 1862 the appropriation varied from $30,000 to $75,000" (p. 34).

Note: Browne distributed Admiral Perry's seeds (including soybeans) from Japan. And in the Report of the Commissioner of Patents, Agriculture, he wrote numerous articles about new plants, including one about soybeans in 1855.

In the early 1860s a movement started to form a U.S. Department of Agriculture as a separate organization, outside the Patent Office. The idea became a Act which was approved by President Abraham Lincoln in 1862 (p. 37-40). Its first era was 1862-1888, with Isaac Newton as the first commissioner of agriculture in 1862, and again in 1867. He was promoted from chief of the agricultural section of the patent office.

"The initial appropriation for the department was $60,000... For the fiscal year 1867 the appropriations aggregated to $199,000. The Department [USDA] had six rooms in the basement of the Patent Office building [in Washington, DC], which had formerly been occupied by the agricultural division, and gradually acquired possession of the property of that Division, including the propagating garden at Sixth Street and Missouri Avenue NW. There was also assigned to it a tract of land, lying between Twelfth and Fourteenth Streets from B Street SW to the canal (now Constitution Avenue), which was being used by the War Department as a yard for army animals. This tract, now forming the Department grounds, did not come into its possession until April 1865, when it was made an experiment farm" (p. 42). Tests were made that summer. Continued. Address: USDA, Washington, DC.

591. True, Alfred Charles. 1937. A history of agricultural experimentation and research in the United States 1607-1925, including a history of the United States Department of Agriculture (Continued–Document part II). *USDA Miscellaneous Publication* No. 251. 321 p. For soybeans, see p. 91, 94, 100, 115, 146, 222, 227, 263, and 269. July. [327* ref]

• ***Summary:*** (Continued): In 1863 about 1.2 million packages of seed and 26,000 bulbs, cuttings, and vines were distributed. Appropriations for a USDA library were approved in 1864, and the first brick building was occupied in 1865. In 1867 seed distribution was still the department's main activity, accounting for 58% of the total budget of $199,100 (p. 47). In 1868 the USDA's first new main building was completed and occupied. It "gave the Department much better quarters and opened the way for reorganization and enlargement of its work. The grounds about this building were too small for an experiment farm. (p. 46, with photo).

"In 1873 the lot which had long been used as a propagating garden was exchanged for about 4 acres of land on the north side of the Department grounds," which had formerly been connected with a canal (p. 50). Commissioner William Gates LeDuc (1877-81) "advocated the purchase of a farm of 1,000 acres near Washington [DC] and at one time suggested the Arlington Estate. In addition he desired 8 or 10 stations in different parts of the country" to ensure proper testing and propagating of plants and seeds (p. 55).

"In 1901 the Arlington Farm, a tract of over 300 acres on the Virginia side of the Potomac River opposite Washington, was added to the material equipment of the Department" (p. 190).

By the 1860s, several states had their own agricultural colleges. The first of these was the Michigan Agricultural College, which began operation in May 1857, near Lansing, Michigan; it was the first agricultural or industrial school on this continent–and the first to offer a practical (non-classical) education. The Kansas State Agricultural College began in 1863.

In 1877 some 2.3 million packets of seed were sent out, rising to 2.5 million in 1883. The term "Secretary of Agriculture" was first use in 1885. Galloway began as Asst. Pathologist in 1887 and by 1890 the Section of Vegetable Pathology was under his leadership.

Under the provisions of the Hatch Act, the Office of Experiment Stations was established in 1888. In 1889 the Secretary of Agriculture (head of USDA) was given a seat in the president's cabinet.

"Interest in the applications of science to agriculture was greatly increased by the publication of Liebig's work on Chemistry and its Applications to Agriculture and Physiology in 1840, and Boussingault's account of his agricultural experiments in *Economie Rurale* in 1844. The experiments of Lawes and Gilbert in England took a more organized form in 1843, and an agricultural experiment station was begun at Moeckern in Saxony [later part of Germany] in 1851."

In the USA, from 1840-1875 there was a movement among the states to establish institutions for agricultural research. State agricultural experiment stations operated without federal aid from 1875 (starting with Connecticut {Middletown}) to 1888. These were usually connected with state agricultural colleges. Other early state agricultural experiment stations: North Carolina: March 1877. New York (Cornell, at Ithaca): Feb. 1879. New Jersey (Rutgers College, New Brunswick): March 1880. New York (Geneva): Aug. 1881. Ohio (Columbus): April 1882. Massachusetts (Amherst): May 1882. Tennessee: June 1882. Alabama: 1883. Accounts of the agricultural experiments at the University of Illinois from 1875-1899 were published in the biennial reports of the board of trustees. Soon many states had two colleges–an academic and an agricultural one, e.g. Univ. of Kansas (Lawrence, 1863) and Kansas State Univ. (Manhattan, 1863). Colleges with the word "State" at the end of their names were usually agricultural colleges (Ohio State, Michigan State, Oregon State, etc.). But other agricultural colleges had names like Purdue (West Lafayette, Indiana, 1869).

The Hatch Experiment Station Act. of 1887 established agricultural experiment stations in each state, funded by the federal government. The idea was stimulated by similar European stations. From 1852 to 1877 more than 2,000 books and pamphlets were published by the experiment stations. Prior to the passage of the Hatch Act, the U.S. federal government had appropriated money for agricultural research only to the patent office and its offshoot, the USDA. The Hatch Act established a new relationship between the federal government and the states by granting money to the states for agricultural experiment stations that were to be distinctly state institutions. When the Act passed, experiment stations connected with land grant colleges were operating in eight states. More or less systematic work was being done in 13 other states. Most of the experiment stations published periodic bulletins and less frequent annual reports.

The Adams Act (p. 165) increased federal aid for agricultural research.

"The act of May 15, 1862, creating the Department of Agriculture, was a compromise measure, which left the department as an independent establishment with a commissioner at its head." Starting in 1876, various national and state farm organizations (such as the National Agricultural Congress and the Grange) adopted resolutions asking Congress to create the office of Secretary of Agriculture–for the benefit of American farmers and "agriculturists." On 9 Feb. 1889 the USDA was elevated to cabinet rank (p. 175-77). By then, the organized system of agricultural research in the USA was put on an organized and permanent basis The state and national agencies were linked together to the USDA Office of Experiment Stations. The passage of the Morrill Act of Aug. 1890 ensured further endowment of the land-grant colleges with federal funds. Thus within the short period of 3½ years, three great acts of congress became law, and fixed in a large and permanent way the general policy to be pursued by the U.S. regarding the maintenance of public institutions for agricultural research. The first Secretary of Agriculture was James Wilson (1897-1913); his was a long and very active tenure.

In 1901 the Arlington Farm, a tract of over 300 acres on the Virginia side of the Potomac River, was acquired by the USDA. A farm of 475 acres in Beltsville, Maryland, was purchased for the use of the Bureau of Animal Industry.

The USDA library grew from 59,000 books and pamphlets in 1897 to 122,000 in 1912.

In 1901 the USDA's work on plants was consolidated in the Bureau of Plant Industry. This led to great expansion of such work in many different lines. Beverly T. Galloway was in charge of this Bureau; he had formerly been Chief of the Division of Plant Physiology and Pathology (p. 197). For details on the history of the Bureau of Plant Industry see p. (221-24).

"The plant-introduction work, inaugurated in 1898, developed into a system of world-wide agricultural exploration, through which over 34,000 plant varieties and species were brought in the United States. These were propagated at Washington or at outlying field stations, and as far as possible their progeny was distributed to experiment stations and private experimenters and plant breeders in the States and tropical possessions. A historical record of all these introductions and distributions was kept."

In 1915 the USDA Office of Home Economics was established. It became a Bureau in 1923. The Bureau of Plant Industry did much of its work at the Arlington Farm. The Bureau of Chemistry (1913-1921) studied the composition of soybean varieties and soy oil. There was an agricultural depression in the USA from 1921 to 1925.

Also discusses: Alfalfa, John and William Bartram (p. 3), Chinese sugarcane (i.e., sorghum, p. 31), chufa (p. 31), cowpeas, flax, hemp, lupines, maize, peanuts, velvetbean

[velvet bean], wheat gluten.

A photo shows Justin S. Morrill. Address: USDA, Washington, DC.

592. Banton, O.T. 1937. Illinois grows more soybeans than 47 other states combined. New crop has been too loudly ballyhooed its best friends believe; commercially sound products increasing in number, many merely stunts. *Decatur Herald and Review* (*The*) (*Illinois*). Aug. 29. p. 13. Sunday.
• ***Summary:*** In column 1, paragraph 2, we read: "Cradled in Decatur, which has become the soybean capital of the world, the industry in this country is largely centered in Illinois, which produces more than half the national output of the beans."

Note: This is the earliest document that the Decatur Public Library can find (Sept. 2016) which contains the phrase: "soybean capital of the world." It was found and sent to us by Becky Damptz, Local History Librarian/Archivist, Decatur Public Library, Decatur, Illinois 62523. Henry Bolz is widely credited with coining this phrase. He worked for the Association of Commerce (Prelude to the Chamber of Commerce) in Decatur, and would often address the public on radio station WJBL in a booming voice announcing: "This is Henry Bolz coming to you from the Soybean Capital of the World."

One large table (top right) shows "Production in Illinois by counties." Soybean production (in bushels of threshed beans) is given in each county in 1935 and 1936. In 1935 / 1936 the top six counties are:

Champaign 2,256,000 / 1,922,400.
Christian 1,816,000 / 1,039,500.
Macon 1,470,000 / 1,015,000.
Shelby 1,209,600 / 1,065,000
Piatt 1,284,000 / 997,200.
McLean 1,100,100 / 925,200.

Another large table shows "Production by states in the U.S." Soybean production is given for 1928-32 (average), 1936 and 1936. The top 5 states are:

Illinois 5,869,000 / 24,012,000 / 17,216,000
Iowa 736,000 / 6,600,000 / 2,483,000
Indiana 1,982,000 / 6,970,000 / 3,948,000
Ohio 522,000 / 2,604,000 / 2,092,000
North Carolina 1,187,000 / 1,282,000 / 1,475,000.

Address: Herald & Review Staff.

593. Grinnells, C.D.; Moore, J.L. 1937. The comparative values of peanut and soybean hay for milk production. *North Carolina Agricultural Experiment Station, Bulletin* No. 312. 28 p. Aug. [16 ref]
• ***Summary:*** "The data indicate that peanut hay of similar quality is equal to soybean hay for milk production. The results from one feeding trial do not, however, warrant one in drawing definite conclusions...

"The price of the peanut hay usually runs about one-third less than that of soybean. On a basis of feed cost per hundred pounds of milk, considerable saving may be effected by the use of peanut hay in feeding dairy cows." Address: Raleigh.

594. Bailey, L.H. 1937. The standard cyclopedia of horticulture. Vol. 2: James J.H. Gregory, by Edgar Gregory. New York, NY: The Macmillan Co. See p. 1578.
• ***Summary:*** "James J.H. Gregory, farmer, seeds, and author, was born at Marblehead, Massachusetts, November 7, 1827, and died February 20, 1910. He was educated in the public schools at Marblehead, two years at Middlebury College, and graduated from Amherst College in 1850. He taught in Marblehead, Hingham and Lunenberg. The starting of the seed business was almost an accident. He was reading the 'New England Farmer' and saw the request for a good winter squash, and as his father had recently raised some splendid squashes from seed that 'Old Marm Hubbard' had given him, he sent the inquirer some of this seed. The man was so well pleased that he wrote articles for several papers extolling these squashes, and soon the Gregory Seed Business was thriving, sending Hubbard squash seed to all parts of the United States. Naturally the business started in the home, the attic being used for the purpose; in a very short time it was necessary to move to larger quarters. He branched out with other seed, both vegetable and flower, and at the time of his death was carrying on one of the largest seed establishments in the country. During his career he introduced many new varieties of vegetables, several of which are the standards in the market today. His seed-farms comprised over 400 acres where he grew pedigreed stock; he always felt that by growing his own seeds he was less liable to mistakes and could, himself, select the most perfect types. His reputation for choice varieties was so renowned that the firm became the headquarters for stock seeds for other well-known concerns.

"He wrote and distributed many thousands of copies of treatises on various agricultural subjects, such as: 'Onion Raising,' 1865; 'Squashes: How to Grow Them,' 1867; 'Cabbages and Cauliflower,' 1870; 'Carrots, Mangold Wurtzels and Sugar Beets,' 1877; 'Fertilizers,' 1885. In his early life he lectured extensively on agricultural and horticultural subjects.

"Mr. Gregory was a philanthropist of renown. He gave large sums of money for the establishment of southern schools and colleges, the Gregory Institute of Wilmington, North Carolina, being founded by him. He served his native town in many responsible capacities and filled many public offices."

595. Becker, Joseph A.; Froehlich, Paul; Hendrickson, Roy F.; et al. comps. 1937. Agricultural statistics 1937. Washington, DC: U.S. Government Printing Office. 486 p. Index. 24 cm. For soybeans and soy products see p. 218-220.

• ***Summary:*** This volume presents information formerly published [until 1935] in the statistical section of the Yearbook of Agriculture" (p. 1).

Page 218: Table 290. Soybeans: Acreage, yield, production, and season average price per bushel received by producers, by States, average 1928-32, and annual 1935 and 1936.

Page 218: Table 291. Soybeans: Production in specified countries, 1924-25 to 1935-36 (in 1,000 bushels). The countries are: United States, Manchuria, Chosen (Korea), Japan, Netherland India (later Indonesia). Note: Data from Manchuria are reports from the South Manchuria Railway and do not include the large production of China proper. Manchuria is by far the biggest soybean producer in 1936, with 155.424 million bu produced. U.S. production increased from 4.947 million bu in 1924 to 44.378 million bu in 1935.

Page 219: Table 291. Soybeans: Average price per bushel received by producers, United States, 1926-27 to 1936-37. The weighted average price ranged from a low of $0.48 in 1931-32 to a high of $2.00 in 1926-27.

Page 219: Table 203. Soybeans for seed: Average wholesale selling price per bushel at Baltimore [Maryland] and St. Louis, Missouri, 1926-1925. The price in St. Louis ranged from a low of $0.94 in 1933 to a high of $2.66 in 1929.

Page 220: Table 294. Soybeans crushed and crude oil produced by quarters, 1926-27 to 1935-36 (in 1,000 pounds). The total soybeans crushed increased from 335,000 bu in 1926-27 to 25,181,000 bu in 1935-36. The total soybean oil produced rose from 2.650 million lb in 1926-27 to 208.964 million lb in 1935-36.

Page 220: Table 295. Soybean oil, domestic crude: Average price per pound, in drums, New York, by months, 1929-30 to 1936-37.

Page 221: Table 296. Soybeans and Soybeans and soybean oil: International trade (principal importing and exporting countries), average 1925-29, annual 1933-35.

Page 225: Table 394. Hay, tame by kinds: Acreage and production, United States, 1919-1936. Note: Soybean, cowpea, and peanut vine hay are group together. Their total acreage rose from 2.332 million acres in 1929 to a peak of 8.027 million acres in 1934, falling to 6.829 million acres in 1936. Their total production rose from 2.078 million short tons (1 short ton = 2,000 lb) in 1929 to a peak of 7.788 million short tons in 1935, falling to 5.411 million short tons in 1936 (preliminary).

Page 265: Table 471. Imports of principal agricultural products into the United States by countries, 1928-29 to 1935-36. Soybeans were imported from China, Japan, Kwantung, Germany, other countries, and total. The total decreased (because of the Smoot-Hawley Tariff Act of 1930) from 76,366 tons in 1928-29 to 18,277 tons in 1935-36.

Page 368: Table 471 continued. Soybean oil was imported from Kwantung, China, Japan, other countries, and total. The total decreased from 17.172 million lb in 1928-29 to 11.284 million pounds in 1935-36 (because of Smoot-Hawley).

Page 371. Table 472. Oil cake and oil-cake meal: International trade, average 1925-29, annual 1933-35. The main cakes are from cottonseed, flaxseed, peanuts, corn, etc. Soybean cake is not included in this table. The principal exporting countries in 1925-29 were the USA, USSR, and British India. The principal importing country in 1925-29 was Germany (by far).

Page 372: Table 473. Vegetable oils: Exports from the United States, 1909-10 to 1935-36. The main vegetable oil exported (by far) in 1909-10 was cottonseed oil at 223 million lb. but by 1935-26 it had been reduced to a trickle, 3.5 million lb. Soybean oil was first exported in 1919-20 when 67.7 million lb were exported. This decreased to 4.4 million lb in 1935-36.

Page 372: Table 474. Vegetable oils: imports into the United States, 1909-10 to 1935-36. Statistics for soybean oil imports started in 1911-12 with 28.021 million lb, increasing to a peak for 336.825 million lb in 1917-18 (during World War I), then decreasing to 11.284 million lb in 1935-26.

Soybeans are also mentioned on pages 378 (farm business and related statistics. Crop and livestock summary: Acreage, production, numbers and value, average 1928-32, and annual 1935 and 1936), 381 (total acreage an total farm value of principal crops, by States, 1935 and 1936. Note: Soybeans are not separated out from the many crops grown, Illinois and Iowa have the largest farm value in 1936: 368 and 363 million dollars respectively). 382 (gross income from farm production, USA, by commodities, 1934 and 1935). Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

596. Grinnells, C.D.; Moore, J.L. 1937. The comparative values of peanut and soybean hay for milk production (Abstract). *Association of Southern Agricultural Workers: Proceedings of the 30th Annual Convention* 38:235. Held 1937 in Atlanta, Georgia.

• ***Summary:*** In three trials, peanut hay was more effective in milk production than soybean hay. Tables show: (1) Digestible nutrients in peanut and soybean hay. (2) Average feed consumed per unit of production. (3) Average feed consumed per cow. (4) Average milk and butterfat produced daily per cow. Peanut hay yield slightly more milk and butterfat. (5) Average changes in body weights (3 trials). Address: North Carolina State College, Raleigh, North Carolina.

597. Grinnells, C.D.; Moore, J.L. 1937. Peanut versus soybean hay for dairy cattle (Abstract). *Association of Southern Agricultural Workers: Proceedings of the 30th Annual Convention* 38:225. Held 1937 in Atlanta, Georgia.

• ***Summary:*** Gives the results of three feeding trials, which

found that good peanut hay is of equal or slightly greater value than an equal quantity of soybean hay. "The peanut groups produced 368.32 pounds of milk and 8.49 pounds of butterfat more during each thirty-day period than did the soybean groups." Address: North Carolina State College of Agriculture, Raleigh, North Carolina.

598. 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].

599. 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].

600. 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].

601. 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].

602. Portrait of C.B. Williams (Photograph). 1937? Undated.
• ***Summary:*** This black-and-white portrait photo is of soybean pioneer C.B. Williams of North Carolina State University (NCSU), where he was Director of Research 1907-1912 and Dean of Agriculture 1917-1923. He died on 25 June 1947.

Source: Special Collections Research Center at NCSU Libraries.

603. 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.

604. Kishlar, Lamar. 1938. Soja max–The soybean. In: Soybean Nutritional Research Council, ed. 1938. The Composition and Nutritive Properties of Soybeans and Soybean Oil Meal; A Literature Review. Chicago: SNRC. 62 p. See p. 7-9. Oct. [9 ref]

• ***Summary:*** "This is the success story of an immigrant plant which came in to America and made good. This is the story of Soja Max, the soybean, who waited 5,000 years for his big chance, and, when opportunity knocked, made a lasting place for himself in American agriculture and commerce on the basis of merit and merit alone.

"The soybean is a native of Asia. It is one of the oldest crops grown. How long ago man started to cultivate the soybean no one knows. Some say that soybeans have been grown for 25,000 years (Breedlove, 4 June 1936, p. 12). The first written record seems to be a Chinese book on Materia Medica, *Pen Ts'ao Kong Mu* written by Emperor Shen-nung about 4,800 years ago (Horvath, May 1931, p. 36).

"Even the name is cloaked with mystery. For the salted soybeans [fermented black soybeans], the early Chinese had a word pronounced 'Shi.' Another word, 'Yu,' was given to the oil used as a condiment. Later the term 'Shi-yu' [fermented black soybean sauce] was applied to the plant and to the raw beans" (Chicago J. of Commerce, 20 June 1936, p. 14).

"Linnaeus, the first botanist to make a scientific study of the leguminous plants, applied the Greek word, glycine, meaning sweet, to all the ground nut species of legumes. Since the soybean had very large nodules on the roots, he called it Glycine Max. Many years later Moench found that the soybean was a distinct genus. He renamed it Soja Hispida. More modern authorities have shown a preference for Soja Max, the name which has become generally accepted.

"The soybean was a long time in coming to America. In 1804 a Yankee Clipper ship, searching the Chinese ports for a return cargo, loaded several bags of soybeans as reserve food supply and brought the first importation to America" (Burlison 1936).

"More than one hundred years passed. A few soybeans were raised mostly as botanical curiosities. In 1907, Dr. C.R. Ball of the United States Department of Agriculture, described twenty-three varieties of soybeans, all that were then known in the United States (6). These included fifteen introductions by the United States Department of Agriculture between 1900 and 1905. The remaining eight were brought by individuals from the Orient, several by the way of Europe.

"By 1913, the list had grown to 427. By 1925, 1,133 varieties were described. In all more than 7,000 samples of seed have been collected from Japan, Chosen, Manchuria, China, Formosa, Java, Sumatra, and India (3). Of these, there are more than 2,000 distinct types, which have maturities ranging from 75 to more than 200 days. These types and varieties have been grown in various places, the less promising varieties being discarded, until, at present, more than 100 named varieties are widely grown, or are being increased for greater distribution in the United States (7).

"The soybean is a summer leguminous annual (1). The pods are from 1 to 2½ inches long and contain from 2 to 4 seeds. The root tubercles, which permit this plant to build up the fertility of the soil, are large and abundant. The stems, usually strong and woody, grow from 2 to more than 6 feet in height. The flowers are small, sweet-pea shaped, and white or purple in color. The seeds which grow in the pods may, when mature, be yellow, green, brown; or black in color. Some seeds are round; some are oval; while some are flat like a lima bean.

"Some varieties of soybeans are useful only as an oil seed or for feed. They are so hard that several hours' boiling fails to properly soften them. However, some of the newer varieties are useful for food and, when cooked, are delicious eaten as a vegetable. The University of Illinois has tested 467 varieties of vegetable or edible soybeans and has given six, a very good, and seventy, a good rating (8). The soybean was probably first utilized for the production of oil and meal in the United States about 1910 by an oil mill on the Pacific Coast. The beans were imported from Manchuria.

"During the World War, the general shortage of fats and oils made it necessary to import very substantial quantities of Manchurian soybean oil. This oil was frequently of very poor quality because of the crude equipment on which it was made. Often it was shipped from the Orient in five gallon kerosene cans which had been improperly cleaned, and the contaminated oil was ruined for edible purposes. In 1918 import figures show that 336,000,000 pounds of soybean oil were imported from the Orient (9).

"The production of soybean oil from domestic seed was started, in a small way, in North Carolina in 1916. The first oil was produced in a cotton oil mill in the off season, using cotton oil presses. In 1920, soybean oil was produced in Chicago Heights, Illinois, using an expeller. In 1922, oil was made by the A.E. Staley Manufacturing Company of Decatur, Illinois. At first, only one expeller was used, but two more were installed shortly afterward, and about 90,000 bushels of beans were crushed that year (9).

"From this modest beginning, the soybean processing industry has grown until soybean production in the United States reached a peak for the crop year 1935-36 when some 44,378,000 bushels were harvested. Over half of this production was processed, yielding a total of approximately 600,000 tons of soybean oil meal. The year 1938-39 is expected to exceed the record of 1935-36. When one realizes

that the industry produced only 21,000 tons of soybean oil meal for the crop year 1928-29, it is obvious that a product must have merit to increase in volume 30 times during years when all feedstuffs were cheap and plentiful.

"Thus, the Asiatic visitor was quick to catch on to American ways, to thrive on American soil, in American climate. He grows nearly everywhere that corn or cotton can be grown. When history is finally written, the story of Soja Max will be the greatest success story of the great World Depression." Address: USA.

605. Orr, Joseph L.; Froehlich, Paul; Christy, D.F.; et al. comps. 1938. Agricultural statistics 1938. Washington, DC: U.S. Government Printing Office. 544 p. Index. 24 cm. For soybeans and soy products see p. 252-55, 271-275.
• ***Summary:*** This volume presents information formerly published [until 1935] in the statistical section of the Yearbook of Agriculture" (p. 1).

In this 1938 volume, tables concerning soybeans are on pages 252-55, 271-75.

One new table (#381 on p. 275) is Soybean meal, 41-percent protein, average price per ton [each month] at Chicago 1929-1938. The prices range from a low $20.83 in 1931 to a high of $50.39 in 1929. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

606. Primmer, George H. 1939. United States soybean industry. *Economic Geography* 15(2):205-11. April.
• ***Summary:*** Contents: Introduction. Recent phenomenal acreage increase. Soil relationships. Effect of slope. Climatic influences. Relation to pests and diseases. Use of soybeans for food and feed (coffee substitute, "cooked as a green vegetable," "soy sprouts of about two inches receive praise as a winter vegetable," "Duluth confectionary counters display 'Salted Soys' alongside other exotic nuts," "Recipes for preparing soybean 'milk' circulate widely").

Note. This is the 3rd earliest English-language document seen (Jan. 2013) that contains the modern term "soy sprouts."

Industrial uses of soybean oil and residue: the regional industrial products laboratory in Urbana, Illinois, staffed by 40 men.

Figures show: (1) Bar chart of the world's principal soybean producing countries in 1924-25, and in 1935-36. In 1936, Manchuria was by far the leader, followed by the USA, Chosen [Korea], Japan (whose production has decreased since 1925), and Netherland India [today's Indonesia].

(2) A map of the eastern half of the United States, with carefully located 50,000-acre dots showing areas of heaviest soybean production. Between 1934 and 1939, the area increased 5-fold in Mississippi and 21-fold in Minnesota. The area in Oklahoma decreased.

(3) A graph shows that the number of combines used to harvest soybeans in Illinois skyrocketed from 0 in 1924, to about 20 in 1925, to about 75 in 1926, to about 300 in 1927; by 1935 the number had increased to an estimated 3,000. (4) A photo shows a combine harvesting soybeans.

(5) A photo of a "Superior field of Indiana soybeans probably cultivated for the last time as plants shade most of the field's surface. Two-row corn cultivators or "beet cultivators may till four such soybean rows simultaneously.

(6) A graph shows soybean oil imports into the United states; these imports increased dramatically during World War I, peaking in 1918 [at 335.98 million lb].

(7) A map shows the location of soybean oil mills in the United States. There are large numbers in Illinois, Indiana, Ohio, Iowa, and North Carolina.

(8) A bar chart shows "Utilization of soybean oil processed in the United States" in 1934, 1935, and 1936. In 1934 the 30 million lb was used mostly by the drying oil industry. In 1935 the 140 million lb was used mostly for [lard] compounds and vegetable shortenings. In 1936 the 280 million lb was still used mostly for compounds and vegetable shortenings, but a significant amount was used for oleo, other edible, the drying oil industry, and soap.

(9) A photo shows a mill for removal of oil from Corn Belt soybeans; the processing plant serves an area tributary to Champaign, Illinois, and ships the oil to Chicago factory area.

"Soybeans provided some of the none-too-kindly remembered 'coffee' rations to Union Civil War soldiers. Sausage makers, at times, put up to 50 per cent soybean flour in part of their product."

Note: This is the earliest English-language document seen (Dec. 2012) that uses the term "Salted Soys" to refer to soynuts.

607. Reiser, Raymond. 1939. The effect of phospholipid ingestion upon the gas exchange in man. *American J. of Physiology* 126(1):109-19. May. [24 ref]
• ***Summary:*** The author tried to determine whether sprue patients can tolerate lecithin better than neutral fat. For this purpose, 60 grams of mixed soybean phosphatides were fed to normal subjects by stomach tube and the respiratory quotient, urinary phosphorus, nitrogen, and blood sugar were determined. The author made the surprising observation that the respiratory quotient under the conditions of the experiment quickly dropped to a minimum and then rose to a maximum as high as unity in two to four hours.

After a review of the literature, the methods used are described. The author discusses the significance of his findings and points out that there is a decrease in oxygen consumption. It is suggested that the fatty acids of the phospholipids undergo a partial oxidation in the intestinal mucosa and, when carried to the tissues, the oxidation is completed. This could explain the variations of the respiratory quotient (R.Q.).

The author gives the following conclusions:

(1) It was found that after feeding 60 grams of soybean phospholipids to humans, the non-protein R.Q. fell during the first half hour and then rose reaching a maximum considerably above the basal value in three to four hours. It was shown that this was mainly an oxygen effect.

(2) That this effect was not entirely one of the phospholipid molecule was shown by similar effects upon the oxygen absorption and carbon dioxide elimination of a mixture of olive oil and disodium glycerophosphate equivalent in amount to the phospholipid. In the latter condition, however, the R.Q. did not rise above the basal level.

(3) That the effect is not due to the phosphate or oil alone is shown by the very different results after feeding these substances separately.

(4) The increase in serum in organic phosphate was greatest after phospholipid feeding, slightly less after oil plus phosphate, and much less after phosphate alone.

(5) The elimination of urinary phosphate was greatest after phospholipid, less but more rapid after phosphate, and somewhat less and slow after oil plus phosphate.

(6) An increase of 25 mgm. per 100 gm in serum phospholipid, after phospholipid feeding, was not found after feeding equivalent amounts of olive oil or oil plus phosphate. (Abstract by American Lecithin Co.). Address: Dep. of Medicine, Duke Univ. School of Medicine, Durham, North Carolina.

608. *Staley Journal* (*Decatur, Illinois*). 1939. Staley persistence and faith founded and developed country's soybean industry. Aug. p. 4-13.

• ***Summary:*** A good history of the company's pioneering work with soybeans, with many photos. On page 4 is a full-page portrait photo of A.E. Staley, Sr.

"Throughout most of the United States when soybeans are mentioned Staley's is immediately suggested. The close association of these two in the minds of the nation is to be expected. While soybeans have been grown in this country for more than a hundred years, it is an undisputed fact that the Staley company made the United States conscious of them. Corn and wheat, cotton and rice–agriculturally and industrially the country knew them and depended upon them. Soybeans–until A.E. Staley began talking about them were known only in restricted areas and then chiefly as a forage crop.

"Long before many soybeans were grown in this country the oil was being used to some extent by a few manufacturers. That limited use, and the knowledge of the extensive use of soybeans in the Orient convinced A.E. Staley that they had a distinct place in future American life. Shortly after the world war the Staley company took definite action by announcing the opening of a soybean processing plant.

"Three-fold Task: With its faith in the future of soybeans so concretely expressed the company was faced with a three-fold task. It must experiment in the processing of soybeans; it must sell the idea of soybean products, and it must interest and encourage farmers in raising the beans.

"Any new industry may be faced with that first task. Problems in processing always confront a man who pioneers a new industry. Introducing a new product always brings with it the problem of educating the public to the use of that product. The Staley company found its third problem–that of encouraging the farmers to raise soybeans–its largest task. and quite its most interesting.

"Promotion Starts: This campaign of promotional encouragement was started before the soybean plant was completed. It continued for some years after the plant started operations, for the Staley company found that this cooperation with the growers was as necessary to the success of the undertaking as efficient production or successful selling.

"As early as 1916 Staley grain buyers were talking with Illinois farmers about the possibilities of growing soybeans. There were many discussions in the Staley grain office, in Mr. Staley's office, and in fields and elevators in surrounding territory.

"Boyhood Impressions: Mr. Staley was thoroughly confident that the industry could and would be established in this country, and his feeling of confidence was infectious. His interest in soybeans dated back to his boyhood, when, on his father's farm in North Carolina he had seen the men of the neighborhood examining with great interest a handful of soybeans brought back to this country from China by a returning missionary.

"Some of the beans had been planted, as an experiment, on his father's farm, and proved excellent feed for livestock and at the same time, being leguminous, enriched the soil. Little else was done with them then, but they made a lasting impression on this farm boy. Many years later, after he had built and seen well started on its way a large and successful corn products plant he turned his attention to soybeans.

"Campaign Is On: When Mr. Staley turns his attention to a subject things happen. This has been particularly true in the case of soybeans. He talked soybeans to everyone he met, he aroused a widespread and intense interest in them and before long he had Illinois farmers raising them. The subject had been introduced at exactly the correct time. The productivity of Illinois corn land had been diminished during the World War years, because farmers. eager to take advantage of high wartime prices for corn had neglected crop rotation.

"Just when they needed it most a crop which would bring in money while it was enriching the soil, came as a godsend. The Staley company added to the general well-being of everyone concerned by announcing that its new soybean plant would be ready for the 1922 crop.

"After this announcement and the opening of the plant

for operation in October, 1922, farmers were assured of a commercial outlet for their beans. There is no doubt but what this assurance was responsible for the increases in soybeans planted for seed and threshed between 1922 and 1924.

"Simply saying that the Staley company announced that it was opening its plant in 1922 does not even give a hint of the whole story. Such an announcement was made, but for several years before, and for a long time after a great deal was done to interest the farmers, and win them to the idea of raising and selling the beans.

"Conversational Barrage: Mr. Staley and the entire grain buying department never missed an opportunity to talk soybeans. When farmers brought in corn to sell the conversation soon turned to beans. When a buyer talked with a farmer or a country elevator man–he got around to the subject of beans. This was the first stage and it was effective for it aroused curiosity and interest.

"All during the winter of 1921 and 1922 soybeans were much discussed by farmers and grain dealers in the grain-growing section of Illinois. These men had thought and talked in terms of corn for many years, for corn had always been a dependable cash crop. Now another seemingly just as dependable was being offered them but they smartly wanted to know all about it before they went into it.

"Growers' Interests: It was natural that the things the growers were interested in were these–what would be the probable price paid for beans, would the Staley company be able to buy them, would the company buy them consistently year after year. The Staley company was able to answer all of these questions to the satisfaction of the growers and then suggested that they get in touch with the University of Illinois College of Agriculture for information concerning cultivation and the best varieties to plant.

"Soybeans had been raised in Illinois before but never was a crop raised with as much personal supervision as that put in in the spring of 1922. The growers themselves gave special care to the crop, the University of Illinois was particularly interested, and the Staley company sent representatives into the soybean growing districts to make weekly reports on crop conditions.

"They Talked Some More: The Staley representatives did not just observe. They talked to farmers, to elevator men, to bankers and newspaper men. They answered questions about the Staley company and about its plans for soybean development, and left in their wake a trail of satisfaction about the future of the crop. Quite naturally one big question was uppermost in the minds of farmers. and business men in the farming districts–could the Staley company process and market all the beans they could produce? Company representatives convinced them that it could. During the years since then these growers and others interested have learned that their confidence was not misplaced.

"In what to many was an experiment, all were successful, chiefly because the Staley company had its plan carefully thought through. This thing of the manufacturer working directly with the grower was something rather new, but it was logical and has proved most profitable. Neither could succeed without the other, but by both working together the entire agricultural and industrial program of the country was destined to be changed.

"First Beans Arrive: The first shipment of beans arrived at the plant in September, 1922, having been purchased from an Illinois grain dealer at 99.75 cents a bushel. September 30 of that same year will go down in our history as the day the first beans went into the process.

"Driers and oil expellers of the latest type had been installed during the summer and on that memorable day the unit had a capacity of 500 bushels. Small though that unit was it was quite large enough for the available supply. Bean acreage was small and consequently beans did not arrive at the plant in large quantities. Compared to present day shipments they fairly trickled in that first year, sometimes being bought by the wagon load.

"Gloom Spreads: That condition in itself was discouraging, and equipment difficulties added to the general gloom. The quality of the few beans received was uneven chiefly because of the inexperience of the farmers in cultivating and harvesting them, and the product was not satisfactory for a combination of reasons. Not the least of these contributing reasons was the small quantity of beans available, for a high quality of product is quite dependable upon a sizeable volume.

"Although the latest model driers and expellers had been installed, short operation showed the driers were not all that could be desired. Since the bean supply was short anyway, it was decided after running a few weeks to shut down, get the situation under perfect control and get ready for a big season next year. This was the plan followed. Company engineers worked over the driers and succeeded in perfecting them, and the expeller capacity was increased.

"This final action was regarded with much skepticism by the interested world in general, but Mr. Staley was confident that within a few seasons beans would be arriving in sufficient quantities to warrant the enlarged plant." Continued. Address: Decatur, Illinois.

609. *Staley Journal* (*Decatur, Illinois*). 1939. Growing increase in acreage shown in reports. Aug. p. 30-31.
• ***Summary:*** The large table shows bushels of soybeans harvested in leading states from 1924 to 1938 (estimate). The leading states in 1938 for production of soybean seeds are: Illinois (55.26%), Indiana (14.57%), Iowa (9.94%), Ohio (9.21%), North Carolina (3.49%). Missouri (1.06%). Six leading states (93.54%). All other U.S. states (6.46%). Total U.S. production of soybeans 57,665,000 bushels.

The bottom half of the page contains four other tables for 1939:

(1) Soybean acreage grown for all purposes in the four

GROWING INCREASE IN ACREAGE SHOWN IN REPORTS

While Illinois is always greatly in the lead among the soybean raising states, in bushels produced, the acreage and production of commercial soybeans is greatly increasing. Below are the annual production figures, in bushels, of soybeans grown in the United States since 1924. The figures are those of the United States Department of Agriculture:

The government report issued July 10

Year	Illinois	Indiana	Iowa	Missouri	Ohio	North Carolina	Six Lead. States	Balance U. S.	Total U. S.
1924									5,190,000
1925	1,120,000								4,875,000
1926	1,450,000								5,239,000
1927	2,392,000	884,000	276,000	504,000	304,000	1,200,000	5,560,000	1,378,000	6,938,000
1928	3,069,000	1,000,000	357,000	722,000	360,000	1,080,000	6,588,000	1,292,000	7,880,000
1929	3,842,000	1,425,000	576,000	736,000	347,000	1,050,000	7,976,000	1,422,000	9,398,000
1930	6,970,000	2,114,000	1,023,000	700,000	434,000	1,164,000	12,405,000	1,066,000	13,471,000
1931	7,704,000	3,115,000	790,000	954,000	940,000	1,485,000	14,988,000	1,745,000	16,733,000
1932	7,760,000	2,256,000	936,000	890,000	527,000	1,155,000	13,524,000	1,451,000	14,975,000
1933	5,415,000	1,800,000	1,615,000	1,188,000	528,000	1,046,000	11,591,000	1,556,000	13,147,000
1934	13,756,000	2,960,000	2,070,000	737,000	697,000	1,176,000	21,396,000	1,699,000	23,095,000
	59.56%	12.82	8.96	31.90	3.02	5.19	92.64	7.36	100.00
1935	24,012,000	6,970,000	6,600,000	889,000	2,604,000	1,282,000	42,357,000	2,021,000	44,378,000
	54.11%	15.70	14.87	2.00	5.87	2.89	95.45	4.55	100.00
1936	17,216,000	3,948,000	2,483,000	245,000	2,092,000	1,475,000	27,459,000	2,157,000	29,616,000
	58.13%	13.33	8.38	.83	7.06	4.98	92.72	7.28	100.00
*1937	27,040,000	5,797,000	4,236,000	513,000	3,249,000	1,560,000	42,395,000	2,877,000	45,272,000
	59.73%	12.80	9.36	1.13	7.18	3.45	93.65	6.35	100.00
*1938	31,866,000	8,404,000	5,733,000	609,000	5,313,000	2,015,000	53,940,000	3,725,000	57,665,000
	55.26%	14.57	9.94	1.06	9.21	3.49	93.54	6.46	100.00

*While the last government estimate was 57,665,000 bushels of beans for the 1938 crop, it is generally conceded that the final estimate will be nearer 60,000,000 bushels.

1939 Soybean Crop Report

SOYBEAN ACREAGE GROWN FOR ALL PURPOSES (Thousands of Acres)

Year	Ohio	Indiana	Illinois	Iowa	Four States	U. S.
1936	330	748	1,887	560	3,525	5,811
1937	380	812	2,183	762	4,137	6,171
1938	445	828	2,118	950	4,341	6,858
	Estimated for 1939—Government report of July 10					
1939	668	1,201	2,542	1,083	5,494	8,119

SOYBEAN ACREAGE CUT FOR BEANS (Thousands of Acres)

Year	Ohio	Indiana	Illinois	Iowa	Four States	U. S.
1936	132	299	1,076	182	1,689	2,132
1937	171	341	1,352	229	2,093	2,549
1938	253	431	1,356	294	2,334	2,898

YIELD PER ACRE

Year	Ohio	Indiana	Illinois	Iowa	Four States	U. S.
1936	15.5 bu.	14.0 bu.	16.0 bu.	14.0 bu.	....	14.1 bu.
1937	19.0 bu.	17.0 bu.	20.0 bu.	18.5 bu.	....	17.8 bu.
1938	21.0 bu.	19.5 bu.	23.5 bu.	19.5 bu.	....	19.9 bu.

TOTAL YIELD (Thousands of Bushels)

Year	Ohio	Indiana	Illinois	Iowa	Four States	U. S.
1936	2,046	4,186	17,216	2,548	25,996	29,983
1937	3,249	5,797	27,040	4,236	40,322	45,272
1938	5,313	8,404	31,866	5,733	51,316	57,665

leading states and in the US as a whole (thousands of acres).

(2) Soybean acreage cut for beans in the four leading states and in the US as a whole (thousands of acres).

(3) Yield per acre of soybeans in the four leading states and in the US as a whole (bushels per acre).

(4) Total production of soybeans in the four leading states and in the US as a whole (thousands of bushels).

610. Norris, Hoke. 1939. Tuesday to be 50th anniversary for N.C. State and Prof. Williams: Department head was one of 72 first students; first football captain. *News and Observer* (*Raleigh, North Carolina*). Oct. 1.

• ***Summary:*** "A school and a man will observe an anniversary together here Tuesday.

"The school is N.C. State College, which will celebrate its opening 50 years ago.

"The man is Prof. Charles Burgess Williams, 68-year-old head of the agronomy department, who enrolled at State on its first day, October 3, 1889, and has been connected with the college, as student and then as professors, ever since.

"So could you blame him if, during the anniversary day speeches, his mind goes back half a century and recalls a little one-building school called the North Carolina College of Agriculture and Mechanical Arts?

"He may remember that the campus covered only 15 acres and then was about a mile from the end of a trolley line (a pair of mules pulled a car out Hillsboro Street to St. Mary's School and during bad weather students and professors alike were marooned by impassible roads to "uptown" Raleigh).

"72 Students at First: He may recall, too, that there were only six professors, including Alexander Q. Holladay; that only 72 students, all freshmen, registered for the first year; that he and 18 others finished as the first graduating class four years later; that he was captain of the school's first football team, played five years (there were no eligibility rules to bother athletes then) and spent many an hour clearing a playing of rocks; and that all the students worked in a small garden which served the double purpose of supplying food and giving the agriculture students practical training.

"If he looks around him in Pullen Hall, while former Governor O. Max Gardner and others speak on Anniversary Day, he will be able to see a faculty grown to more than 250 and if he looks out windows of the old auditorium he can see the 250-acre campus with its $7,000,000 plant of 89 buildings: and some of the 2,350 students registered [?] at the school.

"He can recall, too, a career touching on almost all phases of agriculture.

"Studied at Hopkins: Born in Shiloh, Camden County, December 23, 1871, he obtained his bachelor's degree in agriculture and chemistry in 1893 and in 1896 got his master's at State. He studied at Johns Hopkins in 1896-97.

"He was assistant chemist of the North Carolina Experiment Station and the Experiment Station of the State Department of Agriculture 1893-1906. He directed the N.C. Experiment Station from 1907 to 1912 and was dean of agriculture at the college from 1917 to 1924. Since 1926 he has been head of the department of agronomy.

"Among his extra-curricular activities have been chairmanships of a tobacco research committee in 1920 and of a committee which toured Europe in 1928 to report on European agriculture. He was in charge of the State soil survey in 1915.

"Now after50 years of studying agriculture's problems, Dr. Williams thinks the farmer should as far as possible conduct his business so that he will have to buy as little as possible.

"'If a farmer produces tobacco,' he said, 'there is no reason he shouldn't have a garden so that his family can have vegetables almost throughout the year. But our prosperity is tied up with cotton and tobacco. If tobacco sells low, you see bad times in Eastern North Carolina and all lines of business are affected.'"

A large photo shows Prof. Williams standing next to a laboratory bench, The caption: "Professor Charles Burgess Williams, 68, head of the State College agronomy department, is shown in his laboratory at the College. He entered there as a freshman October 3, 1839, and has been connected with the institution ever since, either as a student or as a teacher." Address: North Carolina.

611. 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.

612. International Institute of Agriculture. 1939. Oils and fats: Production and international trade. *Studies of Principal Agricultural Products on the World Market* No. 4. Part I. 345 p. See p. 59-76. [Eng]

• ***Summary:*** Nine major oilseed crops and their respective oils are discussed: cottonseed, groundnut, linseed, soya beans (p. 59-76), sunflower seed, colza seed–rapeseed–mustard seed, sesame seed, castor seed, perilla seed, others (hemp seed, poppy seed, maize/corn). I. Grinenco wrote section IV titled "Soya beans and soya bean oil." Contents: I. Production (p. 59-68). Areas of production: Table 18 shows "Areas cultivated for soya." Average 1924-1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, in China, Manchukuo, Chosen [Korea], Japan, Netherlands Indies [Indonesia], United States, U.S.S.R. [USSR, p. 61-62] (Territory in Europe and Asia), Europe.

Table 19 shows "Areas cultivated for soya" during the same time periods shown above. In 1936 the world's leading soybean producing countries (in 1,000 metric tons) were: China 5,911.0, Manchukuo [Manchuria] 4,175.5, United States 816.0, Chosen [Korea] 487.1, Japan 339.8,

Netherlands Indies (Java and Madura) 247.4, U.S.S.R. [USSR] 44.3, Kwantung 17.7, Taiwan 4.4.

Table 20 shows "Area and production of soya in China by provinces (average 1931-1935)." The leaders in total production are (in 1,000 metric tons): Shantung 1,980.7, Kiangsu 1087.4, Honan 765.0, Szechuan 517.0.

Table 21 shows "Production of soya in Manchukuo by provinces in 1936 (in 1,000 metric tons):" Northern provinces: Pinkiang 1,083.9, Kirin 980.8, Lungkiang 464.9, Sankiang 260.6, Chientao 91.4, Heiho 2.7. Total north: 2,884.3. Southern provinces: Fengtien 985.4, Antung 154.7, Chinchow 151.1. Total south: 1,291.2.

Table 22 shows "Area cultivated for the production of soya bean in the United States (in 1,000 ha):" Figures are given for Illinois, Indiana, Iowa, Ohio, North Carolina, Mississippi, Missouri, Other states. Total.

II. Trade (p. 68-76). Principal countries exporting soya beans: Manchukuo, Chosen [Korea], The United States. Principal countries importing soya beans: Germany, Denmark, Sweden, Netherlands, France, Norway, Latvia, Italy, Japan, Chosen, Netherlands Indies. Principal countries exporting and importing soya oil: Manchukuo, Japan, United Kingdom, Austria, Czechoslovakia, Finland, French Morocco, Hong Kong. III. Conclusion (p. 76).

Concerning Norway: Table 24 (p. 71) shows "Net world imports of soya beans (in 1,000 metric tons)," yearly from 1929 to 1936, plus average 1909-1913, and average 1924-1928. A footnote shows that in 1910-11 Norway imported 700 tonnes of soybean oil, followed by an average of 100 tonnes in 1924-28. Norwegian imports of soybean oil were zero from 1929 to 1932, then 2,200 tonnes in 1933, rising to 15,300 tonnes in 1934, then 15,700 tonnes in 1935, and 22,900 tonnes in 1936.

Concerning Finland: Pages 74-75 state that Finland imports soya oil. Finland's first recorded imports were in 1931, when 684 metric tons (tonnes) were imported. By 1936 Finland was importing 2,565 tonnes of soya oil a year. Note: This is the earliest document seen (May 2002) concerning soybean products (soy oil) in Finland; soybeans as such have not yet been reported. This document contains the earliest date seen for soybean products (soy oil) in Finland (1931).

Concerning Latvia: Page 72 states: "Among the countries that have increased their imports of soya beans are France, Norway, and Latvia, although the quantities imported up to the present are relatively small." They are so small that no statistics are given. Address: Villa Umberto I, Rome, Italy.

613. Matagrin, Am. 1939. Le soja et les industries du soja: Le soja en Afrique et en Australie [Soya and soya industries: Soya in Africa and Australia (Document part)]. Paris: Gauthier-Villars. x + 390 p. See p. 57-58. 18 cm. [Fre]
• ***Summary:*** There are no indigenous soybean varieties in Africa, but soybeans were introduced by the English to the Cape [South Africa]; then to the Orange Free Province, Rhodesia, and Transvaal, and also to Nigeria, the Gold Coast [later Ghana], and Côte d'Ivoire. Likewise, they were introduced by the French to Dahomey [later Benin] and Togo. Today soybeans seem to offer good promise everywhere, but production has been developed only in southern Africa. In northern Africa, earlier trials, which were rather indecisive due to the lack of selection and lack of human experience (except for those of Asian peoples), have been undertaken more seriously since 1918 in Algeria, then in Tunisia and then in Morocco; the coastal regions, where irrigation is unnecessary, seem more favorable.

Elsewhere, it is important to get early maturing varieties in order to avoid dehiscence of the pods under the influence of the summer heat. Note: Seedpods of some soybean varieties dehisce at maturity. That is, they split lengthwise along the natural line of the pod and discharge the contents of the pod–the soybean seeds.

The sandy and rocky soils, which are sometimes well tolerated by soybeans grown in the USA (North Carolina, etc.), are poorly suited in Algeria.

Following the advice of Mr. Rouest, we could try planting the seeds in two rows (20 to 25 cm apart), leaving between the two rows a space of about 1 meter of fallow (unplanted) land. In Tunisia, the climate and the vast territory offer advantages to many soybean varieties, and the trials which began in the 19th century, have now reached a certain amplitude / developed prosperously.

Note: Haberlandt (1878, p. 6) states that he obtained one green-seeded soybean from Tunis [later renamed Tunisia] in 1873 at the Vienna World Exposition (*Wiener Weltausstellung*).

In Morocco, where 35,000 to 50,000 tonnes per year of other beans (*d'autres fèves*) are produced, at least one-third of which is exported (including the bean of Safi, which reminds one of the horse bean or dry kidney bean {*féverole*} of Egypt), this crop succeeds in the regions that are rather cool zones or that allow irrigation. This crop could enrich the soils with nitrogen in the valley of Sebou and the area around Fez, the small market-garden valleys of Mogador, perhaps even on the plains or plateaus of the Chaouïa and of the Doukala [Doukkala; the latter two places are now both in Morocco].

As for Egypt, it has already been worked over by the English propaganda, and soy has spread in the valley of the Nile, beside the horse-beans (*féveroles*) which have an ancient reputation.

In Australia this Asian legume is finally being cultivated successfully. It began at the start of the 20th century in the southeast, and today it grows all along the eastern coast (Queensland, New South Wales, Victoria). From there it somehow spread a bit to Tasmania and toward Adelaide, and above all to New Zealand, where it was welcomed. It does not seem that British New Guinea [later renamed Papua New Guinea] contributed its transmission, although the Dutch

region of this large insular territory [Dutch New Guinea, later named Irian Jaya = Irian Barat or West New Guinea] did adopt the soybean, either from Mindanao (Philippines) or from Java [Indonesia].

Tables show: (1) Production and utilization of soybeans in the USA in 1934 and 1935, by states (in 100 metric tons) (p. 18-19). (2) Quantity and value of soybeans, soybean cake, and soybean oil imported into the USA from 1909 to 1928 (p. 26). (3) Importation of soybeans and soy oil into Great Britain (from 1913), Germany (from 1922), Netherlands (from 1913), Denmark (from 1913), and Sweden (from 1930) (all in Europe) in 1913, 1922, 1925, 1930, 1933, 1934, and 1935 (p. 41). (7A) Production of soybeans in China, Manchuria, Korea, and Japan (all in East Asia) in 1928 and 1935 (p. 51). (7B) Soybean trade among countries in Asia in 1909-13, 1922-23, 1924-25 incl. China and Manchuria, Japan, Korea, Dutch Indies, Java and Madura, Formosa, British and French possessions (p. 51).

Note 1. This is the earliest document seen (April 2015) concerning soybeans in Dahomey (later Benin), Côte d'Ivoire (Ivory Coast), or Togo, or the cultivation of soybeans in Dahomey, Côte d'Ivoire, or Togo. This document contains the earliest date seen for soybeans in Dahomey, Côte d'Ivoire, or Togo, or the cultivation of soybeans in Dahomey, Côte d'Ivoire, or Togo (1939; one of two documents for Côte d'Ivoire). The source of these soybeans is unknown. Unfortunately, the author gives no documentation for this early cultivation of soybeans in Dahomey, Côte d'Ivoire, and Togo.

Note 2. Matagrin says (without citing any source) that soybean trials were conducted in Tunisia (a protectorate of France from May 1881 to 1956) in the 19th century. If that were true, this document would contain the earliest date seen for the cultivation of soybeans in Tunisia. In 1869, Tunisia declared itself bankrupt. An international commission, with representatives from France, the United Kingdom, and Italy took over its economy. In 1878 Friedrich Haberlandt wrote that he had obtained 20 varieties of soybeans at the Vienna World Exposition in 1873; at least one of these, he said, came from Tunis (Tunisia). How did soybeans get to Tunisia in order to be tested there? One possibility is that they were sent there from France by the Society for Acclimatization, which reported that it was conducting soybean trials in neighboring Algeria a few years before 1880. Address: France.

614. Pellett, Frank C. 1940. The postscript: The discussion of the soy bean grows in interest. *American Bee Journal* 80(3):138. March.
• ***Summary:*** "Now comes a letter from J.E. Eckert, of Davis, California, to say that while he was in North Carolina he observed that the bees gathered a very good surplus from the soy bean in the coastal section east of Washington. The honey was extra light amber in color, of good flavor and granulated quickly. An average of from one to two supers per colony were produced in summer when no other source of nectar was available.

"There are enough reports of honey from soy beans to establish the fact that at times it is a valuable source while very commonly the bees pay no attention to it..."

Note: Washington, in eastern North Carolina, is the capital of Beaufort County, on the Pamilco River at the head of navigation, 30 miles north of New Bern.

615. *Chicago Daily Tribune.* 1940. 80 business men make friendship trip downstate: Visit big Staley plant at Decatur. May 29. p. 31.
• ***Summary:*** Eighty Chicago business men, all members of the Chicago Association of Commerce, traveled on a special train on the Illinois Central railroad, hoping to improve relations between Chicago and other cities in the state.

The A.E. Staley Manufacturing Co. plant in Decatur, Illinois, processes mostly corn, however the processing of soy beans is increasing in importance. "The founder of the company, who came from North Carolina, was one of the first in the country to sense the value of the soy beans as an America crop and Illinois now leads the nation in the growing of the soy bean."

Towering over the Staley plant is a luxurious 11 story office building that resembles the state capitol. The company's products include soy bean oil and soy bean meal. "Its soy bean mill is the largest in the world.

"Large warehouses and processing plants of three other companies help to give Decatur its name as the soy bean capital of the nation."

Note: This is the earliest document seen (Aug. 2016) which uses the term "soy bean capital" (of the United States) in connection with Decatur, Illinois. However in 1935 the term "Soy Bean Capital of the World" appears in *Popkess' Dairyman's Journal*–Volumes 22-24–Page 157 (found on Google Books, 27 Aug. 2016).

616. *Staley Journal* (*Decatur, Illinois*). 1940. Soy bean gains importance. 23(12):33. June.
• ***Summary:*** "Although the larger part of the Staley activity is the processing of corn, the processing of soy beans is increasing in importance. The founder of the company, who came from North Carolina, was one of the first in the country to sense the value of the soy bean as an American crop and Illinois now leads the nation in the growing of the soy bean. During the seven week crop harvesting period last year the Illinois Central railroad alone brought 5,100 carloads to the plant and each carload consisted of 1,500 bushels.

"Dominating the Staley plant is an 11 story office building that resembles a state capitol and boasts offices of a luxury rarely seen in Chicago. The purchasing department even has its own board room in which are quoted grain Prices in all parts of the world.

"Products of the plant include starches and various other corn products, soy bean oil, and soy bean meal. Its soy bean mill is the largest in the world.

"Large warehouses and processing plants of three other companies help to give Decatur its name as the soy bean capital of the nation. Besides being used as meal for feeding cattle and for other purposes, the soy bean is now being converted into plastics-a use said to be in its infancy."

Note: This is the earliest issue of the *Staley Journal* seen (Aug. 2016) in which the phrase "soy bean capital of the nation" appears. We cannot find the phrase "soy bean capital of the world" or "soybean capital of the world" or "soy bean capitol of the world" in any issue of the *Staley Journal.*

617. USDA Agricultural Marketing Service. 1940. Farm production, farm disposition, and value of soybeans and cowpeas, 1924-1936, by states. Washington, DC. 30 p. June. Unpublished manuscript.

• ***Summary:*** Contents: Introduction. Soybeans: Production, disposition surveys, fed to livestock, used for seed, sales, soybean prices, value of production, value of sales. Cowpeas: Home consumption, etc. Table–Soybeans: Production, farm disposition, and value, United States, 1924-1936 (p. 4). Same table for cowpeas. Tables–Soybeans: Production, farm disposition, and value, by states. There is one full-page table each year from 1936 back to 1924. The states in 1936 are: New York, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa, Missouri, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas, then total for the USA. Address: Washington, DC.

618. Halverson, J.O.; Sherwood, F.W. 1940. The vitamin A activity and the vitamin B-1 content of soybeans and cowpeas. *J. of Agricultural Research* 60(2):141-44. Aug. [9 ref]

• ***Summary:*** Fixen and Roscoe found the carotene level in mature dry soybeans to be 4.5 to 9.7 micrograms per gram; Lanzig and Van Veen found it to be 0.4 to 0.8, and Sherman and Salmon found it to be 0.17 to 2.44. Fixen and Roscoe found the vitamin B-1 level to be about 1.0 to 1.5 International Units per gram. Address: North Carolina Agr. Exp. Station.

619. Smith, John T. 1940. Today's trend in soybean production. *Proceedings of the American Soybean Association* p. 53, 55. 20th annual meeting. Held 18-20 Aug. at Dearborn, Michigan.

• ***Summary:*** Discusses the growth of the soybean industry in Illinois. "Mr. President, members of the American Soybean Association and Friends:

"In discussing the subject assigned me, 'Today's Trend in Soybean Production,' we will confine our remarks to the growth of the soybean industry in Illinois. Soybeans first came into Illinois in the early years of the 20th Century [sic]. At the University of Illinois some 12 varieties were grown experimentally in 1897. After some years of experimentation, a few farmers in various parts of the State commenced raising a few acres. There were no mills for processing, no established markets of any kind. These men planted a crop, pioneering, if you please, and trusted they would be able to save a few bushels per acre. The yield ranged from 5 to 12 bushel of seed per acre. In most cases it was almost impossible to get a threshing machine to thresh the crop. Elevators refused to have anything to do with them. If you grew any beans, your only outlet was to sell them as seed for a hay crop. Fortunately, the cow was not as skeptical as were the people. Farmers here and there over the corn belt kept increasing their acreage, College Extension people preached soybeans up and down the state and the acreage of the crop increased. The question then was, 'What will we do with the crop.'

"As time went on the harvesting was done with a binder, thresher men finally accepting soybeans as a necessary evil, rather grudgingly threshed them as a favor for 20¢ per bushel, finally coming down to 10¢ per bushel. Fortunately for our soybean crop–red clover began failing to stand over the winter, and soybeans filled in as a substitute hay crop. Progress was being made, but still our cry each year was, 'What are we going to do with the crop?' This brings us up to 1921.

"A linseed oil processor, Mr. I.F. Bradley, of Chicago Heights, was experimenting with crushing soybeans and expelling the oil. People said it could not be done, but he did it. Soybeans immediately took a new lease on life and the seed demand took up the available supply of beans in Illinois and Mr. Bradley was forced to buy a car load of soybeans in North Carolina in 1922 to get enough to carry on his experimental work. The tune changes to 'If we processors only had enough beans, we could keep our plants running and build more processing plants.'

"In 1923 the A. E. Staley Company of Decatur, Illinois commenced processing beans in a small way. The farmers kept increasing their acreage, and each year more tried a few acres. Thresher men became a little more friendly to the soybean as more and more farmers began raising them.

"Funk Brothers Seed Company, Bloomington, Illinois, persuaded Mr. Bradley to move his plant to Bloomington. He did so and started with three expellers in 1924. Then a new picture came into view. The Allied Mills of Peoria made a contract with the Grange League Federation of New York to furnish a years supply of feed including therein a certain percentage of soybean meal. This contract was reflected back to the grower in a guaranteed price per bushel was continued for the second year and also for the third year.

"Bean acreage increased until in 1939 Illinois alone produced over 42,000,000 bushel of soybeans. Processing

plants increased from none in 1921 to 75 in 1939 with a combined crushing capacity of approximately 80,000,000 bushel.

"Methods of production changed as time went on. In the start, most of the beans were sown with wheat drills, using every hole in the drill as wheat is sowed. As weeds became a factor in soybean production, sugar beet drills and cultivators were used, planting the beans in rows 21 inches apart. Now there is a definite trend to grow soybeans in rows, in many cases, using a regular corn planter, with 36 to 40 inch rows and cultivating with the regular corn cultivators. Reports of yields exceeding solid drilled plantings are continually coming to us. Yields have increased from a few bushels per acre in 1910 to 30, 35 and 40 bushel per acre, some going even higher. This is due to better methods of production, better inoculation and better varieties.

"To date the progress made in soybean production is due to the plant breeders, the culture people, the machinery companies, the processors, as well as farmers. The plant breeders have selected, people have encouraged better inoculation of beans, the machinery companies have improved the machinery at hand and introduced the combine of the wheat fields of the west into the bean fields of Illinois and other states. This probably has been the one big factor in the increased growing of soybeans.

"Among the varieties first grown in the State are Ito San, Midwest, Ebony, Virginia and A.K. A few years later we grew the Manchu, Illini, Dunfield, Mansoy, Virginia and Ebony. In addition to these we are now growing Wisconsin No. 3, Richland, and a new selection 'The Chief' which are now coming into the front.

"The old method of cutting with the binder, shocking and threshing with the threshing machine was a costly operation. The first combines introduced were the 12 foot machines that were used in the wheat country. As there were few machines and a big demand for custom harvesting, we find people buying 10 to 20 foot cutter bar machines. There is a definite trend now back to smaller combines with a 5 to 6 foot cutter bar for the average farm. These little machines will cut two rows at a time. They can be operated by one man and under favorable conditions he can cut and thresh 15 acres a day.

"As we view the 'Future Trend in Soybean Production' we see the plant breeders searching for new varieties of soybeans for special purposes. Anyone who has tried to eat commercial soybeans under whatever name has been sadly disappointed. There are many varieties of edible soybeans today that are really palatable.

"Machinery companies have perfected the machines to a high degree of efficiency. We are looking to processors for new ways of utilizing the by-products of the crushed soybeans. There seems to be no limit to the different things that can be made from them. A few of these are plastics, linoleum, glue, T.N.T., paints, oils, varnish, edible oils, automotive parts, etc.

"From the producers stand point the trend is definitely to row beans. As to the width of rows, experience will determine that problem. At the present time the corn planter width row seems to be in the ascendency. Crop indications point to a 100,000,000 bushel crop this year. In our opinion the saturation point has not been reached. Research is continually finding new uses for the crop. We have seen in Illinois an increase of from 5,240,000 bushel in 1934 to 42,000,000 in 1939 with a demand for still more beans. In a time of crop surpluses, soybeans have been a form of insurance to the farmers income." Address: Tolono, Illinois.

620. *Canton Enterprise* (*The*) (*Canton, North Carolina*). 1940. Soybean milk, as the answer to the problem of children who are allergic to cow's milk,... Sept. 12. p. 2.
• ***Summary:*** "... may become a reality if processing costs can be brought down."

621. McIlroy, G.G.; Edmondson, J.B. 1940. American Soybean Association business session: Dearborn Inn. *Proceedings of the American Soybean Association* p. 81-83.
• ***Summary:*** The meeting was called to order by President McIlroy at 8:30 A.M. The secretary's report, and then the treasurer's were read and accepted by unanimous vote.

New business: "Jacob Hartz discussed the necessity of the Association broadening its policies in an effort to meet the growing needs of the soybean industry. Two definite suggestions were made to be 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.

"In order to make way for the development of the above suggestions, amendments to the constitution were presented by the Secretary as follows:" These concerned the board of directors, executive committee, and state executive committee. After some discussion, the amendments were accepted.

There followed a discussion on the use of soybean oil in the manufacture of oleomargarine.

The report of the resolutions committee (K.E. Beeson, chair, George Strayer, George Banks, David Wing) was read by Prof. Beeson and accepted. The resolutions are given: (1) Appreciation to the Ford Motor Company, hosts of this occasion, and especially to Dr. E.A. Ruddiman and Dr. R.A. Boyer of that organization. (2) Gratitude to all agencies interested in soybeans and to the present efficient officers of the Association for their work in planning this meeting. (3) Thanks to all those participating in the 1940 program. (4) Renewed appreciation for the efforts of the U.S. Regional Soybean Industrial Products Laboratory, extension workers, commercial laboratories, National and State chemurgic councils, State Experiment Stations, and agricultural colleges. (5) Gratitude for the financial support

of a sympathetic industry which makes possible the printing of the proceedings, and the leaders of the soybean industrial field. (6) Thanks to the Pennsylvania Railroad, through its agricultural representatives Russell G. East and Sydney Friend, for bringing up to date the soybean panel exhibit and making it available as a cooperative exhibit of the Association. (7) Urge the repeal of all federal and state laws imposing unnecessary and unfair restrictions on the sale of oleomargarine made of domestic oils and fats.

The nominating committee, under the chairmanship of Dr. W.L. Burlison, presented the names in nomination for the offices of the Association. State directors were: Illinois: John Smith, Tolono. Indiana: Ersel Walley, Ft. Wayne. Iowa: George Strayer, Hudson. Arkansas: Jacob Hartz, Stuttgart. Ohio: David Wing, Mechanicsburg. Wisconsin: James Swan, Delevan. North Carolina: D.W. Bagley, Moyoek. The next meeting will be at Des Moines, Iowa. Address: 1. President; 2. Secretary-Treasurer [American Soybean Assoc.].

622. Associated Press (AP). 1940. A.E. Staley Sr., manufacturer, dies in Miami. *Chicago Daily Tribune.* Dec. 27. p. 12.

• ***Summary:*** "Miami, Florida, Dec. 26–August Eugene Staley Sr., 73, founder of the A.E. Staley Manufacturing company at Decatur, Illinois, and a pioneer in the corn and soy bean processing industries, died tonight at his winter home here." He "suffered a stroke last week and became critically ill Christmas day."

He began life as a farm boy in North Carolina and built a company now worth $20 million. The Staley plant, which processes corn and soy beans, "is believed to be the largest of its kind in the United States."

Lists the organizations of which he was a member. He is survived by two sons, A.E. Staley Jr. and A. Rollin Staley, both of Decatur, and three daughters, Mrs. H.P. Dunlap of Decatur, Mrs. Ruth Staley Hunt of Highland Park, Illinois, and Mrs. David Hugh Annan of Chicago.

623. *Decatur Daily Review* (*Illinois*). 1940. A.E. Staley, Sr., dies in Florida; funeral to be held here Monday: Body coming back Sunday. Dec. 27. p. 1, 8.

• ***Summary:*** The title of this article is a bold headline across the top of the front page. "A.E. Staley, Sr., died last night in his winter home at Miami, Florida. Death came to the 73 years old Decatur grain processing millionaire at 7:30 o'clock. His family was at the bedside. The founder and chairman of the board of the A.E. Staley Mfg. co. suffered a stroke last week and his condition became critical Christmas day.

"Funeral services will be held in the First Presbyterian church at 2 p.m. Monday. Burial will be in the Fairlawn Mausoleum after services in the Fairlawn Chapel. Rev. E.E. Freed, pastor of the First Presbyterian church will give the funeral sermon.

"Pallbearers will be members of the Staley Company Executive committee and representative employees of the company." "Had Been in Good Health: The elderly industrialist's illness occurred unexpectedly. He had been in apparent good health while he was in Decatur during the summer and appeared at his office daily.

"Although Mr. Staley was ill for a short time after a fire burned through palm trees near his Miami home in the winter of 1939 he recovered rapidly." He was a very generous donor to many Decatur charities. He was an independent Democrat until 1936, when he left the party of Roosevelt. He was awarded two honorary degrees, by Milliken university in Decatur last June, and by High Point college, High Point, North Carolina, the previous year.

"Augustus Eugene Staley was born of English parentage on a farm near Julian, North Carolina, Feb. 25, 1867. His father was William Staley and his mother was Mary Jane Ledbetter Staley. He was married to Emma Louise Tressler on Dec. 14, 1898 in Baltimore" [sic, in Bryan, Ohio].

"Besides his wife he leaves two sons, A.E. Staley, Jr., and A. Rollin Staley, both of Decatur and three daughters, Mrs. H.P. Dunlap, Decatur, Mrs. Ruth Staley Hunt, Highland Park, and Mrs. David Hugh Annan, Chicago.

"Grandchildren are Eugene Henry, Richard Seth and Mary Beth Staley, Shirley Cowell, Robert Eugene Mueller and John Keelin Jr., and Michael Keelin."

"As a barefoot boy in North Carolina, the son of parents ruined financially by the Civil war, Gene Staley first had ambitions to become a business man. Oddly enough he hated farming,..."

Note: According to Findagrave, A.E. Staley's parents are William Staley (born 6 Feb. 1840 in North Carolina; died 1 Aug. 1885 in Julian, Guilford County, North Carolina; buried in Shiloh United Methodist Church Cemetery, Liberty, Randolph Co., North Carolina) and Mary Jane Ledbetter Staley (born 18 June 1842 in Asheboro, Randolph Co., North Carolina; died 4 Nov. 1906 in North Carolina; buried in the same cemetery as her husband).

A.E. Staley's children are (1) Ione Staley (born 23 Jan 1900, died May 1981 in Miami, Florida; she was unmarried when she died). (2) Ruth Staley Howell (born 1901 Baltimore, Maryland; died 1970 in Miami Beach, Florida; she married Mr. Howell). (3) Augustus Eugene Staley, Jr. (born 24 July 1903; died 19 March 1975, Decatur, Illinois). (4) Mary Louise Staley Annan (born 17 Sept. 1905; died 3 April 1973. Buried in Lake Forest Cemetery, Lake Forest, Lake County, Illinois). (5) Andrew Rollin Staley (born 16 May 1907 in Baltimore, Maryland; died Oct. 1968 in Decatur, Illinois. Buried in the Fairlawn Cemetery Mausoleum).

A.E. Staley's 3 younger siblings were (1) Arthur E. Staley (1869-1930). (2) Georgiana Staley Coble (1872-1952). (3) Wilhelmina "Willa" C. Staley Garner (born 5 April 1885 in North Carolina; died 26 March 1950

in Randolph County, North Carolina. Married Melville Cecil Garner {1915-1937}. She is buried in Shiloh United Methodist Church Cemetery, Liberty, Randolph Co., North Carolina).

624. *Decatur Herald* (*Illinois*). 1940. A.E. Staley, Sr., dies in Florida home: started career on farm; father of bean industry. Dec. 27. p. 1, 3.

• ***Summary:*** Most of this 18-page issue of the *Decatur Herald* is devoted to A.E. Staley, Sr. and exploring this many-faceted great man. There are many articles and short quotations by others who knew him well about him. He was universally regarded with the highest praise and widely considered the father of the soybean industry in the USA–as well as in Decatur. The title of this article is a banner headline on page 1, above a large photo of him looking healthy and walking down a drive at his winter home in Miami, Florida.

The main story about him on page 1 begins: "Augustus Eugene Staley Sr., the North Carolina farm boy who built a 20-million dollar corn and soybean processing industry in Decatur, died last night in his winter home in Miami, Florida. He would have been 74 years old in February.

"Death came to Mr. Staley at 7:30 p.m. (Decatur time). Members of the family were at his bedside.

"Mr. Staley, founder and chairmen of the board of A.E. Staley Mfg. Co., suffered a stroke last week and his condition became critical Christmas day.

"Father of Soybean Industry: The Decatur industrialist, whose first job was that of a railroad section hand, is generally credited with 'fathering' the soybean processing industry in this country. He served as president of the Staley company from the date of its founding in Baltimore in 1897 until 1932 when he was succeeded by his son A.E. Staley, Jr.

"Members of his family said Mr. Staley put up a 'terrific' fight during the time he was critically ill. He was in a coma a great deal of the time.

"Parents Ruined By War: As a barefoot boy in North Carolina, the son of parents ruined financially by the Civil war, 'Gene' Staley first had ambitions to become a business man.

"Oddly enough, he hated farming, hated it as only a boy who has hacked at sticky clay clods on a Carolinian hillside can hate it. After his father died young Staley, then 17, set out to fulfill his ambition to become a business man. His chief hope was to secure a job as a traveling salesman."

Mr. Staley's formal education was limited. From the age of about 6 to 16 he attended a little country school, several miles from his parents home, about two months each winter.

625. *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.

626. 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.

627. *Soybeans harvested for beans. Acreage, yield, and production. By counties for 15 principal states.* 1940-1953. Serial/periodical. USDA Crop Reporting Board.
• ***Summary:*** North Carolina was the first state in the United States to grow soybeans on a large state. It was by far the leading state from 1917 to 1923. In 1924 North Carolina was passed by Illinois as the leader in soybean production.

628. Becker, Joseph A.; Froehlich, Paul; Fraser, W.O.; et al. comps. 1940. Agricultural statistics 1940. Washington, DC: U.S. Government Printing Office. 737 p. Index. 24 cm. For soybeans and soy products see p. 299-311, 377, 383-84, 455-56, 459-60, 519, 523.
• ***Summary:*** This volume presents information formerly published [until 1935] in the statistical section of the Yearbook of Agriculture" (p. 1).

In this 1940 volume, tables concerning soybeans are on pages 299-311, 377, 383-84, 455-56, 459-60, 519, 523.

Page 301: Table. Soybeans: Acreage and production in specified countries, average, 1930-34, annual 1935-40. The countries in approximate descending order of production are: China (excluding Kwangsi Province; Guangxi Autonomous Region in southern China), Manchuria, United States, Chosen [Korea], Japan, Taiwan, Netherlands Indies, Rumania (assuming that Bessarabia accounted for 80% of the total), Bulgaria, Yugoslavia, and Hungary. The world total each year excludes the USSR.

Page 305: Table. The main countries exporting soybeans are China, Manchuria and the United States. The main countries in importing soybeans in 1938 are Germany, Japan, Denmark, United Kingdom, Sweden, Italy, Netherlands and Canada.

Page 305: Table. The main countries exporting soybean oil are China, Manchuria, Denmark, Japan, and Sweden. The main countries in importing soybean oil in 1938 are Netherlands, United Kingdom, Italy, Germany, United States, Belgium, Chile, France, Morocco, Norway, Algeria, Austria, Czechoslovakia, Canada, USSR.

Page 308: Soybean production in specified countries in 1924-1939. The countries are United States, China, Manchuria, Chosen [Korea], Japan. Netherlands Indies.

Page 309: Soybean crushed, and production, imports and exports of soybean oil, cake, and meal, 1929-39. Soybeans crushed rose from 1.666 million bushels in 1929 to 44.648 million bushels in 1939. Production of crude soybean oil rose from 13.424 million lb in 1929 to 416.111 in 1938. Soy oil was both imported and exported every year. Soybean meal and cake production increased from 40,000 tons in 1929 to 1,054,000 tons in 1938. There were small imports each year but no exports.

Page 377, 383-384: Fats and oils used in the manufacture of compounds [shortening] and vegetable

cooking fats, United States, 1929, 1931-40. The main fat used was cottonseed oil, but soybean oil increased from 10.8 million lb in 1931 to 201.599 million lb in 1939. Imported palm oil was also used largely.

Page 455, 458-60: Tables. Oleomargarine: Materials used in manufacture, United States, 1924-1940. The main animal materials were oleo oil and neutral lard. The main vegetable oils were cottonseed oil (by far). Soybean oil increased from 11,000 lb in 1929 to 87.1 million lb in 1940. Coconut oil was also largely used. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

629. Deasy, George F. 1941. Geography of the United States soybean-oil industry. *J. of Geography* 40(1):1-7. Jan. [2 ref]
• ***Summary:*** Contents: Development of the United States soybean industry. Distribution of American soybean mills. Uses of soybean oil. Future of the United States bean soil industry,

Tables show: (1) "United States production of vegetable oils from domestic oil-yielding seeds." Cottonseed oil 1,678 million lb. Soybean oil 323 million lb. Linseed oil 157 million lb. Corn oil 137 million lb. Peanut oil 78 million lb. Olive oil 5 million lb. Tung oil 2 million lb. Thus, soybean oil ranks second only to cottonseed oil–but a distant second. The amount of soybean oil produced is only 19% as much as the amount of cottonseed oil.

(2) United States acreage and production of soybeans, 1924 to 1938. For even-numbered years gives: Total soybean acreage (increased from 1.78 million in 1924 to 7.79 million in 1938). Acreage harvested for soybeans (increased from 0.448 million to 2.898 million). Total production of soybeans (increased from 4.947 million bushels to 57.665 million). Soybeans crushed (increased from 0.307 million bushels to 48.886 million). Percent of total production crushed (increased from 6.2% in 1924 to 84.8% in 1938).

(3) Comparative conditions of the soybean industry in selected regions and states of the U.S., 1937. Defines and gives figures for 2 regions and 2 states: North-central states, southern states, Illinois, Mississippi. Gives for each: Percentage cut for hay, hogged off, and cut for beans. Yield of beans in bushels/acre. Total soybean production.

(4) U.S. factory consumption of soybean oil, 1938 (million pounds): Edible products: Shortening 137.133. Oleomargarine 39.885. Others 11.280. Inedible products: Paint and varnish 15.183. Soap 10.897. Linoleum and oilcloth 3.605. Miscellaneous products: Unclassified 5.399. Loss: (incl. foots) 14.046.

Bar charts show: (1) Estimated soybean production in leading countries, 1938: China, Manchukuo, United States, Chosen [Korea], Japan. (2) Estimated soybean production in leading U.S. states: Illinois, Indiana, Iowa, Ohio, North Carolina, Missouri, Others.

Maps show: (1) Total U.S. soybean acreage, 1934. Each dot represents 1,000 acres (2) Total U.S. soybean production, 1934. Each dot represents 5,000 bushels. (3) Location of soybean mills in the USA, Nov. 1939. Each dot represents a mill which processes soybeans, or is reported to be equipped or will be equipped for soybean crushing. Most of the mills are in the Midwest, or the central Atlantic seaboard. Address: Formerly Univ. of Cincinnati, Ohio.

630. *Soybean Digest.* 1941. A pioneer dies: Soybean industry loses A.E. Staley, Sr., who began processing soybeans in 1922. Jan. p. 1.
• ***Summary:*** "A.E. Staley, Sr., 73-year-old founder of the A.E. Staley Manufacturing Company, Decatur, Illinois, and an early pioneer in the soybean industry, died Dec. 26 at his winter home in Miami, Florida. He was generally regarded as the father of the soybean industry.

"As a barefoot boy born of English parents on a farm near Julius, North Carolina, Mr. Staley first became interested in soybeans. A missionary from China gave his father a handful of soybeans from a supply of about a bushel she had brought to the United States.

"Boy Plants Beans: His father turned them over to young Staley, who planted them in two rows in the vegetable garden, weeded them, picked them, and saved the seed for planting the next year. There are still probably many beans in North Carolina parented by that original handful planted in the Staley vegetable garden.

"Mr. Staley's career as a manufacturer began in the starch industry, and for many years he nearly forgot about soybeans. Soybeans were first recalled to his mind by large quantities of diseased corn brought to the Staley plant at Decatur.

"If the company could get farmers to grow soybeans, it might indirectly help the corn crop, and the company could obtain more and better corn closer to home, Mr. Staley thought.

"Processing Begins: "'It was a slow process,' Mr. Staley once said of his company's efforts to get the Illinois farmers to grow soybeans, 'but things started to change about 1922 when we started to process beans. Even for a time after we started to process, we had trouble. We couldn't sell the products. We had to educate feeders and grain men just as we had educated farmers.'

"He was the recipient of two honorary degrees, an honorary doctor of science degree from Millikin University [Decatur, Illinois] at its commencement exercises last June, and a doctor of laws degree from High Point College, High Point, North Carolina, the previous year.

"Son Makes Trip: A.E. Staley, Jr., who succeeded his father eight years ago as president of the A.E. Staley Manufacturing Company, accepted the degree at High Point for his father, who was unable to make the trip.

"Surviving Mr. Staley are: his widow; two sons, A.E. Staley, Jr., and A. Rollin Staley, both of Decatur; three

daughters, Mrs. H.P. Dunlap of Decatur, Mrs. Ruth Staley Hunt of Highland Park, Illinois, and Mrs. David Hugh Annan of Chicago, Illinois. Eight grandchildren also survive."

A portrait photo shows Augustus Eugene Staley, Sr. in his later years.

631. **Product Name:** All-Purpose Soy Bean Flour, and Vacuum Packed Soybean Health Foods.
Manufacturer's Name: Judd Mill and Cannery. Renamed Judd's Health Foods by March 1941.
Manufacturer's Address: Asheville, North Carolina.
Date of Introduction: 1941 February.
New Product–Documentation: Ad in *Soybean Digest.* 1941. "Market street." Feb. p. 12. Ad in *Soybean Digest.* 1941. "Market street." March. p. 12.

632. *Soybean Digest.* 1941. Classified ad: Market Street. Feb. p. 12.
• ***Summary:*** This section contains two ads. (1) "Edible soybeans–Bansei and Aoda. Purity 99.5 percent. Germination 96 percent. No samples. No sales under two-bushel lots. Write 'Soybean Johnson, 1151 Claytonia Terrace, Richmond Heights, Missouri. Shipments from farm, northwestern Ohio."

(2) "Try our delicious all-purpose flour and vacuum packed soybean health foods. Judd Mill and Cannery, Asheville, North Carolina."

633. *Soybean Digest.* 1941. Classified ad: Market Street. March. p. 12.
• ***Summary:*** This section contains two ads. (1) "Try 2-pound package delicious Soy Bean Flour and vacuum packed soy products. Judd's Health Foods, Asheville, North Carolina." (2) "Edible soybeans–Aoda variety. Purity 99.9 percent, germination 94 percent. Write for price. Frank C. Gees, Lebanon, Illinois."

634. National Soybean Processors Association. 1941. Year book, 1941-1942 (Association year). Chicago, Illinois. 53 p.
• ***Summary:*** Contents: Constitution and by-laws (as amended Oct. 13, 1941; incl. committees, code of ethics). Officers, directors and committees for 1941-42. Membership of the National Soybean Processors Association. Trading rules governing the purchase and sale of soybean oil meal (First adopted 18 Oct. 1933). Appendix to trading rules on soybean oil meal. Trading rules on soybean oil. Appendix to trading rules on soybean oil–Official testing methods.

Article IX, Committees, lists and describes each.

The section titled "Officers, directors, and committees" (p. 14-16) states: President: Edward J. Dies. V.P., Chairman Executive Committee: E.K. Scheiter. Secretary: E.D. Funk, Jr. Treasurer: W.G. Dickinson. Ass't. Treasurer: F.G. Duncanson. Executive Committee: E.K. Scheiter, Chairman–J.B. DeHaven, E.D. Funk, Jr., W.H. Knapp, W.G. Dickinson, Roy Hall -> D.J. Bunnell, C.T. Prideville, W.H. Eastman, E.F. Johnson, W.E. Flumerfelt, Howard Kellogg, Jr.

Board of Directors: A.M. Andreas, W.E. Flumerfelt, C.T. Prideville, J.H. Caldwell, E.D. Funk, Jr., E.K. Scheiter, J.B. DeHaven, Roy Hall -> D.J. Bunnell, H.R. Schultz, W.G. Dickinson, Howard Kellogg, Jr., I.D. Sinaiko, Roger Drackett, W.H. Knapp, Ralph Wells, W.H. Eastman, J.H. Mitchell.

Standing committees: For each committee, the names of all members (with the chairman designated), with the company and company address of each are given–Traffic and transportation. Research. Finished materials standards. Soybean grades and contracts. Trading rules–oil. Trading rules–meal. Soy flour. Crop improvement. Soybean nutritional research council. Trade development. Edible soybean.

The following companies and organizations are members of NSPA: Allied Mills, Inc., Board of Trade Bldg., Chicago, Illinois (J.B. DeHaven). Archer-Daniels- Midland Co., Box 839, Minneapolis, Minnesota (W.H. Eastman). Berea Milling Co. (The), Berea, Ohio (H.E. Carpenter). Buckeye Cotton Oil Co. (The), Cincinnati, Ohio (W.H. Knapp). Cairo Meal & Cake Co., Cairo, Illinois (A.T. Madra). Central Soya Co., Inc., Fort Wayne, Indiana (Roy Hall). Clinton Co., Clinton, Iowa (E.W. Meyers). Drackett Co. (The), Cincinnati, Ohio (Roger Drackett). Durkee Famous Foods, Chicago. Elevators & Mills, Inc., Windfall, Indiana (J.H. Mitchell). Funk Bros. Seed Co., Bloomington, Illinois (E.D. Funk, Jr.). Glidden Co. (The), Chicago, Illinois (W.G. Dickinson). Honeymead Products Co., Cedar Rapids, Iowa (A.M. Andreas). Illinois Soy Products Co., Springfield, Illinois (I.D. Sinaiko). Iowa Milling Co., Cedar Rapids, Iowa (Jos. Sinaiko). Laucks (I.F.), Inc., Portsmouth, Virginia (H.F. Armstrong). Old Fort Mills, Inc., Marion, Ohio (P. Turner -> Hugo Melo). Plymouth Processing Mills, Fort Dodge, Iowa (C.J. Simmons). Quincy Soybean Products Co., Quincy, Illinois (Irving Rosen). Ralston Purina Co., St. Louis, Missouri (J.H. Caldwell). Simonsen Brothers, Quimby, Iowa (W.E. Simonsen). Southern Cotton Oil Co. (The), Goldsboro, North Carolina (C.S. Ragan). Soya Processing Co., Wooster, Ohio (H.H. Heeman). Soy Bean Processing Co., Waterloo, Iowa (W.E. Flumerfelt). Spencer Kellogg & Sons, Buffalo, New York (Howard Kellogg, Jr.). Staley (A.E.) Mfg. Co., Decatur, Illinois (E.K. Scheiter). Standard Soy Bean Mills, Centerville, Iowa (H.R. Schultz). Swift & Co., Chicago, Illinois (C.T. Prindeville). Terminal Oil Mill Co., Oklahoma City, Oklahoma (S.T. Davenport -> O.K. Winterringer). Wells (Ralph) & Co., Monmouth, Illinois (Ralph Wells).

Organizations represented on committees: American Soybean Association, Hudson, Iowa (George Strayer, D.G. Wing). Illinois College of Agriculture, Urbana, Illinois (Dr. W.L. Burlison, J.W. Lloyd). U.S. Regional Soybean Laboratory, Urbana, Illinois (Dr. H.T. Hopper, Donald H. Wheeler).

Insert: New members added since publication of the Trading Rules Book–Bell (Wilbur) Mill, Fayette, Iowa (Wilbur Bell). Central Iowa Bean Mill, Gladbrook, Iowa (Paul K. Klinefelter). Dannen Grain and Milling Co., St. Joseph, Missouri (Dwight L. Dannen). Decatur Soy Products Co., Decatur, Illinois (Joseph Giovanna). Galesburg Soy Products Co., Galesburg, Illinois (Max Albert). Hoosier Soybean Mills, Marion, Indiana (J.H. Caldwell, Jr.). Mankato Soybean Products, Inc., Mankato, Minnesota (Frank J. Berman). Marr (Pete) Soybean Mills, Fremont, Nebraska (Pete Marr). Toledo Soybean Products, Toledo, Ohio (J.H. Brown).

Note 1. This is the earliest document seen (July 2005) that mentions Honeymead in Iowa.

Note 2. This is the earliest document seen (Sept. 2005) that mentions Quincy Soybean Products Co. (Quincy, Illinois) or Irving Rosen. Address: 3818 Board of Trade Building, Chicago, Illinois.

635. **Product Name:** Soy Bean Oil, and Soy Bean Oil Meal.
Manufacturer's Name: Southern Cotton Oil Co.
Manufacturer's Address: Goldsboro, North Carolina.
Date of Introduction: 1941 September.
Ingredients: Soybeans.
How Stored: Shelf stable.
New Product–Documentation: National Soybean Processors Association. 1941. Year Book, 1941-1942. Members. See p. 18. The Southern Cotton Oil Co., Goldsboro, North Carolina (C.S. Ragan).

636. U.S. Regional Soybean Industrial Products Laboratory. comp. 1941. Soybean processing mills [in the United States and Canada]. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 32. Sept. 4 p.
• ***Summary:*** This document begins: "Mills are listed below which process soybeans or are reported to be equipped or will be equipped for soybean crushing. This list is furnished for the information and assistance of the public, but it is to be understood that no guarantee of accuracy or completeness is implied nor is any discrimination intended."

The listings are alphabetically by state, and alphabetically by city within each state, and alphabetically by company name within each city (for example Chicago and Decatur, Illinois, have four mills each).

The states in which soybean crushing facilities are listed are: Arkansas (4). California (1). Colorado (2). Illinois (19). Indiana (5). Iowa (11). Kansas (3). Kentucky (3). Louisiana (1). Michigan (3). Minnesota (3). Missouri (3). Nebraska (2). New York (3). North Carolina (12). Ohio (11). Oklahoma (1). Pennsylvania (1). Tennessee (2). Virginia (3). Wisconsin (2).

Canada: (3, all in Ontario, in Baden, Owen Sound, and Toronto).

Note 1. This list was later expanded twice as: USDA Northern Regional Research Laboratory. 1943. "Soybean processing mills in the United States." *USDA Bureau of Agricultural and Industrial Chemistry.* AIC-26. 10 p. Nov. Revised edition, 1948. CA-5, 14 p.

Note 2. We think it is unfortunate that the 1st (1941) list does not distinguish between mills that are confirmed to be crushing soybeans versus those that may do so in the future. Address: U.S. Regional Soybean Industrial Products Lab., Urbana, Illinois.

637. Agricultural Marketing Service, USDA. 1941. Annual crop summary: Acreage, yield, and production of principal crops by states, with comparisons. Washington, DC. Dec.
• ***Summary:*** Two half-page tables (p. 79) give: (1) Soybean acreage (for all purposes): Grown alone: Average 1930-39, 1940, 1941. Interplanted: Average 1930-39, 1940, 1941. Equivalent solid: Average 1930-39, 1940, 1941. (2) Soybeans (for beans): Acreage harvested: Average 1930-39, 1940, 1941. Yield per acre: Average 1930-39, 1940, 1941. Production: Average 1930-39, 1940, 1941.

In 1941 the states with the largest soybean production (in 1,000 bushels) were (in descending order of production): Illinois 49,128. Iowa 16,608. Indiana 14,442. Ohio 13,143. Missouri 2,150. Arkansas 1,740. North Carolina 1,710. Michigan 1,344. Minnesota 1,200. Address: Washington, DC.

638. Becker, Joseph A.; Froehlich, Paul; Jackson, D.; et al. comps. 1941. Agricultural statistics, 1941. Washington, DC: U.S. Government Printing Office. 731 p. For soybeans and soy products see p. 7, 299-305, 490, 494, 496, 519, 523. 24 cm.
• ***Summary:*** "This volume presents information formerly published (until 1935) in the statistical section of the Yearbook of Agriculture" (p. 1). "Export and import statistics of the United States include trade with the Philippine Islands. They also include any trade between foreign countries and Alaska, Hawaii, and Puerto Rico, but do not include shipments between continental United States and these possessions. Prior to January 1, 1935, the Virgin Islands of the United States were treated in the same manner as the Philippine Islands, but since that date the Virgin Islands are treated in the same manner as Alaska, Hawaii, and Puerto Rico." (p. 5). A bushel of soybeans weighs 60 lb and a gallon of soybean oil weighs 7.5 lb (p. 7). Note: No separate statistics are given for soybeans or soybean products grown in or exported to or from Alaska, Hawaii, Puerto Rico, or the Virgin Islands.

Table 392 (p. 299) gives U.S. soybean acreage statistics for the years 1924-1940, including: Acreage grown alone for all purposes, total acreage (incl. half the interplanted acres), acreage harvested for beans, yield per acre, production, price (dollars/bushel), farm value (in 1,000 dollars), foreign trade (imports and exports, year beginning in July). In 1924 for

soybeans: Acreage grown alone for all purposes: 1,567,000. Total acreage: 1,782,000. Acreage harvested for beans: 448,000. Yield per acre: 11.0 bushels. Production: 4,947,000 bushels. Average price per bushel received by farmers: $2.46.

The corresponding figures in 1928 were: Acreage grown alone for all purposes: 2,154,000. Total acreage: 2,439,000. Acreage harvested for beans: 579,000. Yield per acre: 13.6 bushels. Production: 7,880,000 bushels. Average price per bushel received by farmers: $1.88.

Table 393 (p. 299) gives U.S. soybean production and farm disposition statistics for the years 1924-1940, including: Total production, used for seed (total, or home grown), fed to livestock, sold.

Table 394 (p. 300) gives U.S. soybean statistics for acreage, yield, production, and season average price received by farmers, by States, average 1929-38, annual 1939 and 1940. The states are: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas, and USA total.

Table 395 (p. 301) gives soybean statistics for acreage and production in specified countries, average 1930-34, and annual 1935 to 1940. The countries are China, Manchuria, United States, Chosen [Korea], Japan, Taiwan, Netherlands Indies, Rumania, Bulgaria, Yugoslavia, Hungary, and estimated world total.

Table 396 (p. 302) gives the average price per bushel of soybeans received by U.S. farmers each month and season average from 1930 to 1940.

Table 397 (p. 302) titled "Soybeans for seed" gives the average wholesale price per bushel at Baltimore and St. Louis, 1931-1941, each month from Jan. to May and average.

Table 398 (p. 302) titled "Soybeans for crushing" gives the average price per bushel, U.S. No. 2 Yellow, bulk, carlots, net track Chicago, 1933-40, each month from Oct. to Sept.

Table 399 (p. 303) gives statistics on amount of soybeans crushed, and production, imports, and exports of soybean oil (crude basis), and soybean cake and meal, USA, 1930-1940.

Table 400 (p. 303) gives the average price per pound of soybean oil (domestic crude) in tank cars, midwestern mills, 1929-1940, each month and yearly average.

Table 401 (p. 303) gives the average price per pound of soybean oil (domestic crude) in drums, New York, 1931-1940, each month and yearly average.

Table 402 (p. 304) gives the average price per ton of soybean meal (41% protein), at Chicago, 1930-1940, each month and yearly average.

Table 403 (p. 305) for soybeans and soybean oil, gives international trade (exports and imports), averages 1925-1934, annual 1938, 1939. For soybeans: Principal exporting countries–China, Manchuria, United States, total. Principal importing countries–Germany, Japan, Denmark, United Kingdom, Sweden, Italy, Netherlands, Canada, total. For soybean oil: Principal exporting countries–China, Manchuria, Denmark, Japan, Sweden, total. Principal importing countries–Netherlands, United Kingdom, Italy, Germany, United States, Belgium, Chile, France, Morocco, Norway, Algeria, Austria, Czechoslovakia, Canada, Union of Soviet Socialist Republics, total.

Table 659 (p. 490) gives U.S. exports (in pounds) of vegetable oils (incl. corn, cottonseed, linseed, cocoa butter, coconut, peanut, and soybean oil) from 1914 to 1939.

Table 617 (p. 455) gives statistics on oleomargarine–materials used in manufacture, USA, 1924-1940. Concerning soybean oil: Less than 500 lb were used in 1924 and 1925, but 33,000 lb were used in 1926. The first significant amount was used in 1930: 2.25 million lb. Note: Additional statistics on oleomargarine production and consumption in the USA are given on p. 454-57.

Table 660 (p. 494) gives U.S. imports (in pounds) of oilseeds (incl. soybeans {but no data given for 1918-1926}, sesame seeds, rapeseed) and vegetable oils (incl. olive oil, palm oil, palm kernel oil, peanut oil, perilla oil, rapeseed oil, soybean oil, and tung oil) from 1914 to 1939.

Table 662 gives imports of principal agricultural products (incl. soybean and soybean oil) into the United States, by countries, each year 1932-1940. The source countries for soybean (p. 519) are: Kwantung, Japan, China, Germany, other countries, total. The source countries for soybean oil (p. 523) are: Kwantung, Japan, China, Netherlands, other countries, total. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

639. USDA Bureau of Plant Industry, Div. of Forage Crops and Diseases. 1941. Partial list of dealers in vegetable varieties of soybeans in 1941. Washington, DC. 3 p.
• ***Summary:*** Lists 18 dealers in 13 states (One dealer per state unless otherwise noted): Connecticut, Illinois 3, Indiana, Iowa 2, Mississippi, Missouri, New Jersey, New York, North Carolina, North Dakota, Ohio 3, Pennsylvania, Tennessee, Virginia 2, Wisconsin 2.

Varieties include Aoda, Bansei, Chusei, Easycook, Emperor, Fuji, Funk Delicious, Giant Green, Goku, Hakote, Higan, Hokkaido, Imperial, Jogun, Kanro, Nanda, Rokusun, Sioux, Sousei, Toku, Tortoise Egg, Waseda, Willomi, 80490-1.

A tally of these by frequency of appearance shows: Bansei 10 times (the most popular), Jogun 6, Hokkaido 5. Seven varieties appeared three times, ten varieties two times, and four varieties appeared only once (Goku, Hakote, Sioux, and Waseda).

Concerning seed companies/suppliers: (1) Associated

Seed Growers, Inc., 205 Church St., New Haven, Connecticut offers fourteen varieties, more than any other source, as follows: Bansei, Chusei, Emperor, Green Giant, Fuji, Higan, Hokkaido, Imperial, Jogun, Kanro, Nanda, Rokusun, Toku, Tortoise Egg, Waseda, Willomi, 80490-1. Associated Seed Growers, Inc. also had an office in Indiana (301 Kentucky, Indianapolis) which offered the same 14 varieties as the Connecticut office. Note: Associated Seed Growers later became Asgrow Seed Co. (2) Strayer Seed Farms (Hudson, Iowa) offers Bansei and Jogun. (3) Harold Timm (Muscatine, Iowa) offers Bansei and Kanro. (4) Delta Experiment Station (Stoneville, Mississippi) offers Nanda. (5) E.F. Johnson (1151 Claytonia Terrace, Richmond Heights, St. Louis, Missouri) offers Bansei and Aoda. (6) George A. Mitchell (Magnolia Road, Vineland, New Jersey) Offers Emperor and Imperial. (7) Cornell Experiment Station (Ithaca, New York) offers Bansei, Hakote, Hokkaido, Jogun, Waseda. (8) G.G. McIlroy (Pres., Farm Management, Inc., Irwin, Ohio) offers Bansei. (9) W. Atlee Burpee Co. (Philadelphia, Pennsylvania) offers Bansei. (10) T.W. Wood & Sons (Richmond, Virginia) offers Easycook, Rokusun. (11) Wisconsin Experiment Station (Madison) offers Sousei and Jogun. (12) E.D. Bonk (Chilton, Wisconsin) Offers Sousei.

Note: The three most popular varieties are: Bansei (10 suppliers). Jogun (6). Hokkaido (5). Address: Washington, DC.

640. Smith, A.K. 1941? Soy sauce producers. 1 p. Undated. Unpublished manuscript.
• ***Summary:*** This handwritten, undated list seems to have been written sometime after 1940.

San Francisco: Wing Nien Soya Sauce Co. (fermented).

Los Angeles: Mrs. Hauser's Soya Foods Co., 4617 Melrose Ave.

Chicago: Great China Foods Co.

Decatur, Illinois: A.E. Staley Mfg. Co.

Columbia City, Indiana: Oriental Show You Co.

Rochester, New York: Vegetable Products Co., 15 Circle St.

Lexington, North Carolina: Vitro Nu Foods Co. [Corp.].

Mt. Vernon, Ohio: International Nutrition Laboratory.

Philadelphia, Pennsylvania: Tastee Soy Foods, 254 E. Girard Ave.

Williamsport, Pennsylvania: Soya Products Co. Address: [Northern Regional Research Lab., Peoria, Illinois].

641. *Soybean Digest.* 1942. Develops his own soybean harvester. Feb. p. 6.
• ***Summary:*** G.E. Pritchard of Elizabeth City, North Carolina, invented his first soybean harvester in 1909. Pritchard says "this machine does two jobs at the same time where soybeans are interplanted with corn: (1) Cuts the cornstalks. (2) Harvests the soybeans. This enables the grower to utilize his ground for two cash crops–corn and soybeans." The machine has 3 sets of bales. "Mr. Pritchard is convinced that his machine can be retailed for $325, and is interested in finding someone who will invest as a partner. He can be reached at Elizabeth City." A photo shows his latest model, pulled by horses.

642. *Plant Disease Reporter* (*USDA*). 1942. Notes on plant diseases in North Carolina in 1941. 26(5):104-13. March 15. See p. 111.
• ***Summary:*** The section titled "Soybeans," by S.G. Lehman (p. 111) states:

"Bacterial pustule (*Bacterium* [*Phytomonas*] *phaseoli sojense*) was present to a greater or less extent in every field examined. In some of the fields marked defoliation of lower and middle portions of the plants occurred. An accurate estimate of the relative proportions of this defoliation due to bacterial pustule and to shading is quite impossible. However, the yellowing of leaves and necrosis of large areas in others well up on the plants and apparently receiving adequate light exposure indicates that a considerable part of the defoliation was due directly or indirectly to the disease.

"Frog-eye (*Cercospora daizu*) was found in but few fields and only in small amounts in these. The varieties commonly grown are not highly susceptible to infection by *C. daizu.*

"Downy mildew (*Peronospora sojae*). Traces were present in nearly all fields examined. As a rule infections were few in number in commercial fields. Certain varieties in variety test plots were heavily infected, the spots being so numerous as to give a yellowish color to leaves." Address: North Carolina.

643. 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.

644. 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.

645. 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.

646. *Soybean Digest.* 1942. He started a new industry from soymeal [I.F. Laucks]. May. p. 6-7.

• ***Summary:*** Large photos show Mr. I.F. Laucks and three plywood hot presses using soybean glue at the Evans Products Co. at Lebanon, Oregon.

"The Soybean Digest is pleased to present this month, Mr. Irving F. Laucks, Seattle, Washington, founder of the Soybean glue industry, the largest non-edible user of soybean oilmeal.

"As a chemist, Mr. Laucks was called upon to test the cargoes of soybean press-cake from Manchuria which used to be unloaded in Seattle in the days just after World War I.

"Convinced that there must be some industrial use for the product, he went ahead and found one, although it took him years of research and more years to sell his idea. "Today, Mr. Laucks and firms which he has licensed turn out some 30,000 tons of soybean glue annually, most of it for use by the plywood industry. Soybean glue has the advantage of being cheaper than starch glues, and water-resistant.

"Laucks also manufactures water-proof resin glues.

"Many difficulties had to be overcome in securing acceptance of soybean glue by the plywood industry. Processing, oil extraction, grinding, and milling methods had to be determined. It was necessary to establish methods of glue formulation.

"At first, little home-produced soy bean oilmeal was available, so it was necessary for Laucks to send chemists to the Orient to secure uniformity of press-cake shipments. By various steps a uniform, dependable output of soybean glue was insured.

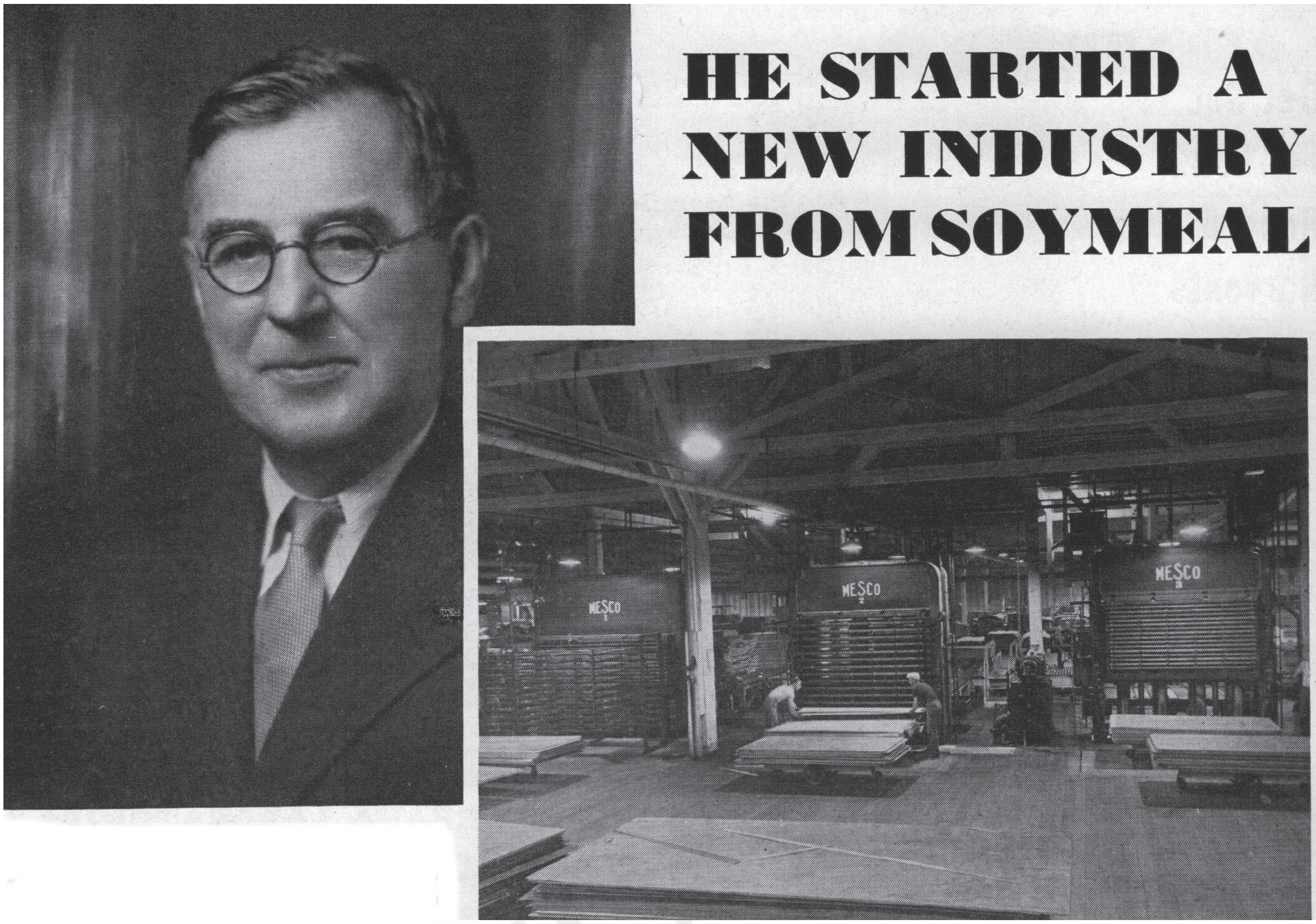
"It was not until 1926 that 'Lauck's bean soup' got its big chance. The plywood industry became desperate in its struggle to keep pace with the demand for automobile running boards for the skyrocketing automotive industry. An abundant supply of water resistant glue was the requisite. Their plywood had to stand being stepped on and to come out of an unexpected shower on a Sunday joy-ride without delaminating.

"A series of competitive demonstrations of water-resistant glues was therefore held–Lauck's bean soup made the grade. In fact, it was so outstanding that within one year every plywood plant on the Pacific coast was using it exclusively. To accomplish this, new types of machines for spreading and handling veneers had to be worked out."

"A few years after soybean glue was solidly established in Pacific coast plywood plants, the Laucks company began shipping it to Eastern gum and birch plywood box plants. This led to the opening shortly thereafter of a soybean glue factory at Bloomington, Illinois, to more conveniently supply these eastern manufacturers.

"In 1932, a plant was started in Portsmouth, Virginia, both to help develop the production of soybeans in the North Carolina district and to provide a regulated supply of soybean meal for the manufacture of the glue in Seattle."

"Related industrial uses for soybean oilmeal were developed by Laucks–paper coating adhesives for washable wallpaper, binders for paints, emulsifiers for fruit sprays, and binders for briquet making. The former was made possible



by Glidden's Alpha Protein.

"Today, at 60, Mr. Laucks confidently and enthusiastically looks forward to the future of the soybean industry."

647. Toole, Eben H. 1942. 2000 years of seed research: What manner of thing is this we sell so glibly? *Seed World* 51(11):92-94, 96, 98. June 5.

• ***Summary:*** An excellent historical overview. Development of the organized study of seed quality is usually credited to F. Knobbe of Saxony (now in Germany) starting in 1869.

In 1876, Dr. E.H. Jenkins of Connecticut became the first person in the United States to take an interest in problems of seed quality; he had recently returned from graduate study in Germany. "Within the next three years, W.J. Beale of Michigan, G.L. Goodale of Massachusetts, and A.R. Ledoux of North Carolina had published on seed testing." During the next 20 years (1880-1900), interest in studying the quality of seed for planting spread to many of the U.S. state agricultural experiment stations and agricultural (Land-Grant) colleges.

In 1894 a "Seed Laboratory" was established in the USDA with Gilbert H. Hicks in charge. Mr. Hicks was a student of W.J. Beal at the Michigan Agricultural College. In 1896 a committee of the Association of American Agricultural Colleges and Experiment Stations was appointed to "devise and adopt a standard form of seed testing apparatus and methods of procedure for use in all American stations."

In Feb. 1897 the work of this committee resulted in the first American rules for seed testing, first published that month as Circular 34, Office of Experiment Stations.

In 1898, upon the death of Mr. Hicks, Dr. A.J. Pieters was placed in charge of the Seed Laboratory. In 1902 Dr. Pieters turned his entire attention to Congressional Seed Distribution; he was replaced as head of the Seed Laboratory by Mr. Edgar Brown. Discusses the work of many other pioneers in the field, with emphasis on USDA's work.

Under the bold title "Germination in greenhouse in 6 days of soybean seed stored for 8 years in different controlled condition" five photos show the germination of Mammoth Yellow and Otootan soybeans in shallow wooden trays. For example the top photo shows four such trays of Mammoth Yellow Soybean seed stored at 8.9% moisture as follows: (1) Front left, stored at 20ºC (68ºF): No seeds have germinated. (2) Front right, stored at 10ºC (50ºF): Most seeds have germinated. (3) Back left, stored at 2ºC (35ºF): Almost all seeds have germinated. (4) Back right, stored at

-10ºC (14ºF): All seeds appear to have germinated and the seedlings are the tallest of those in all the trays.

The next to top photo shows much the same thing except that the seeds were stored at 13-14% moisture, so only the seeds stored at the two coldest temperatures germinated at all. Address: Physiologist, Bureau of Plant Industry, USDA.

648. USDA Bureau of Plant Industry. Div. of Forage Crops and Diseases. 1942. Firms manufacturing or handling soybean food products. Washington, DC. 3 p. July. Mimeographed unpublished manuscript.

• ***Summary:*** The companies are listed alphabetically by state, and within state by city. Numbered codes after each company, keyed to a list of 35 soyfood types in the back, explain which foods are made by each company. Unfortunately, it is not clear from this list which companies are manufacturers and which are "handlers" (retailers or distributors).

California: Arlington (Loma Linda Foods), Berkeley (Golden Gate Food Products Co.), Glendale (Hygenic [Hygienic?] Food Co.), Los Angeles (El Molino Mills, Mrs. Hauser's Soya Foods Co. {4617 Melrose Ave.}, Kevo Co., Klein Soup Co.), San Francisco (Radcliffe Soya Products {146 Fillmore St.}), Santa Cruz (Daglish Health Food Service). Delaware: Milton (Draper Canning Co.). Illinois: Bloomington (Funk Bros. Seed Co.), Chicago (Allied Mills, Armour & Co., Dewey Food Products Inc., Dietetic Supply House, Durkee Famous Foods, Fearn Soya Foods Co. {355 W. Ontario St.}, Glidden Co., Great China Foods Co., Griffith Laboratories {1415 W. 37th St.; handles soy flour and grits}, John F. Jelke Co., Soybean Products Co. {210 N. Carpenter St.}, Swift & Co.), Decatur (Spencer Kellogg and Sons, A.E. Staley Manufacturing Co.), Elgin (B.S. Pearsall Butter Co.), Urbana (Prehn's Health Food Store). Indiana: Columbia City (Oriental Show-You Co.), Decatur (Central Soya Co.), Indianapolis (Standard Margarine Co.). Iowa: Des Moines (Soy Products Co.). Maryland: Baltimore (J.H. Filbert, Inc., The Wm. Schluderberg–T.J. Kurdle Co.), Takoma Park (Hillcrest Health Products Co.). Massachusetts: Boston (Prince Macaroni Co.), Newton Centre (W.L. Cummings & Co.). Michigan: Battle Creek (Battle Creek Food Co.), Detroit (Shedd Products Co.). Minnesota: Minneapolis (Archer-Daniels-Midland Co.). Missouri: Kansas City (Harrow-Taylor Butter Co.), St. Louis (Blanton Co.). New Jersey: Vineland (George A. Mitchell). New York: Brooklyn (Agash Refining Corp., Cosmo Packing Co., Soy-Malt Co. {234-A Marion St.}), Elmhurst, Long Island (American Lecithin Co.), Glandale, Long Island (Beskor, Inc. Note: As of May 1997 there is no place named "Glandale"–or "Glendale"–on Long Island), New York City (Barrett & Eastwood, Borden Company, Enco Chemical Corporation, Franklin Mills Co., National Biscuit Co., Soya Corporation of America {Rockefeller Plaza}, Stein, Hall & Co.), Rochester (Vegetable Products Co.). North Carolina: Asheville (Judd's Health Foods), Lexington (Vitro Nu Foods Corp.). Ohio: Cincinnati (The Churngold Corp., Miami Butterine Co.), Circleville (Winoor Canning Co.), Cleveland (Barton Nut & Candy Co., Pfaffman Egg & Noodle Co.), Columbus (Capital City Products Co.), Greenville (O'Brien Milling Co.), Mount Vernon (International Nutrition Laboratory [Dr. Harry Miller]), Worthington (Special Foods, Inc.). Pennsylvania: Paoli (Great Valley Mills), Philadelphia (J.S. Ivins' Son, Inc., C.F. Simonin & Sons, Tastee Soy Foods), Williamsport (Penna Soya Products Co.). Tennessee: Madison College (Madison Foods). Wisconsin: Hortonville (Fox Valley Canning Co.), Oostburg (Oostburg Canning Co.), Owen (Owen Canning Co.).

The soy food types are: "1. Albumin or protein. 2. Beans–baked. 3. Beans–canned green. 4. Beans–roasted. 5. Breakfast foods. 6. Butter–soy. 7. Candies. 8. Chips or meats. 9. Chocolate. 10. Chocolate and other beverages. 11. Coffee substitute. 12. Crackers, wafers, cookies, puddings, etc. 13. Curd or cheese. 14. Diabetic foods. 15. Flakes. 16. Flavorings. 17. Flour. 18. Flour–prepared. 19. Grits. 20. Health foods. 21. Ice cream powder. 22. Infant foods. 23. Lecithin. 24. Macaroni products. 25. Malted products. 26. Meat-like products. 27. Milk. 28. Molasses–bean. 29. Oil. 30. Puffs. 31. Sauce. 32. Shortening. 33. Soups. 34. Soybeans. 35. Spreads–sandwich. 36. Toast."

Note: This is the earliest document seen (Dec. 2015) that mentions Griffith Laboratories. Address: Washington, DC.

649. Rose Non Pop: New U.S. domestic soybean variety. 1942. Seed color: Yellow (straw), hilum dark brown.

• ***Summary:*** Sources: Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 7. "Rose Non Pop–Farmer selection (North Carolina)."

USDA Production and Marketing Administration [Grain Branch]. 1948. "Soybean varieties: Descriptions, synonyms and names of obsolete or old and seldom grown varieties." Washington, DC. 25 p. Aug. See p. 15. "Rose Non Pop–A non-shattering selection from Mr. W.P. Rose, Goldsboro, North Carolina, apparently from the Haberlandt or Herman variety. Maturity, medium late; pubescence, tawny; flowers, white; pods, two- to three-seeded; shattering, little; seeds, straw yellow with dark brown hilum, about 3,400 to the pound; germ, yellow; oil, 20.4 percent; protein, 41.1 percent; iodine number, 130."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 16-17. Rose Non Pop is in the USDA Germplasm Collection. Maturity group: VI. Year named or released: 1942. Developer or sponsor: W.P. Rose, Goldsboro, North Carolina. Literature: 13, 14. Source and other

information: Selected from 'Haberlandt'. Prior designation: None. Address: USA.

650. *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.

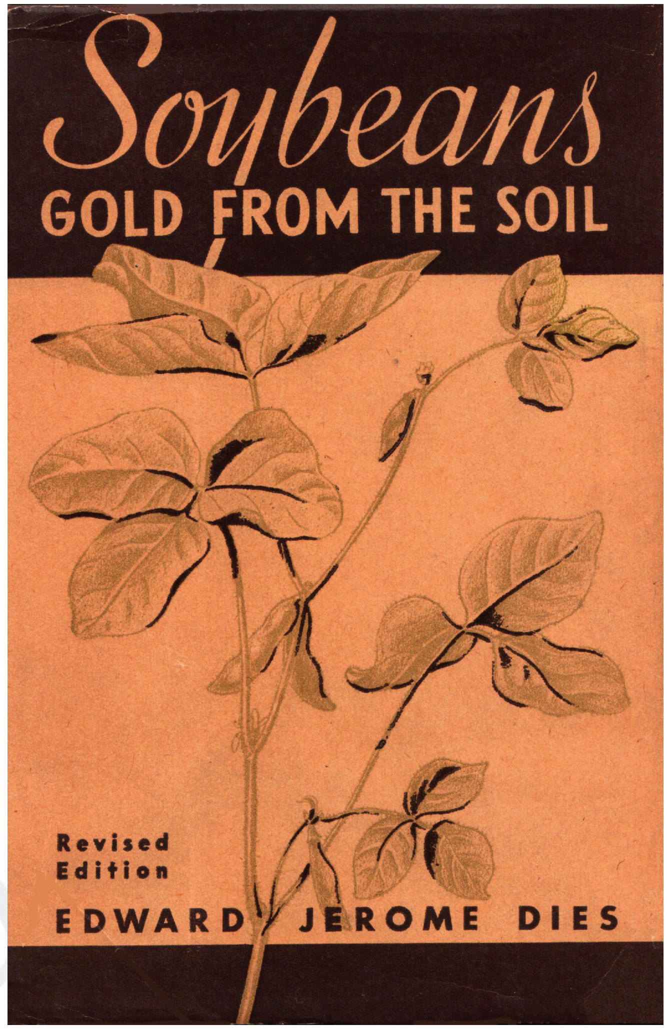
1917–There are now 50,000 acres of soy beans in the USA.

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.

651. 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.



652. Johnson, Howard W.; Koehler, Benjamin. 1943. Soybean diseases and their control. *Farmers' Bulletin* (*USDA*) No. 1937. 24 p. May.
• ***Summary:*** The article is divided into three sections: (1) Leaf, stem, pod, and seed diseases; (2) Root and crown diseases; (3) Control measures. Brief accounts are given of following diseases: (1) Bacterial blight, bacterial pustule, pod and stem blight, frog-eye spots, brown spot, anthracnose, downy mildew, *Alternaria* leaf spot, arsenical injury, mosaic, chlorosis due to deficiencies of potash, iron, and nitrogen, seed discolorations associated with *Cercospora* and *Alternaria* (2) Charcoal rot, sclerotial blight, *Fusarium* blight, root rots, and lightning injury. (3) Control measures include disease resistant varieties, crop rotation, disease-free seed, seed treatment, and exclusion (constant vigilance is needed to prevent introduction of new diseases into the United States).

Concerning seed treatment (p. 23-24): "The results of tests to determine the value of seed treatment with chemical disinfectants in controlling seed-borne diseases of soybeans were reported by the North Carolina Agricultural Experiment Station in 1925 and 1926 and by the Delaware Agricultural Experiment Station in 1929. In North Carolina in 1925 the application of formalin solution, corrosive sublimate solution, and Bayer dust to 2-year-old Mammoth Yellow soybean seed caused no appreciable reduction in the amount of bacterial leaf spot and downy mildew on the resulting plants. Formalin greatly reduced the stand of plants from these 2-year-old seeds, whereas corrosive sublimate and Bayer dust greatly increased the stand as compared with that from untreated seed. These effects on germination were observed again in North Carolina in 1926 with the Mammoth Yellow variety. In all the concentrations used, formaldehyde reduced the germination of the seed very materially, whereas solutions of Semesan and Uspulun, as well as Bayer and

Semesan dusts, increased the percentage of germination. It was concluded from these 2 years' results that formaldehyde should not be used as a disinfecting agent for soybean seeds and that the gain in germination due to the use of organic mercury disinfectants may be sufficient to make soybean seed treatment profitable entirely apart from any benefit accruing from control of seed-borne diseases."

"In 1942 the Oklahoma Agricultural Station reported that treating seeds of Virginia soybeans with Spergon and New Improved Ceresan was effective in preventing seed rots and pre-emergence damping off when the seed was sown in soil naturally infested with *Rhizoctonia solani."*

"Greenhouse tests were conducted at the Illinois Agricultural Experiment Station in 1940 with 23 samples of soybean seed, and Semesan Jr. and Cuprocide as disinfectants, and in 1942 with 13 seed samples, and Barbak C and Spergon as the disinfectants."

"Summarizing, it appears that suitable seed treatment will frequently improve the stand of soybeans, especially when the vitality of the seed is not very high. The use of certain disinfectants seems to be no deterrent to successful inoculation of the seed and subsequent solution."

Contains many photos of soybean diseases on various parts of the plant, including "Nematode root knot on a soybean plant grown in Monetta, South Carolina" (p. 20).

Note: This is the earliest document seen (June 2010) that mentions Spergon, which is a fungicide used in treating seeds, made by United States Rubber Co., Naugatuck Chemical Division. Address: 1. Div. of Forage Crops and Diseases, Bureau of Plant Industry; 2. Chief in Crop Pathology, Illinois Agric. Exp. Station.

653. Swingle, Walter T. 1943. Trees and plants we owe to China. *Asia and the Americas* 43:295-99. May.
• ***Summary:*** See Swingle 1942, "Our Agricultural Debt to Asia." Address: Div. of Plant Exploration and Introduction, USDA.

654. *Manzanar Free Press* (*Manzanar Internment Camp, California*). 1943. Reporters learn process in tofu making tedious. 4(12):4. Oct. 16.
• ***Summary:*** "Overcome by curiosity, three members of the Free Press staff recently visited the tofu factory at 1-20 to obtain first-hand information on tofu manufacturing."

The two supervisors explained that approximately 450 tofu cakes are being made daily by the eight split-shift workers who begin work as early as 5 a.m. Each cake is 3½ by 3½ by 3 inches. "Approximately 22 pounds of Virginia or Carolina grown soy beans are used daily."

The seven basic steps in the process are described. The soybeans are soaked, then finely ground in a grinder. This material is "put in a copper kettle measuring about 42 inches in diameter and about 22 inches deep and boiled in a 200 degree F. mixture" of water, lime, and oil for about one-half hour and stirred constantly. [After filtering] the hot liquid "is placed in a settling tank and mixed with brine. In about 15 to 20 minutes the mixture is ready to be poured into a form box where cloth has been applied and the water is forced out by pressure. After 20 to 25 minutes, the bean curds harden and are cut into squares and placed in cool water tanks, ready for mess hall distribution."

The food value [nutritional value] of tofu is given.

655. Lehman, Samuel G. 1943. Occurrence of yeast spot on soybean in North Carolina. *Plant Disease Reporter* (*USDA*) 27(22):602. Nov. 1.
• ***Summary:*** "While examining soybean pods in August, September, and October of the present year (1943) a considerable number of developing seeds were found with [yellowish to brown] discolorations or greater or less prominence." Ascospores of a yeast-like fungus were found by direct microscopic examination. "This yeast-like fungus belongs to the genus *Nematospora* and probably is the species *Nematospora phaseoli,* described by Wingard in 1922..." Address: Univ. of North Carolina.

656. 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."

657. U.S. Regional Soybean Laboratory. 1944. Southern States Soybean Planning Conference, U.S. Regional Soybean Laboratory, Stoneville, Mississippi, February 29 to March 3, 1944. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 112. [March.] 14 p.
• ***Summary:*** "The following persons representing eleven of the twelve states in the southern region; the U.S. Regional Soybean Laboratory, Urbana, Illinois; the Division of Forage Crops and Diseases; and the Agricultural Research Administration attended this conference:

"O.S. Aamodt, Beltsville, Maryland

"H.W. Marston, Washington, D.C.

"J.L. Cartter, Urbana, Illinois

"L.F. Williams, Urbana, Illinois

"W.B. Allington, Urbana, Illinois

"R.T. Milner, Peoria, Illinois.

"J.E. Adams, Stoneville, Mississippi

"P.W. Gull, Stoneville, Mississippi

"P.R. Henson, Stoneville, Mississippi

"R.B. Carr, Stoneville, Mississippi

"Clay Lyle, State College, Mississippi

"J.F. O'Kelly, State College, Mississippi

"T.F. Akers, West Point, Mississippi

"H.A. York, Raymoud, Mississippi

"H.R. Albrecht, Auburn, Alabama

"C.K. McClelland, Fayetteville, Arkansas

"C.R. Adair, Stuttgart, Arkansas

"G.E. Ritchey, Gainesville, Florida

"U.R. Gore, Experiment, Georgia

"J.L. Weimer, Experiment, Georgia

"J.L. Stevens, Tifton, Georgia

"J.P. Gray, Baton Rouge, Louisiana

"J.A. Bigney, Raleigh, North Carolina

"E.E. Hartwig, Raleigh, North Carolina

"H.W. Staten, Stillwater, Oklahoma

"W.R. Paden, Clemson, South Carolina

"J.B. Washko, Knoxville, Tennessee

"K.F. Manke, College Station, Texas

"First Session: 2:30 p.m., February 29

"Dr. J.E. Adams conducted a tour of the Delta Experiment Station.

"Second Session: 8:30 a.m., March 1 at Hotel Greenville, Greenville, Mississippi. Dr. J.E. Adams, chairman

"This was a joint meeting with county agents and planters from the Delta section of Mississippi.

"1. Dr. J.E. Adams: Reviewed the history and development of the Delta Experiment Station, Stoneville, Mississippi, and outlined the scope of the experimental work being conducted at that Station.

"2. H.W. Marston: Outlined the work being conducted at the nine U.S. Regional Laboratories and the legislation that made these possible.

"Funds were made available by the Bankhead-Jones act which was passed June 29, 1935.

"The nine regional laboratories are;

"a. U.S. Regional Vegetable Laboratory, Charleston, South Carolina

"b. U.S. Regional Pasture Laboratory, State College, Pennsylvania

"c. U.S. Regional Soybean Laboratory, Urbana, Illinois

"d. U.S. Regional Swine Laboratory, Ames, Iowa

"e. U.S. Regional Sheep Laboratory, Dubois, Idaho

"f. U.S. Regional Animal Disease Laboratory, Auburn, Alabama

"g. "U.S. Regional Poultry Laboratory, East Lansing, Michigan

"h. U.S. Regional Salinity Laboratory, Riverside, California

"i. U.S. Regional Plant, Soil, and Nutrition Laboratory, Ithaca, New York

"3. Dr. O.S. Aamodt: Outlined the organization of the U.S. Department of Agriculture.

"a. Extension

"b. Agencies such as AAA and SCS that give advice and financial assistant to farmers.

"c. Research: The research work or the Department is carried on in cooperation with the state experiment stations in order to avoid duplication of efforts. This also makes it possible to carry on fundamental regional investigations that would not be possible for the state experiment stations to do when working as single units.

"4. J.L. Cartter: The work done by the U.S. Regional Soybean Laboratory in the North Central states was reviewed and a summary of the work was presented. It was pointed out that this program had been expanded to include the twelve states in the southern region so that we now have a real cooperative organization for the entire soybean production area. 5. P.R. Henson: The southern region was defined and the cooperators from each state were introduced. Virginia was not represented. Ninety-two variety tests were grown in 1943. Seventy-seven of these were completed and fifteen were lost because of dry weather, diseases, insects, livestock damage, or lack of labor to harvest. Five dates of planting tests were conducted.

"A short time was given over to a discussion of the problems in soybean production in the Delta section of Mississippi. This was entered into by the farmers and county agents of that section. Most of the farmers seemed to want

a variety that was early in maturity, non-shattering, and produced good quality beans, with a high oil content.

"Third Session: 1:30 p.m. March 1, Stoneville, Mississippi. Mr. H.W. Staten, chairman

"Reports on the results of previous investigations and needs for the future were given by the representatives of the experiment stations in the southern region.

"1. Alabama Experiment Station, Auburn. H.R. Albrecht Drought, diseases, and insects were serious at most locations in Alabama. *Sclerotium rolfsii,* mildew, pod and stem blight, Cercospora, and nematodes caused injury at several locations. The need for breeding work to develop resistant varieties was pointed out. A breeding program to develop hay type varieties is underway. In this project selections are being made from introductions from the U.S. Department of Agriculture.

"2. Arkansas Experiment Station, Fayetteville, C.K. McClelland; Stuttgart, C.R. Adair.

"The history of soybean production in Arkansas was mentioned briefly. The crop was first grown in the State about 1921. In 1945 it was grown on 267,000 acres.

"In 1943 there was normal to excessive rainfall in the early summer which was followed by a serious drought in mid and late summer. Probably because of the drought in July and August no disease was serious. There was very little insect damage except caterpillar damage to the late varieties at Stuttgart.

"Based on needs of growers the breeding program should seek to produce:

"a. A short season variety that can be used to precede or follow fall sown small grains

"b. An edible variety that can be produced on a field scale

"c. A hay variety that will produce high yield of beans for grain

"d. A high yielding, medium maturing, high oil content variety

"3. Florida Experiment Station, Gainesville. G.E. Ritchey

"Most varieties produce good forage yields but produce very low seed yields although the plants set pods. Plants that were covered with cheese cloth produced a good crop of seed but plants shaded in a lath shed did not set any more seed than plants in the open. The non-setting of seed did not appear to be caused directly by insects although it was suggested that it might be caused by a virus or bacterial disease that was transmitted by insects. It was also suggested that the soybeans were planted too early although one introduction from the U.S. Department of Agriculture produced a good yield when planted April 15 and vegetable varieties grown in gardens set seed.

"The velvet bean caterpillar caused serious damage; Tennessee Non-Pop was the most resistant to that insect.

"4. Georgia Experiment Station, Experiment. U.R. Gore

"Low yield caused by late summer drought, poorly adapted varieties, insects (velvet bean caterpillar), disease (root rot), and shattering.

"Most of acreage devoted to hay varieties.

"A new hay variety, Gatan, which was selected from Otootan is being increased.

"The breeding program includes work on seed, hay, and edible varieties. At this time the best varieties are: seed–Ogden; hay–Gatan; and edible–Seminole.

"Tifton–J.L. Stephens

"The uniform groups were grown at five locations. The variety-station interaction was high which indicates that none of the varieties now available are widely adapted in south Georgia. The demand in that section is for a dual purpose–high seed and hay production-variety.

"One of the serious problems is 'rust' which might be a potash deficiency.

"5. Louisiana Experiment Station, Baton Rouge. J.P. Gray

"The need in Louisiana is for a forage type variety that will control the weed growth and produce a high yield of seed. Varieties that mature in midsummer are not reliable in yield and the seed produced is of low quality and viability. Early varieties sown after fall grains usually make high yields which suggests the need for further date of planting experiments.

"Mr. Gray suggested that the factors used for designating lodging were not suitable for viny forage type varieties." Continued. Address: U.S. Regional Soybean Industrial Products Lab., Urbana, Illinois.

658. 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 II). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 112. [March.] 14 p.

• ***Summary:*** (Continued): "6. North Carolina Experiment Station, Raleigh. J.A. Rigney

"Nutritional deficiencies were observed at several locations. At Rockymont none of the varieties produced a significant yield of seed although there were differential varietal responses. Deficiencies were also noted at other locations. The Soils Department of the North Carolina Experiment Station plans to carry on comprehensive fertilizer studies with soybeans in 1944. Demonstration plots of a few fertilizer treatments will also be grown adjacent to the experimental plots.

"Dry and hot weather prevailed at Raleigh in 1943 so the nurseries were not harvested. *Sclerotium rolfsii* was severe at one location and a differential varietal response was observed. Fusarium wilt was severe at another location. Nematodes caused damage at one location. Palmetto appeared to be resistant so it will be included in the

hybridization program.

"The breeding program was started in 1941. Selections from introductions have been made and also a hybridization program has been started.

"7. Oklahoma Experiment Station, Stillwater. H.W. Staten

"Excessive rainfall in May (23 inches) followed by a drought in midsummer caused yields to be low in 1943. Group IV grown in the northeastern part of the state and Group V in the east central and central part. No soybeans grown in the western part of the state because of the low rainfall and rodents.

"Soybeans formerly grown for forage but farmers are now interested in growing them for seed production in the eastern part of the state. Most farmers plant soybeans on their poorer soils. An effort is being made to have some of the better soils used for the production of this crop.

"Favorable harvesting conditions usually prevail in September and October so a variety of Arksoy type maturity is about right.

"Blister beetles are usually the most serious insect pest. Bacterial pustule and pod and stem blight were the most serious diseases in 1943.

"Information on date of planting, varieties, and fertilizers are needed.

"Drought and hot dry weather may occur any place in the state although an average rainfall is higher in the eastern than in the western part of the state. It is thought that low humidity at flowering time is detrimental to seed setting.

"8. South Carolina Experiment Station, Clemson. W.R. Paden

"The yields have been very low in South Carolina. In the past most of the interest has been in forage varieties. The leading variety has been Otootan with Red Tanner becoming more prominent.

"The cooperative project has stimulated interest in soybeans at Clemson. Groups V and VI were grown in 1943. An early frost damaged the late varieties. Varieties of Ogden to Volstate maturity were best. Boone, Macoupin, and S100 were too early. The Clemson variety shatters too badly for seed production. There is a need for a non-shattering variety of the Clemson type.

"Florence and Monetta. E.E. Hartwig

"Drought and velvet bean caterpillar were serious in the Florence area. The late varieties suffered most from the drought. Volstate is being promoted by the Coker's Pedigreed Seed Company, Hartsville, South Carolina.

"Groups V and VI were grown at Monetta and the variety, Monetta, looked good there.

"9. Tennessee Experiment Station, Knoxville. J.B. Washko

"West Tennessee may be the best situated for soybean production because of the proximity of oil mills.

"In 1943 there was a drought in the western part of the state but normal rainfall was obtained at Knoxville.

"Ogden and Volstate best varieties. Tennessee Non-Pop also good but it has been dropped from certification because of lack of uniformity. It was suggested that desirable uniform types might be obtained from that variety by selection.

"Non-shattering Ogden types should be obtained. Rate of planting, Ogden variety, 1943 (2½ ft. spacing)

rate (lbs/A); yield (bu/A)

"10 21.3

"20 23.6 3.0 bu/A for sig. diff.

"30 25.7

"40 28.0

"50 25.5

"Row spacing, Ogden variety, 1943 (rate of planting: 30 lbs/A)

"spacing (ft.); yield (bu/A)

"2½ 14.6

"3 18.0 3.1 bu/A for sig. diff.

"3½ 16.3

"drilled (7-inch rows) 14.4 10. Texas Experiment Station, College Station. K.F. Manke The coastal and eastern parts of the state are not adapted to soybean production because of high humidity. The central 'black-lands' section cannot produce soybeans because of root rot. Production is limited to the western and northern irrigated sections. The Rio Grande section is not important as a soybean producing area because of competition with other crops. It has been observed that low humidity is not harmful to seed setting if ample soil moisture is provided by irrigation.

"Insects and rodents usually cause some damage in western area.

"Soybeans are sometimes planted in Rio Grange section about September 15. When planted at that time, all the varieties matured in 85 to 95 days.

"A system of planting nurseries by using a two-row planter and dropping by hand was described.

"Dr. R.T. Milner of the Northern Regional Research Laboratory, Peoria, Illinois, gave an illustrated lecture on 'Interesting War-Time Developments at the Northern Regional Research Laboratory.'

"Fourth Session: 8:30 a.m., March 2, Stoneville, Mississippi

"J.L. Cartter, chairman

"Discussion of soybean diseases

"W.B. Allington, U.S. Regional Soybean Laboratory:

"Most important diseases in the South are:

"a. Pod and stem blight (*Diaporthe sojae*)

"This disease caused by a weak parasite. Any unfavorable environmental condition may predispose the plant to infection. The causal fungus is saprophytic [lives on dead or decaying organic matter] so it cannot readily be controlled by crop rotation. It is most severe on lighter soils. Arksoy strains are susceptible.

"b. Southern root rot (*Sclerotium rolfsii*)

"This disease is widespread and causes much damage.

"c. Charcoal rot (*Sclerotium bataticola*)

"Other soybean diseases are:

"a. Anthracnose (*Glomerella glycenes*)

"Symptoms may be similar to pod and stem blight but the picnidia are not usually in a definite pattern.

"b. Nematodes (*Heterodera marioni*)

"Cause serious damage in some locations in the southeast. There seems to be differences in varietal reaction.

"c. Downy mildew (*Peronospora manshurica*)

"The amount of damage is difficult to determine. Some varieties have only a flecking and the lesions do not develop.

"d. Bacterial leaf spots

"(1) Blight (*Pseudomonas glycinea*)

"(2) Pustule (*Xanthomonas phaseoli* var. *sojense*)

"There are probably two other bacterial leaf spots also which make it extremely difficult to know which of the four diseases are being dealt with in any particular case and so to determine varietal response.

"e. Frog-eye (*Cercospora daizu*)

"There is differential varietal response to this fungus. Otootan is very susceptible.

"f. Mosaic

"Symptoms appear early but the plant seems to overcome the diseased condition and produces normal seeds.

"g. Purple spot on seeds (*Cercospora* sp)

"Experiment conducted in Illinois in 19S3 to study effect of this disease on the succeeding crop. It did not reduce the yield but there were more infected seed on plants from diseased seed than there were on plants from healthy seed.

"h. Bud blight (virus) Infection of the plant in early stages kills terminal bud. The axillary buds may then develop and produce a dwarfed, branched plant. When pods are infected early, no seeds are developed and the pods turn brown and drop off. If the pods are infected late, they produce seeds and the seeds are normal in appearance except for size. A 50 percent infection in the field was estimated to cause 25 percent reduction in yield. This disease may not be present in the South.

"There are two strains of the virus. These are indistinguishable in the field but they can be separated in the greenhouse.

"i. Wildfire (bacterial) This disease is new on soybeans but potentially it is the most serious disease.

"General considerations in the disease program

"a. Because of the naturally spotted occurrence of many diseases in the field, care should be exercised and a variety studied under a wide range of conditions before concluding that it is resistant.

"b. Nurseries should be conducted in areas where diseases are known to occur so that the varietal reaction can be determined.

"c. Seed treatment experiments should be undertaken."

Address: U.S. Regional Soybean Industrial Products Lab., Urbana, Illinois.

659. 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.

660. 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 IV). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 112. [March.] 14 p.

• ***Summary:*** (Continued):

"7:30 p.m., March 2, Stoneville, Mississippi

"L.F. Williams, chairman

"Discussion of breeding methods and maintaining pure seed stocks

"1. Maintaining stocks of pure seed

"Mr. O'Kelly explained a system that he had used to develop pure line strains from the Ogden and Volstate varieties.

"Dr. Aamodt suggested that a large number of plant rows be grown. The off type rows could be discarded or at least kept separate, and the typical rows could either be bulked together or they could be planted in larger plots the next year and then bulk the lines that were alike. The advantage of keeping the lines separate through the second year is that there is an opportunity to check the lines again and make sure that no off type lines were included. This system is essentially the one followed by Mr. O'Kelly. Varieties were assigned to most experiment stations represented at the Conference, and it was suggested that as soon as possible (the plants could be collected in 1941) that this system be used to develop pure seed stocks.

"Ogden and Volstate are the only varieties in the South that have been purified by this method. Dr. Williams suggested that if there are different lines of any of the southern varieties, they should all be grown at the same station to determine if they are the same or not and to save the best one.

"2. Methods of handling hybrid material

"At the North Carolina Experiment Station plants are selected from the F2 population and grown in plant rows in F3. F3 lines that seem to be of the desired type that are reasonably uniform in plant type are harvested and planted in a yield test in F4.

"Dr. Williams mentioned that at the Iowa Experiment Station a yield test is conducted in F3 by spacing the F2 plants far apart in the row.

"The backcross method is being used by Dr. Williams and also in North Carolina. The crosses listed below were made by Dr. Williams in 1943. Anyone wishing to have the Laboratory use these to make backcrosses should notify Dr. Williams. The crosses are:

"Female Parent, Male Parent, Number of seeds

"Lincoln x Biloxi, 22 seeds

"Lincoln x Ogden, 5

"Lincoln x Mammoth Yellow, 6

"Lincoln x Herman, 11

"Lincoln x Edsoy, 13

"Lincoln x Ralsoy, 15

"Macoupin x Ogden, 6

"Macoupin x Herman, 6

"Ralsoy x Lincoln, 8

"Ralsoy x Edsoy,

"Ralsoy x 89775A, 1

"Ralsoy x Ogden, 12

"Ralsoy x Herman,

"Ogden x Edsoy, 7
"Ogden x Biloxi, 10
"Mammoth Yellow x Ogden, 7
"Missoy x Ogden, 14
"Biloxi x Ogden, 13
"Nanda x 81044, 9
"Nanda x Edsoy, 12
"Nanda x Seminole, 5
"Nanda x Rokusun, 2
"Seminole x Rokusun, 1

"In 1943 a number of F2 populations and F3 lines were grown at the Delta and North Carolina Experiment Stations. These were harvested and grouped according to maturity dates. It was suggested that Mr. Henson send lists of all of this material to the collaborators in the southern states so they could request the material they thought suitable for their area.

"Sixth Session: 8:30 a.m., March 3, Stoneville, Mississippi

"P.R. Henson, chairman

"1. General agronomic problems with soybeans in the southern states

"J.F. O'Kelly:

"a. Problems to be considered in soybean projects in the South

"(1) Cropping and fertilizer studies to raise level of fertility of soils used for soybean production

"(2) Weed control should be cooperative project between agronomists and agricultural engineers

"(3) Disease studies

"(4) Storage

"(5) Development of improved seed stocks

"(6) Utilization–determine best varieties for sprouting and canning

"b. Discussion

"The relationship between germination and seed coat color and retention of viability was brought up. Mr. Cartter mentioned that there was some data on this that could be obtained from the U.S.D.A. Seed Laboratory in Washington and mimeographed for distribution.

"2. Discussion of date of planting tests and suggestions for 1944 The need for data on date of planting seemed to be general, but there was a difference of opinions on the method to use in obtaining those data. It was finally agreed to select several varieties then each station could select four varieties from that list. The varieties selected wore: Macoupin, S100, Arksoy, Ogden, Palmetto, Volstate, and Acadian. Each collaborator was to let Mr. Henson know how many tests he would grow and which varieties would be included.

"3. Administrative problems: J.L. Cartter

"4. General discussion.

"Motion by Mr. Manko, seconded by Dr. Aamodt, and passed unanimously that the Conference go on record as appreciating the fine cooperation of the Delta Experiment Station throughout the Planning Conference.

"Dr. Adams expressed his appreciation in having the Conference at the Delta Experiment Station.

"C.R. Adair, Secretary of Conference

"February 29 to March 3, 1944

"RSLM 112" Address: U.S. Regional Soybean Industrial Products Lab., Urbana, Illinois.

661. Moore, R.P.; Rigney, J.A.; Middleton, G.K.; Bennett, L.S. 1944. Official variety tests–1943: corn, soybeans, cotton, wheat, oats, barley. *North Carolina Agricultural Experiment Station, Bulletin* No. 343. 50 p. May.
• ***Summary:*** The section on soybeans (p. 40-50) discusses yields at 6 locations, varietal characteristics, and yields–two year average. A map (p. 6) shows the three regions (Coastal Plain, Piedmont, and Mountains) into which North Carolina is divided, and the sites in each region where soybeans were tested: McCullers, Wenona, Trenton, Willard, and Statesville.

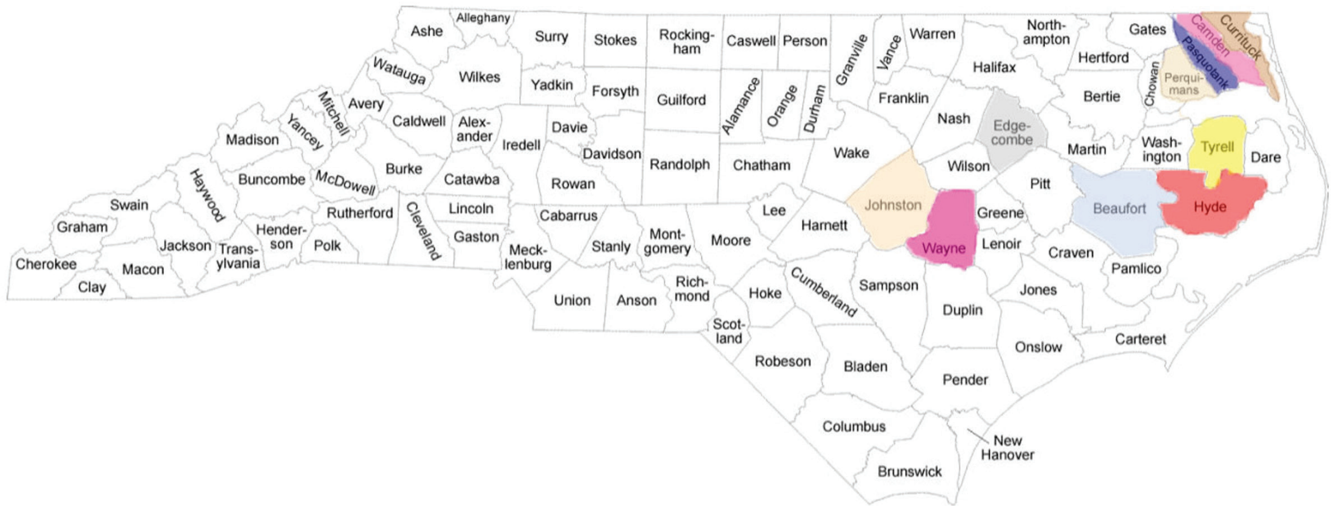
Table 48 (p. 49) shows the yield of each variety at each site in 1943. Table 49 gives the characteristics of the following soybean varieties: Ogden, Volstate, Arksoy, Woods Yellow, Herman, Tokio, Mammoth Yellow, C.N.S., and Clemson.

Table 50 shows the soybean performance test average for 1942 and 1943, for 6 varieties at 6 sites and average for each variety.

662. *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.

663. USDA Bureau of Agricultural Economics, Crop Reporting Board. 1944. Soybeans harvested for beans: acreage, yield and production 1940-1943. By counties for 15 principal states. Washington, DC: 57 p.

• ***Summary:*** On the cover we read: "The Crop Reporting Board has assembled the following estimates of acreage, yield, and production of soybeans harvested for beans for the years 1940, 1941, 1942, and 1943, in 15 soybean producing States. Estimates for 1943 are preliminary. These county estimates are a breakdown of the official State estimates and were prepared by the Agricultural Statisticians in the 15 States mentioned. Soybean production is estimated in 30 States. However, 1943 production in the 15 States shown in this report represents about 98 percent of the United States production. Kentucky. and Tennessee each produce close to a million bushels of soybeans at present although county estimates are not shown for these States.

The states are; Illinois, Iowa, Ohio, Indiana, Missouri, Arkansas, Kansas, North Carolina, Mississippi, Michigan, Virginia, Wisconsin, Delaware, and Maryland.

Page 23: North Carolina: Soybeans harvested for beans, 1945 and 1946. In North Carolina there are eight districts in which soybeans were grown in 1946. In descending order of production they are:

District 3: 1,393,680 bushels
District 6: 867,190 bushels
District 9: 353,380 bushels
District 2: 69,450 bushels
District 5: 67,240 bushels
District 4: 43,340 bushels
District 8: 39,940 bushels
District 1: 27,780 bushels

Counties in North Carolina producing more than 100,000 bushels in 1946 are in the northeastern part of the state (see map, above):

Pasquotank 278,660 bushels
Camden 238,000 bushels
Perquimans 198,800 bushels
Beaufort 191,860 bushels
Currituck 169,000 bushels

Johnston 158,070 bushels
Hyde 154,020 bushels
Wayne 141,750
Edgecombe 119,430 bushels
Tyrrell 10,980 bushels

664. Atkinson, R.E. 1944. Diseases on soybean in North Carolina. *Plant Disease Reporter* (*USDA*) 28(21):687. July 15.
• ***Summary:*** "Dry weather in the Piedmont has been hard on soybeans, but has probably kept leaf diseases at a minimum this season. However, bacterial blight [*Pseudomonas glycinea*], frogeye [*Cercospora sojina*], downy mildew [*Peronospora manshurica*], and mosaic (virus) were found. They are not of economic importance at this time. A marginal leaf spot on which a *Phyllosticta* sp. was fruiting was observed on the lower leaves in one field." Address: Emergency Plant Disease Prevention Project.

665. 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
"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

U. S. REGIONAL SOYBEAN LABORATORY
Urbana, Illinois

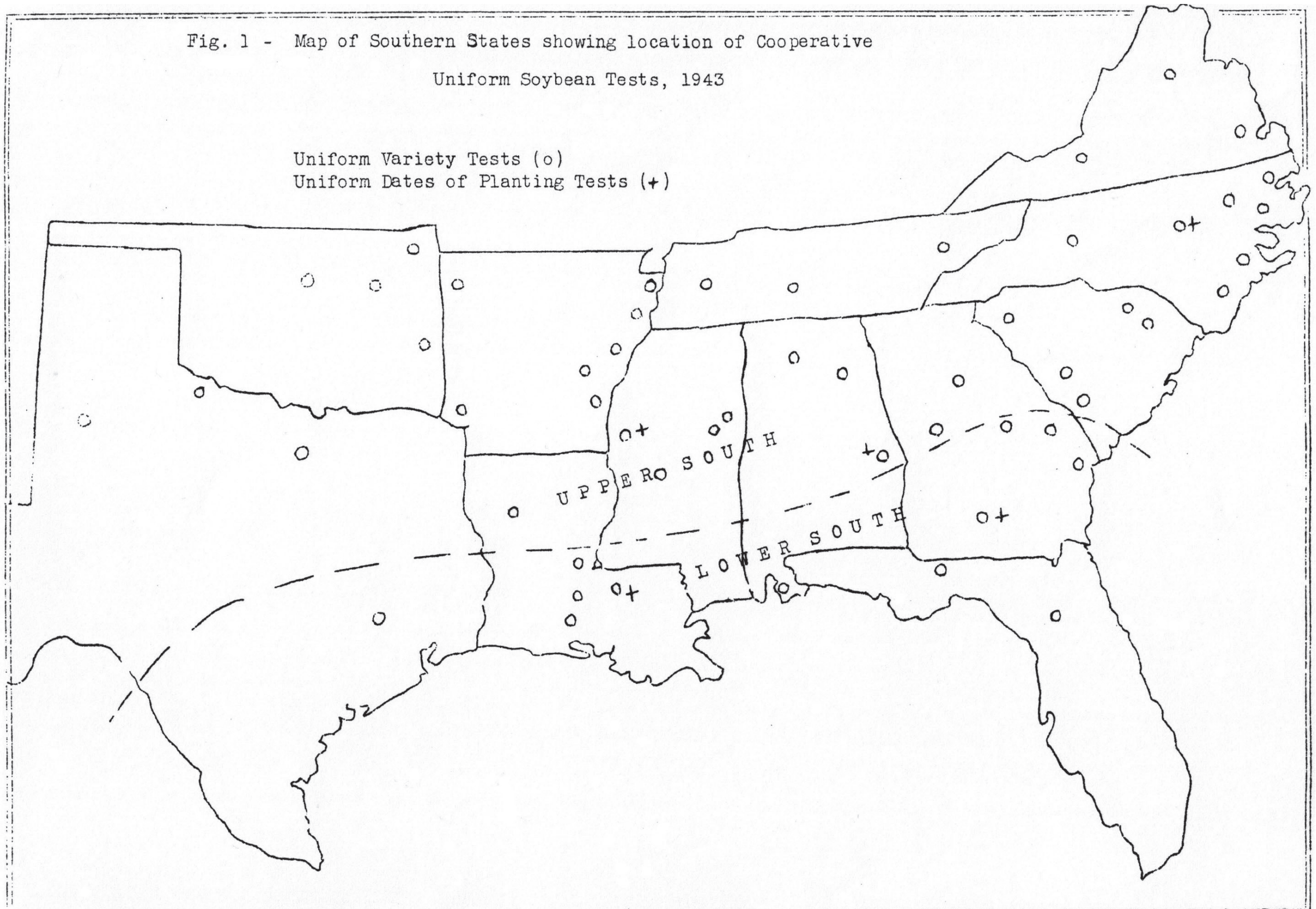
RESULTS OF THE COOPERATIVE UNIFORM
SOYBEAN TESTS, 1943

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



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.

666. Probst, A.H.; Cutler, G.H. 1944. Lincoln: A new mid-season variety of soybean well adapted for central Indiana. *Indiana* (*Purdue*) *Agricultural College, Agronomy Mimeo* No. 42. Aug. 5 p.

• ***Summary:*** "Lincoln is the most promising mid-season variety of soybean released to date.

"Origin: The Lincoln soybean variety is a selection from a natural cross, probably between a white-flowered Mandarin plant and Manchu, made in 1934, by Dr. C.M. Woodworth, Chief in Plant Genetics, Illinois Agricultural Experiment Station. The final selection, L6-685, was made by Dr. L.F. Williams, Associate Agronomist, U.S. Regional Soybean Laboratory*, Bureau of Plant Industry, Soils, and Agricultural Engineering, United States Department of Agriculture, cooperating with the Illinois Agricultural Experiment Station in soybean breeding.

"Description: The Lincoln soybean resembles the Mandell variety in appearance, height, standing ability, time of maturity, and in most other respects except that it is higher yielding, produces seed of much higher oil content, and has white flowers instead of purple. The white flowers distinguish it from all other varieties with brown pubescence

now grown in Indiana. Lincoln is intermediate in height between Dunfield and Illini. It lodges less than either of these two varieties, but is not as stiff-stemmed as Richland.

"The seed is yellow with a prominent black hilum, medium in size (3,000 per pound), about the same size as Mandell, slightly larger than Illini (3,200 per pound), and slightly smaller than Dunfield (2,750 per pound), and Richland (2,800 per pound). Three seeds to the pod predominate when grown on fertile soil.

"Cooperative Tests in Indiana: The U.S. Regional Soybean Laboratory has cooperated in the testing of soybean varieties at eight different locations representing different soil and climatic conditions in Indiana. Lincoln has been included from one to four years at all locations and the yield, chemical composition, and maturity results as compared to several other varieties of soybeans are given in Tables 1, 2, and 3.

Footnote: * A cooperative organization participated in by the Bureau of Plant Industry Soils, and Agricultural Engineering, Agricultural Research Administration of the U.S. Department of Agriculture and the Agricultural Experiment Stations of 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.

On page 3 are 2 tables: (1) "A Comparison of Yield, Maturity, and Chemical Composition of Lincoln and Several Other Varieties of Soybeans Grown at Four Locations in Northern and North Central Indiana." The other varieties are: Early: Earlyana, Richland. Mid-season: Dunfield, Illini, Lincoln. The four locations are LaGrange, Wanatah, Bluffton, Lafayette. The chemical composition gives (in all tables) the percentage of oil, percentage of oil, and iodine number of the oil.

(2) "A Comparison of Yield, Maturity, and Chemical Composition of Lincoln and Several Other Varieties of Soybeans Grown at Three Locations in Central and Southeastern Indiana." The other varieties are: Mid-season: Dunfield, Illini, Lincoln. Late: Patoka, Chief. The three locations are Lafayette, Greenfield, Vernon.

Page 4: The top half contains a third table and the bottom half more text: (3) "A Comparison of Yield, Maturity, and Chemical Composition of Lincoln and Several Other Varieties of Soybeans Grown at Two Locations in Southwestern Indiana." The other varieties were: Mid-season: Illini, Lincoln. Late: Patoka, Chief, Gibson, Kingwa.

"Adaptation: The Lincoln variety of soybean is well suited to the same conditions under which other varieties of the same maturity group, such as Dunfield, Mandell, Manchu, and Mingo, are grown in Indiana, and might well replace these varieties in this state because of its high yield, good standing ability, and high oil content. It is best adapted in central Indiana. Lincoln should be used only for early planting in northern Indiana and for medium-late planting south of U.S. Highway 50, because of its time of maturity. Earlyana, Richland, Patoka, Gibson, and Chief, are expected to continue to fill the conditions of their Special adaptation for which they have been recommended.

"Seed Quality: Lincoln has equalled or excelled Illini and Dunfield in seed quality in central and northern Indiana. It has produced seed of a poorer quality than Gibson or Chief, when planted in May in southwestern Indiana in 1942 and 1943, but has about equalled the seed quality of Illini in this area of the state. Date of planting studies at Evansville indicate that fairly good seed quality is obtained with Illini when planted after the first week of June. Similar results may be expected with Lincoln.

"Cooperative Regional Tests: Lincoln has been widely tested throughout the soybean belt in 95 cooperative tests between the U.S. Regional Soybean Laboratory and the Illinois, Ohio, Iowa, Missouri, Nebraska, Michigan, Wisconsin, Virginia, and Purdue Agricultural Experiment Stations. The tests were conducted in Illinois in 1938: Illinois and Ohio in 1939: Illinois, Ohio, Iowa, and Indiana, in 1940 and 1941: Illinois, Ohio, Iowa, Indiana, Missouri, and Nebraska, in 1942: and in Illinois, Ohio, Iowa, Missouri, Nebraska, Michigan, Wisconsin, Virginia, and Indiana, in 1943. The results of these tests are presented in Table 4.

Page 5 contains two tables plus text. Table (4): "Summary of Yield and Chemical Data for Lincoln, Illini, and Dunfield Soybeans Grown in Regional Tests in Indiana, Illinois, Ohio, Iowa, Missouri, Nebraska, Wisconsin, Michigan, and Virginia, 1938-1943."

"Lincoln has exceeded the average yield of Dunfield and Illini in each of the individual years and has averaged 5.2 bushels, or 18.6 per cent. higher than these varieties for the six-year period. It likewise has had better quality seed and has lodged less than either of these varieties. The oil content has been high, even exceeding Dunfield, a variety noted for its high oil content. In these tests, Lincoln has matured about one and one-half days earlier than Illini and about the same as Dunfield.

"Lincoln Excels Mandell in Grain Yield and Oil Content: In 31 of the cooperative regional tests conducted in the states indicated above during the three-year period 1940-1942, Lincoln averaged 34.2 bushels per acre and 21.4 per cent oil in comparison to Mandell which averaged 28.3 bushels per acre and only 19.1 per cent oil.

"Hay Yields: Hay yield tests were made at Lafayette, Indiana, by R.R. Mulvey, Associate in Crops in Agronomy, Purdue University, and are presented in

Table 5: "Yield of Hay of Lincoln and Several Other Varieties of Soybeans Grown at the Soils and Crops Farm, Lafayette, Indiana, 1942-1943." The varieties are: Early: Earlyana. Mid-season: Lincoln, Dunfield. Late: Gibson, Patoka. Gibson had the highest hay yield at 2.82 tons/acre compared with Lincoln at 2.68.

"Lincoln Soybean Seed Available for 1945: Approximately 5,600 acres were planted with the Lincoln soybean in 1944 in 75 Indiana counties by some 300 growers who agreed to have the seed certified and make it available for planting in 1945. Since Lincoln growers are located in all the important soybean-growing counties in the state, a supply of seed should be available locally. The names of local growers may be obtained from the county agent: or seed sources secured by writing to the Indiana Corn Growers' Association, West Lafayette, Indiana." Address: 1. Assoc. Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA; 2. Assistant Chief in Agronomy, Purdue Univ. Agric. Exp. Station [West Lafayette, Indiana].

667. Cartter, J.L. 1944. What is the U.S. Regional Soybean Laboratory doing? *Soybean Digest.* Sept. p. 22, 62.
• ***Summary:*** Editor's introduction: "Report of the work of the last 8 years of this Laboratory, which is a cooperative organization participated in by the Bureau of Plant Industry, Soils and Agricultural Engineering, U.S. Department of Agriculture, and the agricultural experiment stations of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia. The author is senior agronomist of the Laboratory at Urbana.

"If I were to sum up the work of the Laboratory in one sentence I would say that we are developing improved varieties and strains of soybeans for industrial use. One of the most essential factors in the economical growing of any crop is an adequate supply of adapted productive strains. The soybean crop is no exception to this rule, making a program of varietal improvement of great importance.

"It was not until 1889 that work on this crop was reported by any experiment station. In that year, W.P. Brooks of the Massachusetts Agricultural Experiment Station brought with him several varieties from Japan and the next year C.C. Georgeson of Kansas secured three introductions from the same country. In 1898 the U.S. Department of Agriculture began the introduction of a large number of soybean varieties from all over the Orient. Since that time around 15,000 introductions have been made by the Department and the majority of the present commercial soybean varieties have come from these introductions as a result of improvement through selection.

"Thirty Years: Breeding and selection work to develop improved strains of soybeans with respect to yield and other agronomic characters has been carried on by experiment stations for the last 2 or 3 decades. The high protein and oil content of the seed and the need of these constituents for food and feed has made necessary a large-scale breeding program to meet the demand for improved varieties.

"The U.S. Regional Soybean Laboratory was started in the spring of 1936 as a Bankhead-Jones project, and headquarters were established at the University of Illinois, where adequate laboratory, greenhouse, and office facilities have been provided by the University. With this inauguration of the Laboratory as a cooperative undertaking by the U.S. Department of Agriculture and the 12 states of the North Central Region, a more extensive breeding program became possible, using chemical analysis of strains as a further basis for selection.

"Several thousand soybean plant introductions and selections being grown at the cooperating state experiment stations have been studied for agronomic behavior–such as yield, lodging resistance, shattering resistance, height, seed quality, etc.–and the seed analyzed chemically to determine the best strains for industrial use. Much of our effort during the first few years of the laboratory was devoted to improving the technique of testing strains and in learning the effect of such factors as date and rate of planting, soil type and fertility level of the soil, fertilizer applications, time of trimming the ends of the plots, effect of adjacent varieties of different maturity and many other factors on the accuracy of the soybean yield testing work. All this was a necessary preliminary to any large scale testing of new strains.

In 1938 a system of uniform soybean variety and strain tests was started in the North Central States. In these first tests about 20 or 30 improved strains were grown along with a few of the best commercial varieties. These uniform tests were grown at several locations in each of the cooperating states and seed samples were sent to the analytical section of the Laboratory for chemical analysis. During the first years of this work only three groups of strains were grown and were designated as the early, midseason and late tests. It was soon found that this designation of the tests was inadequate, especially as the area served by the Laboratory increased.

"When speaking of soybean varieties, the terms early, midseason, and late must always be thought of with reference to some small area or zone of latitude under consideration. As an example of this, the variety Macoupin which is considered as a late variety for Illinois is a very early variety for Mississippi conditions. We are now endeavoring to express the maturity rating of a new strain in relation to some standard adapted variety with which we are all familiar. Thus we are using the variety Illini as the reference strain for the group adapted to Central Illinois, and can express maturity of the other selections in the nursery as so many days earlier or later than Illini.

"The number of uniform nursery groups in the North Central States was increased to four in 1942. In July of that year the part of the Laboratory work devoted to the development of new industrial uses for soybeans was transferred to the Northern Regional Research Laboratory at Peoria, Illinois, and at the same time the area served by the

U.S. Regional Soybean Laboratory at Urbana was enlarged to include 12 of the southern states as well as the original 12 states of the North Central Region.

"To adequately serve the breeding program of the greatly expanded laboratory region a total of eight uniform nursery groups have been arranged for 1944, including strains early enough for Minnesota and late enough for the Gulf Coast states. Of these nurseries, the Uniform Test, Group 0, is composed of very early strains suitable for the northern part of the North Central Region. Group I is made up of slightly later material, suited to the latitude of central Wisconsin and southern Minnesota. Group II is composed of strains of a proper maturity for the latitude of northern Illinois and central Iowa. Group III is adapted to central Illinois and Group IV to southern Illinois and Missouri. Groups V, VI, and VII composed of progressively later soybean strains are adapted to the Southern States. These uniform nurseries furnish a means of accurate and rapid determination of the value of any new strains developed through the breeding work.

"Definite progress has been made in the breeding and testing of new soybean strains. Certain strains have been found especially suited to certain specific conditions of environment. One of these strains, Richland, selected by the Indiana Agricultural Experiment Station from a U.S. Department of Agriculture plant introduction is particularly adapted to soils of high productivity due to its short habit of growth and lodging resistance. On the other hand, Earlyana, developed by the Indiana station and widely tested by the Laboratory is 4 or 5 days earlier than Richland and on account of its earliness and tall growth habit is especially adapted to the less fertile soils of the northern part of the soybean belt.

"One of the most important achievements of the cooperative work has been the development of the variety Lincoln. This strain is from a natural cross discovered by the Illinois Agricultural Experiment Station in 1934 and selected by the Laboratory on the basis of outstanding yield and oil content of the seed. In a 4-year comparison in the Uniform Test, Group II, comprising 49 nursery trials in five states, Lincoln has averaged over 5 bushels per acre higher in yield than the average of Illini and Dunfield.

"In the Group III test where it has also been grown for the last 2 years it has shown the same advantage in yield over Illini and Dunfield. In oil content the strain is slightly superior to Dunfield and Scioto, the best in oil of the present commercial varieties, and over 2 percent above Illini. Lincoln has averaged superior in lodging resistance to the common varieties in its maturity class and has excellent seed quality. The variety is adapted in the area where Illini and Dunfield are generally grown and may replace these varieties if its present performance is maintained. This season over 900 cooperators in the soybean belt are growing a total of over 19,000 acres of registered Lincoln seed and there should be sufficient seed to plant nearly 400,000 acres in the spring of 1945." Continued.

668. National Soybean Processors Association. 1944. Year book, 1944-1945 (Association year). Chicago, Illinois. 71 p. • ***Summary:*** Contents: Constitution and by-laws (incl. committees, code of ethics). Officers, directors and committees for 1944-45. Membership of the National Soybean Processors Association. Trading rules governing the purchase and sale of soybean oil meal. Appendix to trading rules on soybean oil meal: Official methods of analysis (moisture, protein, oil, crude fiber–official). Trading rules on soybean oil. Appendix to trading rules on soybean oil: Uniform sales contract, refining loss method (cup refining test, tentative official centrifugal refining test), soybean oil bleach test–refined oils, free fatty acids, tentative method of grading soybean oil for green color, official method for oil sampling, standard specifications for crude soybean oil for technical uses, moisture and volatile matter (vacuum oven method, hot plate method), modified Gardner break test, iodine number–Wijs method, unsaponifiable matter, official chemists and samplers for oil.

Article IX, Committees, lists and describes each.

The section titled "Officers, directors, and committees" (p. 13-20) states: President: Edward J. Dies. V.P., Chairman Executive Committee: E.K. Scheiter. Secretary: C.E. Butler. Treasurer: E.F. Johnson. Ass't. Treasurer: F.G. Duncanson. Executive Committee: E.K. Scheiter, Chairman, D.J. Bunnell, C.E. Butler, Edward J. Dies, Jasper Giovanna, S.F. Johnson, Mr. June S. Mitchell, H.R. Scroggs.

Board of Directors (Term expiring Sept. 1945): C.E. Butler, H.L. Dannen, Roger Drackett, Howard Kellogg, Jr., W.H. Knapp, H.R. Scroggs. (Term expiring Sept. 1946): H.A. Abbott, D.J. Bunnell, H.E. Carpenter, J.B. DeHaven, Philip S. Duff, P.M. Jarvis. (Term expiring Sept. 1947): J.H. Caldwell, Jasper Giovanna, Mr. June S. Mitchell, E.K. Scheiter, H.R. Schulze, P.E. Sprague.

Standing committees: For each committee, the names of all members (with the chairman designated), with the company and company address of each are given–Traffic and transportation. Research. Technical. Soybean grades and contracts. Oil trading rules. Meal trading rules. Soy flour. Crop improvement. Soybean research council. Trade development. Edible soybean. Handwritten on blank facing pages: Contract. Margarine. Wartime exports (11 March 1945). Soybean oil meal industry advisory committee. Nominating committee (16 July 1945). Uniform rules and standards committee for soybean oil meal (14 Sept. 1945). Urea yield committee (14 Sept. 1945).

The following organizations, and individuals are members of NSPA: Albers Milling Co., Seattle, Washington (W.P. Kyle). Allied Mills, Inc., Board of Trade Bldg., Chicago, Illinois (6 members). Archer-Daniels-Midland Co., Box 839, Minneapolis, Minnesota; Chicago, Illinois;

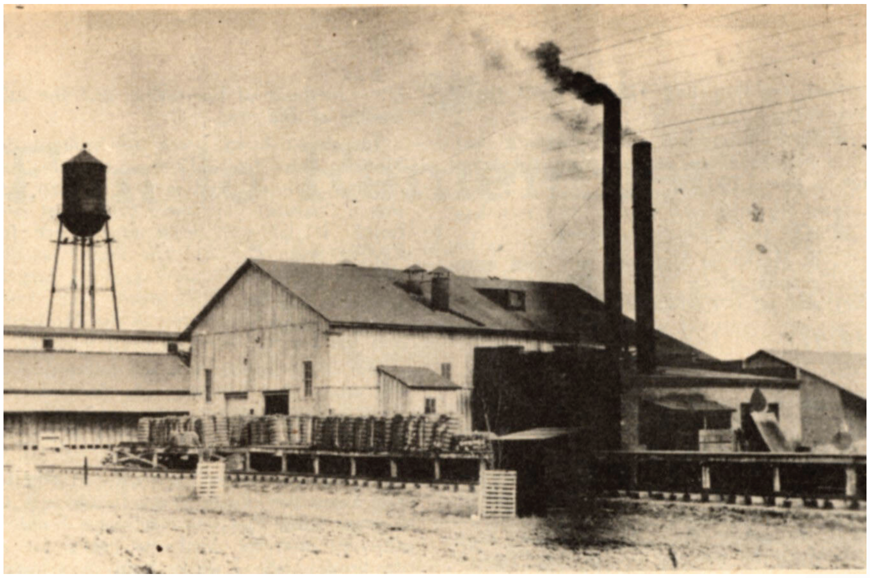
Decatur, Illinois; Toledo, Ohio (5 members). Berea Milling Co. (The), Lexington, Ohio. Blanton Mill (The), St. Louis, Missouri. Boone Valley Cooperative, Eagle Grove, Iowa. Buckeye Cotton Oil Co. (The), Cincinnati, Ohio; Louisville, Kentucky; Memphis, Tennessee. Cairo Meal & Cake Co., Cairo, Illinois. Cargill, Inc., Minneapolis, Minnesota (Julius Hendel); Springfield, Illinois (Eric Nadel); Cedar Rapids, Iowa (L.O. Hauskins); Fort Dodge, Iowa (H.E. Marxhausen). Central Iowa Bean Mill, Gladbrook, Iowa. Central Soya Co., Inc., Chicago, Illinois; Gibson City, Illinois; Decatur, Indiana (3 members). Clinton Co., Clinton, Iowa (E.W. Myers). Concord Soya Corporation, Concord, Michigan (W.C. Whittecar). Dannen Grain & Milling Co., St. Joseph, Missouri. Decatur Soy Products Co., Decatur, Illinois (Jasper Giovanna). Drackett Co. (The), Cincinnati 32, Ohio (Roger Drackett). Elevators & Mills, Inc., Windfall, Indiana (Mr. June S. Mitchell). Fairfield Soy Mill, Fairfield, Iowa (Jos. Sinaiko). Farmers Cooperative Assn., Ralston, Iowa (Karl Nolin). Farmers Cooperative Co., Dike, Iowa (C.M. Gregory). Farmers Cooperative Elevator, Martelle, Iowa (C.K. Gordon -> H.B. Lovig). Fayette Soy Bean Mill, Fayette, Iowa (J.M. Durfey -> W.V. Clark). Funk Bros. Seed Co., Bloomington, Illinois (H.A. Abbott). Galesburg Soy Products Co., Galesburg, Illinois (Max Albert). General Mills, Inc., Vegetable Oil and Protein Div., Minneapolis, Minnesota (W.H. Eastman); Belmond, Iowa (W.E. Flumerfelt). Glidden Co. (The), Cleveland, Ohio (P.E. Sprague); Chicago, Illinois (A.A. Levinson -> R.R. Stegler). Gooch Milling & Elevator Co., Lincoln, Nebraska (M.R. Eighmy). Hemphill Soy Products Co., Kennett, Missouri (W.A. Hemphill). Hiawatha Soybean Mill, Hiawatha, Kansas (A.G. Thomson). Honeymead Products Co., Cedar Rapids, Iowa (D.O. Andreas -> Osborn Andreas); Spencer, Iowa (J.M. Wilson -> Steve Burke); Washington, Iowa (Hugo Lensch). Hoosier Soybean Mills, Marion, Indiana (J.H. Caldwell, Jr.). Huegely Elevator Co., Nashville, Illinois (J.W. Huegely). Hulcher Soy Products, Virden, Illinois (Norman E. Hulcher). Iowa Soy Co., Redfield, Iowa (E. Lyster -> H.R. Straight). Kansas Soybean Mills, Inc. (The), Emporia, Kansas (Ted W. Lord). Laucks (I.F.), Inc., Portsmouth, Virginia (H.F. Armstrong). Mankato Soybean Products Inc., Mankato, Minnesota (Frank J. Bergman -> W.A. Berge). Marr (Pete) Soybean Mills, Fremont, Nebraska (Pete Marr). Mellott Grain Co., Mellott, Indiana (Milford Knowles). Muscatine Processing Corp., Muscatine, Iowa (G.A. Kent). Old Fort Mills, Inc., Marion, Ohio (Ralph Kail). Owensboro Grain Co., Owensboro, Kentucky (William M. O'Bryan). Pillsbury Soy Mills, Clinton, Iowa (Raymond C. Ilstrup); Centerville, Iowa (H.R. Schultz). Procter & Gamble Distributing Co., Cincinnati, Ohio. Procter & Gamble, Ivorydale, Ohio (W.H. Knapp). Producers Cooperative Oil Mill, Oklahoma City, Oklahoma (O.K. Winterringer). Quincy Soybean Products Co., Quincy, Illinois (Irving Rosen). Ralston Purina Co., St. Louis, Missouri (E.F. Johnson); Kansas City, Missouri (G.H. Banks); Lafayette, Indiana (Ralph Guenther); Iowa Falls, Iowa (H.N. Johnson); Circleville, Ohio (Hal Dean). Shellabarger Soybean Mills, Decatur, Illinois (W.L. Shellabarger). Simonsen Brothers, Quimby, Iowa (W.E. Simonsen). Sioux Soya Co., Sioux City, Iowa (H.R. Scroggs). Southern Cotton Oil Co. (The), Goldsboro, North Carolina (C.S. Ragan); Tarboro, North Carolina (W.A. Moore). Soya Processing Co., Wooster, Ohio (H.H. Heeman). Soy Bean Processing Co., Waterloo, Iowa (C.E. Butler). Soy-Rich Products, Inc., Wichita, Kansas (B.S. Brooks). Spencer Kellogg & Sons, Buffalo, New York; Chicago, Illinois; Decatur, Illinois; Des Moines, Iowa (Howard Kellogg, Jr.). Staley (A.E.) Mfg. Co., Decatur, Illinois (E.K. Scheiter); Painesville, Ohio (H.D. Egly -> Thomas Longbons). Swift & Co., Chicago, Illinois (P.M. Jarvis). Swift & Company Oil Mill, Cairo, Illinois (W.B. Stone). Swift & Company Soybean Mill, Champaign, Illinois (N.P. Noble). Swift & Company Soybean Mill, Des Moines, Iowa (A.F. Leathers). Swift & Company Soybean Mill, Fostoria, Ohio (S.D. Hollett -> H.S. Byrd). Toledo Soybean Products Co., Toledo, Ohio (J.H. Brown). Wells (Ralph) & Co., Monmouth, Illinois (Ralph Wells). West Bend Elevator Co., West Bend, Iowa (R.W. Jurgens). Western Soybean Mills, Sioux Falls, South Dakota (E.A. Woodward). Williams Milling Co., Sac City, Iowa (Leo W. Williams).

Organizations represented on committees: American Soybean Association, Hudson, Iowa (George Strayer, Howard Roach). Illinois College of Agriculture, Urbana, Illinois (Dr. W.L. Burlison, J.W. Lloyd). U.S. Regional Soybean Laboratory, Urbana, Illinois (Dr. R.T. Milner).

Handwritten: New members added since publication of the Trading Rules Book–Big 4 Cooperative Processing Assn., Sheldon, Iowa (Morel M. Stientjes, Mgr., April 1945). Delphos Grain & Milling Co., Delphos, Ohio (Floyd E. Hiegel, Pres., Aug. 1945). Haynes Soy Products Inc., Portland, Indiana (W.V. Helfiker, Office Mgr., May 1945). Holland Pioneer Mills Inc., Ohio City, Ohio (G.A. Holland, Pres., March 1945). Jamesville Mills, Inc., Jamesville, Wisconsin (A. Roger Hook, Mgr., Oct. 1945). Kansas Soya Products Inc. (The), Kansas City, Kansas (Richard Lord, V.P. & Treas., Oct. 1943). North Iowa Cooperative Processing Association, Manly, Iowa (Glenn Pogeler, Mgr., Nov. 1944). Honeymead plant in Spencer, Iowa, bought Doughboy Mills, Inc., New Richmond, Wisconsin (4 Dec. 1945). Washington Soy Mill: Name changed by Joe Sinaiko from Honeymead's plant in Washington, Iowa (19 Dec. 1945).

Note: This is the earliest document seen (March 2008) that uses the name "North Iowa Cooperative Processing Association." The word "Cooperative" is spelled without a hyphen. Address: 3818 Board of Trade Building, Chicago 4, Illinois.

669. *Soybean Digest.* 1944. Some early processors. Sept. p. 18-19.



• ***Summary:*** "There could be no real soybean industry until the coming of processing plants. Without them, growers hesitated to expand acreage. But processors waited on a sufficient volume of soybeans so there would be at least a gambler's chance of profitable operation. It took some years to overcome this impasse.

"Pioneers ran into extreme difficulties...

"Herman Meyer at Seattle, Washington, undertook the first known processing of soybeans in America. He crushed some Manchurian beans with a hydraulic press about 1911.

"On the other side of the country, the Elizabeth City Oil & Fertilizer Co., at Elizabeth City, North Carolina, processed the first home grown soybeans. W.T. Culpepper, manager of the firm, conducted a test run on 10,000 bushels in December 1915, and was so satisfied with his results that he is said to have offered growers production contracts in advance in order to insure the company a supply of soybeans for continued operations. But in 1916 German interests took out of the country the entire local supply, paying up to $4.50 a bushel!

"First Midwest processing was undertaken with expeller equipment designed for crushing corn germ by the Chicago Heights Oil Manufacturing Co., at Chicago Heights, Ill., in 1917 or 1918. During the latter year the company added two expellers designed for soybeans. These were used sporadically until the equipment was sold to Funk Bros. Seed Co., another early processor of soybeans, in 1923. I.C. Bradley, now with Allied Mills, Inc., was in charge. He brought in beans from North Carolina, and crushed some of the first seed grown in Illinois. But he was unable to obtain enough beans to keep the plant in continuous operation.

"The enthusiasm and vision of the late A.E. Staley helped the infant industry over some of its first difficult hurdles. In 1922 'at the request of a large number of farmers in this community' he built an expeller plant with an operating capacity of 500 bushels daily at Decatur, Ill. Price paid was 99.75c a bushel. Mr. Staley wrote that operations were 'unprofitable and very discouraging but it is our intention to leave the machinery in our plant for another year...' The A.E. Staley Mfg. Co. has been processing soybeans ever since.

"An early solvent extraction venture was undertaken by the Eastern Cotton Oil Co., at Norfolk, Virginia. A Bollman [Bollmann] type continuous extractor with 80 tons daily capacity was used on North Carolina soybeans. Again the supply proved inadequate.

"So things hitched along. But in 1927 the 'Peoria plan' was evolved when several processing companies contracted in advance with Illinois farmers to buy a cool million bushels of soybeans at $1.35. Wilfred Shaw of the American Milling Co., at Peoria, one of the contracting companies, said his company alone offered a potential outlet of 5 million bushels, and that the country as a whole should absorb upwards of 75 millions! The 'Peoria plan' was an enormous factor in pushing Illinois to the front in soybean production.

"First soybeans processed west of the Mississippi River were at Cedar Rapids, Iowa, by Iowa Milling Co., it is claimed. Joe Sinaiko and Max Albert, partners in the venture, installed the equipment consisting of two expellers, in the fall of 1927 and operations began the next spring. Albert later established the Galesburg Soy Products Co., while Sinaiko operated Iowa Milling until he sold to Cargill in 1943."

Photos show: (1) The Elizabeth City Oil & Fertilizer Co. plant. Note: This is the earliest photo seen of this plant. (2) The Iowa Milling Co. plant, now owned by Cargill. (3) A.E. Staley expeller plant built in 1922. (4) A modern soybean crushing plant built in the early 1940s. (5) "Part of the Eastern Cotton Oil Co. plant in Norfolk, Virginia, early processor by solvent extraction method. At left is Mr. Mr. Scheunemann, erection engineer, at right, son of W.M. Gregory, principal stockholder. Immediately back of men is meal grinding house. Boiler plant is designated by the smokestack. Tall doghouse at rear locates Bollmann extractor and solvent still. To left of field of vision is roll room, and still further left, seed storage."

670. Williams, L.F. 1944. The breeding work of the U.S. Regional Soybean Laboratory. *Soybean Digest.* Sept. p. 34, 64.

• ***Summary:*** "One of the major projects of the U.S. Regional Soybean Laboratory is the development of improved strains of soybeans. We have put a major emphasis on this project because we believe that one of the best ways to produce soybeans more economically is to plant better varieties.

"The introduction of adapted varieties makes possible

a wider distribution of profitable production. In established areas improved varieties can raise the yield of beans per acre or the yield of oil per acre without appreciably increasing production costs, thus lowering the cost per unit produced. Although the breeding work has been centered at Urbana during the first 6 or 7 years of the Laboratory, large scale projects have also been under way in Iowa, Indiana, Ohio, and Missouri, and in the past 2 years Wisconsin, Minnesota, Nebraska, Mississippi, and North Carolina have increased the scope of their breeding programs.

"Some of the ways in which soybeans may be improved are as follows:

"1. Increase the ability to produce seed.

"2. Increase the resistance to lodging.

"3. Increase the resistance to disease.

"4. Increase the resistance to insects.

"5. Select for more suitable maturity, i.e., earlier or later strains for certain sections.

"6. Improve the chemical composition.

"The attempt to increase the yield per acre has received the most attention in the breeding work until recently. There are two reasons for this. First, yield is the most important characteristic and the one most intimately connected with production. If a new variety yields better than the old, farmers are quick to see the advantage of the new strain. Second, an increase in yield of beans per acre has seemed the easiest way to increase the yield of both basic soybean products, meal and oil. So far it has not been difficult to find in almost any segregating population, strains which exceed the yield of the parent varieties. In our present crosses we can hope to secure strains yielding 10 percent more than the parent varieties. Of course, as the level of production is increased in each breeding cycle it probably will become more and more difficult to improve upon the yielding ability of the parent lines.

"Lodging Resistance: Selection for resistance to lodging has also received considerable attention. The Iowa program has especially stressed this characteristic since lodging is quite an important factor in certain sections of that state. Richland has been the most outstanding strain in regard to lodging resistance. This resistance is easily recovered in crosses between Richland and other strains. Due to its relatively early maturity and lodging resistance Richland has entered into a high percentage of the crosses in the northern breeding programs. Patoka and Illinois T117 also contribute considerable lodging resistance to their crosses.

"In the South, Ogden seems to be a promising parent where resistance to lodging is needed, especially on the heavier soils. So many selections from the Richland and T117 crosses look promising that selections from these crosses make up far more than their share of the entries in the preliminary yield trials. It should be pointed out that all of these strains mentioned above are determinate in habit and that a portion of their lodging resistance is due to this characteristic.

"Disease Resistance: To date very little has been done in regard to selection for disease resistance, since the pathological program of the Laboratory has been under way such a short time. However, real progress is being made and it is hoped that in the near future methods can be worked out to test the resistance of selections to a number of important diseases. No clear-cut cases of immunity have been observed in the northern states, but some indications of resistance to *Sclerotium rolfsii* and root knot [nematode] have been observed in the South and breeding work is under way in North Carolina to transfer this resistance to several of the better commercial strains such as Ogden and Volstate.

"The Laboratory has not initiated any work in regard to selection for insect resistance.

"Date of maturity is an interesting character to work with. In the northern states some varieties are grown with maturities (at Urbana) of 85 days, while the southern states have some which need 185 days to mature. This means that separate breeding programs must be undertaken to supply strains of the proper maturity for each region.

"In general, strains which mature during the hot dry weather of July and August produce poor quality seed, but there is some variability in this respect. For some purposes an early maturing bean is desired and an attempt is being made to secure strains which will mature in early fall and still produce good yields of good quality beans. In much of the South and parts of southern Indiana, Illinois, and Missouri seed quality is a major factor limiting soybean production. This is closely related to date of maturity. The varieties Patoka and Gibson have helped fill the need for strains of suitable maturity and are able to produce good yields of good quality seed in southern Illinois and Indiana.

"It is a rather common thing to find transgressive segregation for date of maturity in soybean crosses. For instance in a recent cross between Lincoln and Richland, we found some selections which were 10 days earlier than Richland, the earlier parent, and others a week or more later than Lincoln. This fact is of considerable help in breeding work. The cross referred to was made to combine the high yield and chemical composition of Lincoln with the earliness and lodging resistance of Richland. Without the necessity of introducing a third variety, we have gotten strains early enough to go much farther north than either of the parent strains.

"Ever since the foundation of the Soybean Laboratory we have placed considerable importance on the chemical composition of soybean varieties. The fact that most soybeans are processed for oil and meal makes it desirable to have varieties containing the greatest possible quantities of oil and protein. The newly released Lincoln variety contains about 1 percent more oil in the seed than most of the varieties commonly grown in the area to which it is adapted. Breeding work is under way in an attempt to further increase

this oil content in Lincoln.

"A new strain from the Iowa program also looks very promising from last year's uniform tests. This strain has an oil content as high as Lincoln, yields almost as well, stands as well as Richland, and is as early as Richland. In the South the variety Ogden has been found outstanding in oil content, and extensive breeding work is under way to further improve this strain by crossing with other high oil varieties and backcrossing to Ogden in an attempt to retain its high yield, drouth resistance and other desirable characters.

"The hybrid material produced in the breeding programs of the various states cooperating in the Laboratory has been made available to other states. In this way a large number of crosses have been distributed as bulked F2, F3, F4, or F5 populations. A number of selections have also been exchanged between the various states to hasten the testing program. On account of this preliminary testing new strains entered in the uniform testing program have a better chance of exhibiting wide adaptability.

"This uniform testing program is designed to produce the most information in the shortest time from the effort expended. At present there are eight uniform test groups. In these tests are entered the more promising new strains produced by the various breeding programs as well as a number of standard commercial varieties for comparison. Generally these tests contain from 10 to 25 strains and may be planted at from 10 to 40 locations. The agronomic and chemical data from these tests is summarized and made available to all the cooperating agencies."

Note: This is the earliest published document seen (July 1998; and the second earliest overall) concerning the "release" of a soybean variety, in this case Lincoln. Address: Assoc. Agronomist, U.S. Regional Soybean Lab.

671. Prince, Alton E. 1944. Soybean diseases in North Carolina. *Plant Disease Reporter* (*USDA*) 28(33):1008. Oct. 15.

• ***Summary:*** "A field of at least 25 acres planted to soybeans in Surry County showed some Bacterial Pustule disease, and a very light infection of Powdery Mildew (*Erysiphe polygoni*). Immature cloistothecia of *E. polygoni* were found, in addition to the imperfect stage... weeks of September 25 and October 2."

672. Prince, Alton E. 1944. Soybean diseases in North Carolina. *Plant Disease Reporter* (*USDA*) 28(37):1124-25. Nov. 15.

• ***Summary:*** "During the week of October 9, a survey of soybean diseases was made with Dr. S.G. Lehman, Professor of Plant Pathology at the University of North Carolina, in the counties of Johnston, Wayne, Lenoir, Jones, Craven, Beaufort, and Pitt. No attempt was, made to estimate damage done by the various fungi. Specimens were sent to Dr. Lindsay S. Olive for determination or verification. The following organisms were found to be causing diseases on soybeans:

"Glomerella glycines, Diaporthe sojae [=*D. paseolorum* var. *sojae*], and *Sclerotium rolfsii* on stems. *Peronospora manshurica, Cercospora sojina, Phyllosticta* sp., *Xanthomonas phaseoli* var. *sojense,* and *Alternaria* sp. on leaf blades, and *Diaporthe sojae* on petioles.

"Glomerella glycines and *Cercospora canescens* on pods."

673. Lehman, Samuel G. 1944. Dusting soybeans for control of bacterial pustule (Abstract). *Phytopathology* 34(12):1007-08. Dec.

• ***Summary:*** Discusses Xanthomonas phaseoli sojense. Copper dusts were effective in reducing the disease, but sulfur dust was not. Address: North Carolina.

674. Steece, Henry M. 1944. Soybean projects of the State agricultural experiment stations, 1944. Washington, DC; Office of Experiment Stations (USDA). 23 p. Unpublished typescript.

• ***Summary:*** Page 2, "Explanatory notes" states: "This is a list of the research projects concerned with soybeans, including edible soybeans and soybean products, currently active at the several State agricultural experiment stations. It was compiled in response to requests from the State experiment stations, the U.S. Department of Agriculture, and other agencies for such information as an aid in their work on various problems connected with the production, handling, and utilization of soybeans.

"This list supersedes a similar publication entitled Soybean Projects of the State Agricultural Experiment Stations, 1937 (May 20, 1937). Most of the projects listed as active in the earlier publication have been completed and replaced by new researches. These deal with numerous problems constantly arising in the soybean industry and reflect the broader scope and greater complexity of the general problem. Enormous expansion in the United States soybean acreage, with recent shift in center of production from the Southeastern States to the Corn Belt, has brought forth problems inherent in the peculiar sensitiveness of soybeans to variations of soil and climate. In addition are those problems concerned with newer production methods, changes in cropping systems, insects and diseases, harvesting, and storage. Other fields of inquiry have come out of wartime demands for soybean oil and meal for use in strategic materials, and the increasing use of soybean meal as a high-protein feed for livestock and poultry. Changes in eating habits in which the soybean plays an important part as a green or dried vegetable and as a protein food to supplement animal products, like meat, eggs, milk, and cheese, have also provided many problems for station research.

"Stations cooperating with the U.S. Regional Soybean

Laboratory (Urbana, Illinois) in conducting coordinated adaptation (nursery) tests with groups of varieties and selections include the 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 Stations. At several stations these tests are carried on as distinct projects, while at other stations the tests proceed as phases of other projects.

"The entries in the list include the project title, experiment station departments involved, and cooperation with the U.S. Department of Agriculture."

As an example, here is the first state listed:

Alabama

"Breeding of legumes for forage and soil improvement, Agron. & Soils (Coop. B.P.I. S.A.E.).

"Soybean variety test, Agron. & Soils, 3 substations.

"Cooperative uniform tests, Agron. & Soils (Coop. B.P.I. S.A.E.).

"Factors influencing seed production of legumes, Agron. & Soils.

"Adaptation of edible soybean varieties, Agron. & Soils.

"Forage tests for hay, temporary grazing, and winter grazing value, Agron. Soils.

"The inorganic nutrition of plants, Agron. & Soils.

"Effect of inoculation on certain legumes, Agron. & Soils,

"Factors affecting vitamin A stability and utilization, An. Indus.

"Oil crops for Alabama, Agron. & Soils."

Note 1. Abbreviations:

Agron. = Agronomy

An. Indus = Animal Industry

B.P.I. = Bureau of Plant Industry (USDA)

Coop. = Cooperating with

S.A.E. = Soils and Agricultural Engineering.

Note 2. In addition to "Stations cooperating with the U.S. Regional Soybean Laboratory," states where soybeans is a very minor crop are also listed with their projects, e.g., Alaska, Arizona, California, Colorado, Delaware, Hawaii, Washington State, West Virginia, and Wyoming. Address: Senior Experiment Station Administrator.

675. Markley, Klare S.; Goss, Warren H. 1944. Development of the soybean processing industry (Document part). In: K.S. Markley & W.H. Goss. 1944. Soybean Chemistry and Technology. Brooklyn, New York: Chemical Publishing Co. vii + 261 p. See p. 137-43. [190 ref]

• ***Summary:*** "The first soybean crushing in the United States, for which records are available (Footnote: L.W. Eilertsen, personal communication) however, appears to have been on Manchurian beans in about 1911. The soybeans were imported by the Albers Brothers Milling Company and sold to a Mr. Herman Meyer who operated a small hydraulic press oil mill in Seattle, Washington. The establishment was later known as Pacific Oil Mills, but it is no longer in existence. The meal, produced in these operations, was sold as a feed ingredient under the name of 'Proteina.' It was found, however, that the oil and meal could be imported more cheaply than they could be domestically produced from imported raw materials, and the crushing operations were, therefore, discontinued after the initial shipment of beans had been processed."

Note: This is the earliest document seen (Sept. 2016) that mentions Albers Brothers Milling Company, and states that they imported the first soybeans crushed in America–by Herman Meyer.

"The earliest recorded crushing of American-grown soybeans took place at the cottonseed oil mill of the Elizabeth City Oil and Fertilizer Company in Elizabeth City, North Carolina. This mill was later operated by the Eastern Cotton Oil Company, but its operations were discontinued in the early 1930s. The first soybean crush was largely a test run, extending from December 13 to 20, 1915. During that time, 10,000 bushels of local soybeans were pressed in the six expellers with which the mill was equipped, and the resulting meal was reported to be of excellent quality, containing 5.0 to 5.5% oil. The test was conducted by Mr. W.T. Culpeper [sic, Culpepper], manager of the firm, as part of his activities toward encouraging local soybean production. The experiment was so successful that the company continued to process local soybeans, as supplies became available, and they reportedly offered production contracts with the growers in advance in order to induce farmers to grow more of this crop. In spite of their efforts to develop the production of soybeans sufficiently to assure regular operations, difficulties were encountered, from time to time, in obtaining enough beans to warrant crushing them. In 1916, for example, it is said that German interests bought and exported the entire available supply, at prices as high as $4.50 per bushel.

"In late 1917 or early 1918, the Chicago Heights Oil Manufacturing Company (Footnote: *"E.J. Dies, *Gold From the Soil,* The Macmillan Co., New York, 1942") experimentally processed a small amount of soybeans in expellers which were originally designed for crushing corn germs. During 1918, this company is said to have added two expellers specifically for crushing soybeans. These expellers had a combined capacity of 600 bushels per day and were used intermittently during the ensuing years as supplies of beans became available. In the fall of 1922, the same company is said to have experimented with hydraulic press equipment which had been used for producing linseed oil. The Chicago Heights Oil Manufacturing company continued its pioneering efforts toward the establishment of a soybean industry in the present 'soybean belt' until August 1923, when it went out of business. The equipment was purchased

by Funk Brothers Seed Company of Bloomington, Illinois, during the following year, and the latter company has been continuously engaged in the soybean processing business.

"On September 30, 1922, the A.E. Staley Manufacturing Company of Decatur, Illinois, commenced operations in a mill which was equipped with expellers designed for crushing soybeans. This company has been in the soybean processing business continuously since that date. The Staley development was soon followed by others of a similar nature, and the early twenties saw the establishment of a permanent soybean processing industry.

"Not all the earlier ventures proved successful. For example, the Piatt County Soybean Cooperative Company (sometimes referred to as the Monticello Grain Company) was organized in 1922 in Monticello, Illinois, and installed batch solvent extraction equipment for processing 300 bushels of soybeans per day. The solvent is said to have been benzol. This ill-fated undertaking was apparently unable to cope with the scarcity of beans and was in operation for only about six months during the period 1923 to 1924.

"Another early attempt, at solvent extraction of soybeans, was undertaken during the years of 1924 and 1925 by the Eastern Cotton Oil Company of Norfolk, Virginia. A Bollmann type of continuous extractor, having a capacity of approximately 80 tons per day, was used on soybeans obtained from North Carolina, but the supply proved to be inadequate. Difficulty was also encountered in adapting the German-manufactured equipment to the processing of American-grown soybeans. After exhausting the available stocks of soybeans, the mill's operations were transferred to the extraction of Argentine flaxseed, but this was said to have been found unprofitable.

"At about the same time, soybeans were solvent-extracted by the Prossco Oil Company, also in Norfolk, using Scott rotary extractors. Their operations, however, consisted mainly in the extraction of cocoa butter and other fats, and only a small amount of soybeans is said to have been processed. Others, who engaged in soybean processing during the early twenties, include the Seeds Oil Company in Indianapolis [Indiana] and the Jonathan Havens Oil Company at Washington, North Carolina." Address: 1. Principal Chemist, Southern Regional Research Lab., New Orleans, Louisiana; Northern Regional Research Lab. 2. Senior Chemical Engineer, Northern Regional Research Lab., Peoria, Illinois.

676. 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.

677. Colwell, W.E. 1945. Fertilizing soys in North Carolina. *Soybean Digest.* Jan. p. 11-12.
• ***Summary:*** Soybeans grown on the dark, highly organic, poorly drained soils of the North Carolina Lower Coastal Plain suffered from potash deficiency. The application of muriate of potash as top dressing is recommended. Address: Agronomy Dep., North Carolina Agric. Exp. Station,

Raleigh.

678. *Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1945. Statistics of important crops, by states, 1943 and 1944, with comparisons: Soybeans for beans, soybeans for hay, soybeans grazed or plowed under. 22(1):12. Jan.

• ***Summary:*** Gives statistics for the following states: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas, United States [total]."

Under "Soybeans [harvested] for beans," gives for each state: (1) Acreage harvested (Average 1933-42, 1943, 1944). (2) Yield per acre (bushels) (Average 1933-42, 1943, 1944). (3) Production (in 1,000 bushels) (Average 1933-42, 1943, 1944).

Under "Soybeans [harvested] for hay," gives for each state: (1) Acreage harvested (Average 1933-42, 1943, 1944). (2) Yield per acre (bushels) (Average 1933-42, 1943, 1944). (3) Production (in 1,000 tons) (Average 1933-42, 1943, 1944).

Under "Soybeans grazed or plowed under," gives for each state (in 1,000 acres): Average 1933-42, 1943, 1944.

In 1944 the top states in acreage harvested for beans (in million acres) were: Illinois 3.400, Iowa 2.129, Indiana 1.403, and Ohio 1.308.

679. *Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1945. Soybean acreage for all purposes. 22(1):26. Jan.

• ***Summary:*** Gives statistics for the following states: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas."

For each state gives acres grown alone, interplanted, and equivalent solid (acres grown alone plus one-half the interplanted acres) for the following three time periods: Average 1933-42, 1943, 1944.

In 1944 the top states in equivalent solid acreage (in million acres) were: Illinois 3.857, Iowa 2.229, Indiana 1.776, and Ohio 1.484.

680. *Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1945. Prospective plantings for 1945. 22(2):74. April.

• ***Summary:*** Soybeans appear in two tables. (1) Acreage grown alone for all purposes. Statistics are given for the following states and U.S. total: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas." For each state is given (in 1,000 acres): Average 1934-43, 1944, indicated for 1945, 1945 as a percentage of 1944.

(2) Prospective plantings (of 19 major crops) for 1945 (in 1,000 acres). For soybeans: Average 1934-43: 9,120,000. For 1944: 13,564,00. Indicated for 1945: 13,236. 1945 as a percentage of 1944: 97.6.

681. *Soybean Digest.* 1945. I.C. Bradley–Pioneer processor. May. p. 15.

• ***Summary:*** A good biography of I.C. (Clark) Bradley, a pioneer soybean crusher; a portrait photo shows Clark Bradley. "At the close of the first world war he was processing linseed, corn germ and mustard seed with a small

outfit at Chicago Heights. Some agriculturists who were also soybean enthusiasts approached his firm to suggest that it try processing soybeans. Soybeans were then an Illinois hay crop but these men believed the miracle bean would have a much more substantial future if processors would lend a hand.

"Those early soybeaners must have been persuasive, for the Chicago Heights Oil Manufacturing Co. agreed to some experimental processing and an attempt at developing a market for soy products. The firm had both Anderson expellers and hydraulic equipment. They put Bradley in charge of the soybean promotion...

"Clark prepared for an experimental processing in the fall of 1919, only to see practically all the soybeans harvested that year sold for seed. He was able to secure a few sorry looking beans that nobody else wanted. From these he obtained a few drums of oil as sorry looking as the beans. But he had learned something about the drying, the grinding and the use of the Anderson equipment, and that whetted his interest.

"Growers assured him there would be plenty of soybeans for milling operations the fall following. But the demand remained good and the entire 1920 crop again went for seed. So Bradley bought 10 carloads of North Carolina and Virginia beans, of the Mammoth Yellow variety. With these and what soybeans he could pick up locally, he was able to begin operations.

"Soon he was disposing of the first tank car of native soybean oil ever sold in Chicago. During 1921, 1922 and 1923 enough soybeans became available to permit processing in a small way on both the Anderson expellers and the hydraulic presses... Several tank cars of soybean oil had been produced and marketed through Otto Eisenschiml's Scientific Oil Compounding Co. And several hundred tons of soybean oil meal also had been produced.

"But the oil meal? Let Bradley tell about sales resistance back in 1921-22: 'We begged, coaxed and forced feeders to try it. We hauled meal all over the state and gave feeders a bag or two to try. We sent meal to experiment stations, exhibited the meal at state and county fairs in Illinois and Indiana. We made soy flour, sent samples to bakeries, got a wheat flour mill to blend soy flour with wheat flour and distributed five-pound bags to hundreds of grocery stores where we could get permission to leave it.'

"In 1924 Funk Bros. Seed Co. of Bloomington, Ill., bought the Chicago Heights plant and Bradley went with it to Bloomington... When he induced H.G. Atwood, president of the American Milling Co., at Peoria, to buy Funk's entire output of oil meal another big forward step had been taken in establishing a market."

Prior to 1928 U.S. "farmers still hesitated to plant the [soybean] acreage that would place soybean processing on a firm basis. They feared that once the demand for seed had been met, the price would go down. Then the 'Peoria plan' was evolved when Atwood, Funk, and the Grange League Federation agreed that they would buy all the 1928 crop of soybeans produced from 50,000 acres at a guaranteed price of $1.35 a bushel. The 'Peoria plan' was an enormous factor in pushing Illinois to the front in soybean production. 'Undoubtedly this advanced the progress of soybeans many years,' Bradley believes."

"Later Bradley was sent to Taylorville, Illinois, to establish a processing plant for Funk. When American Milling Co. merged with Wayne Feed Co., to become Allied Mills, Inc., they purchased the Taylorville plant, retaining Bradley as its manager, a post he had held for the past 15 years. Last year the Taylorville mill was destroyed by fire, but a modern new solvent extraction plant is rising in its place." Today Bradley is manager of that plant in Taylorville, Illinois.

682. Murakishi, Harry Haruo. 1945. Studies on the cause, seasonal development, and control of purple stain disease of soybean seeds. MSc thesis, North Carolina State College of Agriculture and Engineering. iv + 38 p. June. Illust. 28 cm. * Address: North Carolina.

683. *State College News.* 1945. Obituaries: Charles W. Dabney. July. p. 21.
• ***Summary:*** "Dr. Charles William Dabney, 90, former president of the University of Cincinnati, former professor and director of the State Agricultural Experiment Station at State College [North Carolina], died in a hospital in Asheville on Friday, June 15, of acute coronary thrombosis. The body was sent to Cincinnati, Ohio, for funeral services and burial. Surviving are two daughters, Mrs. Alexander Thompson and Mrs. John Ingle. Dr. Dabney had for about three years maintained a summer home in Montreat [North Carolina]. He resided at Winter Park, Florida, during the winter, and was en route from there when he suffered the fatal attack."

684. *State College News.* 1945. Lee Alumni hear Frank Jeter. July. p. 21.
• ***Summary:*** "The Lee County Chapter of the N.C. State College Alumni Association held its annual Ladies Night supper in the private dining room of the Fairview Restaurant Saturday evening, May 26, with 37 present.

The meeting was presided over by D.E. Henderson who called on H.H. Underwood for the invocation.

"The program was then turned over to E.P. Holmes who after telling some amusing anecdotes on several of the alumni, entertained with a quiz program. He was assisted by Sam Brooke as the 'man in the left balcony.' Mrs. Leon Thompson won the grand prize for identifying Flora Macdonald, as the subject of a biographical sketch.

"J. Paul Shaw presented Frank Jeter, agricultural editor of the N.C. Extension service, the guest speaker, who

addressed the meeting on 'North Carolina's Place in Post War Reconstruction.' He stressed the fact that North Carolina is in the peculiar position of having some of the finest breed of dairy cattle in the world and some of the best agricultural advantages in the nation, with enough cut-over land to feed entire countries of Europe.

"Mr. Jeter foresees great strides in the development of agriculture and industry in the state, induced by the immediate post war needs and encouraged by the realization brought about by the war that it is possible to produce machinery to do big jobs in a short time with a limited amount of manpower.

"Out-of-town guests were Mr. and Mrs. H.W. Taylor and Frank Jeter of Raleigh and special visitors were Senator and Mrs. J.C. Pittman.

"Members present with their wives were: Mr. and Mrs. Sam Brooke, Mr. and Mrs. P.C. Yarborough, Mr. and Mrs. E.P. Holmes, Mr. and Mrs. D.E. Henderson, Mr. and Mrs. H.H. Underwood, Mr. and Mrs. Frank Brinn, Mr. and Mrs. G.M. Brannon, Mr. and Mrs. Godfrey H. Browne, Mr. and Mrs. Paul Shaw, Mr. and Mrs. J.A. Marsh, Mr. and Mrs. W.T. Proctor, Mr. and Mrs. Leon Thompson. Other members present were Mrs. Clara Cheek, W.T. Smith, R.A. Currie, R.E. Pomeranz, J.H. Henley, P.P. Kelly, J.W. Liles, W.L. Jewell."

685. 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.

686. Earley, E.B.; Cartter, J.L. 1945. Effect of the temperature of the root environment on growth of soybean plants. *J. of the American Society of Agronomy* 37(9):727-735. Sept. [5 ref]

• ***Summary:*** "Root temperature as a factor in the growth of soybean plants has not been investigated as far as the writers are able to learn from a review of the literature. However, attention has been directed to this problem by several investigators for other species of plants." Five studies are reviewed; each showed that warmer temperatures increase plant growth whereas cooler temperatures retard it; each species [and variety] has its optimum temperature or temperature range.

A figure shows a view of the apparatus used in maintaining different temperatures around the roots of the soybean plants in this investigation. Each of the. seven box-like units is equipped with heating and cooling coils operated thermostatically. Electrical space heaters provide heat. A common refrigerating compressor supplies the cooling for the units, the refrigerant for each box being controlled by a solenoid valve in the liquid line ahead of the expansion valve for that box. A double pole thermostat with an adjustable differential maintains the temperature.

"A publication by the U.S. Regional Soybean Laboratory, a cooperative organization participated in by the Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, 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." Address: 1. Asst. Agronomist; 2. Senior Agronomist. Both: U.S. Regional Soybean Industrial Products Lab., Urbana, Illinois.

687. Henson, Paul R. 1945. Southern soybean program at the U.S. Regional Soybean Laboratory. *Soybean Digest.* Sept. p. 47, 60.

• ***Summary:*** "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 greatly increased demand for vegetable oils because of wartime needs resulted in the expansion of the research facilities of the U.S. Regional Soybean Laboratory during the winter of 1942-43 to include in the cooperative soybean program the 12 southern states along with the original 12 states of the North Central region.

"Principal Objective: One of the principal objectives of the Southern Program is the development of adapted, higher yielding varieties of soybeans for industrial uses. New strains must be not only higher yielding, but resistant to shattering, lodging and disease, and have a content of oil and protein most desirable for industrial utilization. The average yields of the area of 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. The tendency of most of the present varieties to shatter as the beans mature or immediately thereafter is partly responsible for lower yields over much of the region. During the long growing season such diseases as bacterial pustule, bacterial blight, southern blight, pod and stem blight, and many others are serious factors in reducing yields of soybeans over the region. These are the main factors which must be overcome to produce superior strains for southern conditions.

"Large numbers of new strains resulting from crosses and plant selections are being tested, or are under observation at many of the southern experiment stations. Attempts to

combine the high yields and chemical composition of the northern varieties with adapted late maturing southern strains appear promising. Several F4 and F5 strains, from crosses between Arksoy and Dunfield, Chief and Arksoy, and others made by L.F. Williams at the U.S. Regional Soybean Laboratory at Urbana, have many of the desired characteristics. Very promising material is coming out of a large number of crosses by J.A. Rigney and E.E. Hartwig, in the cooperative program at the North Carolina station. In addition to the crossing program, introductions and plant selections in large numbers are being tested for superiority. It is reasonable to expect that from all of this material, some new strains of soybeans will soon be available, fully capable of filling the needs of the South for an oil bean.

"One special project of the breeding program at the Delta Station is the development of a variety that will produce high yields of good quality seed, maturing in late August or early September. The cotton farmers, in particular, desire a variety that will mature before cotton is ready for picking. Varieties such as Macoupin, Patoka, and Gibson will mature at this time, but produce seed of very low quality.

"Many early maturing plants having good to high seed quality have been found in some crosses between northern and southern varieties. To advance this material as rapidly as possible an extra generation is being obtained of these strains by planting them at Weslaco, Texas, in mid-September for late December harvest. Satisfactory yields have been obtained on approximately 600 selections, including strains of early maturity for Texas and Oklahoma.

"The main breeding program, however, is concerned with the development of later maturing varieties, as it is fully expected that the highest yielding soybean varieties for the South will be those of late maturity. At the present time we have very few late maturing varieties of commercial importance capable of fully utilizing the long growing season for the production of soybeans. Diseases, in particular, may build up to epidemic proportions, causing serious defoliation if not death to the plant at the critical period of seed setting and seed development. Yields of 50 bushels per acre on fertile soil should not be exceptional when fully adapted, late-maturing soybean varieties, resistant to diseases, are developed.

"Pathologists of the region have helped in evaluating varieties and strains of soybeans with respect to disease resistance, and the information thus provided is being used in the breeding program. However, with the increase in number and destructiveness of soybean diseases during the last few years, the disease problem has become urgent. The development of the new soybean disease program of the Bureau of Plant Industry, Soils, and Agricultural Engineering of the United States Department of Agriculture, is expected to greatly facilitate the breeding of disease resistant strains of soybeans.

"Evaluating Varieties: An essential part of the soybean breeding program is the thorough evaluating of existing varieties and strains of soybeans. For this purpose a series of uniform nurseries have been established to evaluate the new and improved soybean strains developed by the Laboratory in comparison with the commercial varieties now being grown. In the regional grouping of these varieties according to maturity, the southern strains are entered in progressively later maturing groups designated Groups V, VI, VII, and VIII. At the present time there are very few strains of proper maturity for Group V, so particular effort is being made to, secure superior selections for the northern part of the southern region where strains of this maturity are needed.

"Testing soybean varieties on a regional basis began in 1943. An excellent picture of the good and bad characteristics of the varieties is taking form in that results include yield, lodging, plant height, seed quality, disease resistance, shattering resistance, and chemical composition for each variety at many locations. In planning the tests each year, varieties showing little promise are dropped while new ones are added. New strains are entered in the regional tests as soon as they show promise in local tests. Testing over a wide area will give the plant breeders an evaluation of the new strains in 1 or 2 years, that could hardly be obtained by testing for several years in one section or area. In addition, basic information is secured on the various varieties and strains, pointing the way to the plant breeders for crossing varieties to obtain improvement of a strain in one or more characteristics.

"In general, the varietal response over the region has corresponded to differences expected due to length of day, rainfall, and fertility levels, with the exception of the lower coastal area of southeastern South Carolina, Georgia, Florida, and southern Alabama. In this area the varieties Monetta, C.N.S., Palmetto, and Missoy, all introductions or strains developed from introductions from Nanking, China, appear to be the most promising. Ogden, Volstate, Wood's Yellow, Tennessee Non-Pop, all of which are high yielding varieties in other sections, are definitely unadapted to this region.

"The varieties in Uniform Tests in the rainfall deficient area of Texas and Oklahoma have shown little promise. Yields have been very low except under irrigation. New strains developed in the cooperative breeding program are under observation at a number of locations in this area.

"Along the northern edge of the region, good yields of fair quality seed were obtained from a number of varieties from Group IV, S100, a strain developed by the Missouri station and C101 developed by Indiana, in particular, having been very productive. Low yields of poor quality seed result, however, from growing these strains farther south." Continued. Address: Agronomist, U.S. Regional Soybean Lab., Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA.

688. Henson, Paul R. 1945. Southern soybean program at the U.S. Regional Soybean Laboratory (Continued–Document part II). *Soybean Digest.* Sept. p. 47, 60.

• ***Summary:*** (Continued): "Promising Varieties: There are a number of promising varieties in the later maturing groups of which Ogden, in Group VI, is the outstanding variety. Developed by the Tennessee Station, this variety has produced high yields all across the upper half of the southern region. The principle objection to Ogden is that under very dry conditions it will shatter as it matures. Volstate, another high yielding variety developed by the Tennessee Station, has performed well in the tests. This variety matures approximately 2 weeks later than Ogden and shatters very little. N41-90, a new strain developed by the North Carolina Experiment Station, is equal, if not superior, to Volstate in yield, and is of particular interest at this time because of its high oil content. The new strains Acadian, Pelican and L.Z., developed by the Louisiana Station, definitely have a place in the lower South. These are late maturing, tall growing, non-shattering strains with a good oil and protein content.

"Need for Flexibility: The production of soybeans as an oil crop in the South will depend somewhat on the flexibility of this crop with respect to varying crop practices. In this connection, farmers in some sections of the South have found the practice of following early potatoes and winter grain with soybeans to be a profitable one. If productivity can be maintained over a wide range in dates of planting, without adversely affecting the chemical composition of the seed, the acreage of soybeans should be greatly increased. In order to obtain more complete information on this phase of soybean production, cooperative Uniform Dates of Planting Tests are being conducted at a number of locations.

"These consist of three or more varieties representing early, medium, and late maturing strains planted at 3-week intervals beginning in April. Yield data between different dates of planting at any one location have been quite variable.

"General trends in the effect of date of planting on yield and chemical composition are evident from the data, although erratic fluctuations in the data at some locations, apparently due to climatic conditions, tend to obscure such trends. There were no consistent differences in yield between plantings made in April and May. In most of the tests, the yields from late June and July plantings were distinctly lower than those from plantings made earlier in the season. The percentage of oil declined with the very late plantings, while a slight but progressive increase in the iodine number of the oil occurred with lateness of planting. The percentage of protein was not consistently affected by date of planting. Partial and total failures of June and July plantings were reported at some locations both years. These failures due very largely to droughts at planting time, are indicative of the risk involved in late plantings, particularly in the upper South.

"The prompt testing of new strains over a wide area in Uniform Tests, obtaining complete agronomic and chemical data in a short time; the distribution and exchange of new breeding material with other cooperators; the evaluation of cultural requirements of this crop in the widely different areas; and the study of and development of disease resistant strains–all are factors which should result in the development of superior strains of soybeans for industrial utilization for the South."

A large portrait photo shows Paul R. Henson. Address: Agronomist, U.S. Regional Soybean Lab,, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA.

689. Strand, Edwin G. 1945. Soybean production in war and peace. *USDA Bureau of Agricultural Economics, Farm Management Reports.* FM 50. 41 p. Sept. [5 ref]

• ***Summary:*** Contents: Development of the enterprise. Production regions. Yields and production. Expansion in the North Central States, Utilization of soybeans. Soybean processing. Soybean oil meal. Soybean oil. Prices. Future prospects: Markets, processing, production.

Discusses USDA work with soy and soybean introduction. A graph on page 1 shows that from 1924 to 1944, five Corn Belt states (Illinois, Indiana, Ohio, Iowa, and Missouri) harvested the vast majority of soybean acreage in the USA, but this percentage decreased after 1941.

Other graphs: Page 8: Soybeans: acreage planted for all purposes, United States, and selected groups of states, 1924-1944. The three main Delta states for soybeans are Arkansas, Mississippi, and Louisiana. The four Atlantic Coast states are North Carolina, Virginia, Maryland, and Delaware.

Page 10: Soybeans: Yields per acre harvested for beans, United States and Selected groups of states, 1924-44. "There is a strong upward trend in yields of soybeans in the Corn Belt and in the United States as a whole since 1924." In the

Corn Belt they increased from 11 bushels / acre in 1924 to 18.3 bushels / acre in 1944. Yields were lowest and grew most slowly in the three Delta states.

Page 15: Demand and government price supports had sparked a boom in both acreage and processing. Driven mainly by expansion in the Corn Belt states, acres planted in soybeans had increased from four million in 1943 to sixteen million a decade later, and the amount harvested for beans, rather than hay, made a particularly dramatic jump from six million acres in 1941 to ten million in 1942.

Page 17: The dramatic increase was in the number processed into oil and meal, which more than doubled from sixty-four million bushels in 1940 to 142 million bushels in 1944. Address: Agricultural Economist, USDA, Washington, DC.

690. *Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1945. Indicated yield and production of crops [percentages only]. 22(4):162. Oct.
• ***Summary:*** Soybeans. Gives statistics for the following states: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas. Condition Aug. 1: Average 1934-43, 1945. Condition Sept. 1: Average 1934-43, 1945. Stocks of beans on farms Oct. 1 (of old crop): 1944, 1945.

691. Lehman, Samuel G. 1945. Three important foliage diseases of soybeans–Bacterial blight, brown spot, and bacterial pustule. *North Carolina Agricultural Experiment Station, Raleigh, Research and Farming, Progress Report* 4(1):4-5. Oct.
• ***Summary:*** A popular account of bacterial blight, bacterial pustule, and brown spot. Reaction of soybean varieties grown in North Carolina to bacterial pustule is given.

692. Allington, William B. 1945. Wildfire disease of soybeans. *Phytopathology* 35(11):857-69. Nov. [10 ref]
• ***Summary:*** "An intensive soybean disease survey was made by, the United States Regional Soybean Laboratory in the summer of 1943, covering many of the heavy producing areas. Of particular interest was a disease identified as wildfire, caused by *Pseudomonas tabaci* (Wolf and Foster) Stapp.

"Three references in the literature report soybeans (*Soja max* Piper) susceptible to this parasite when artificially inoculated (1, 8, 10)... To the writer's knowledge, however, the disease has not been previously recognized to cause extensive damage to soybeans in the field. The total damage observed in 1943 and 1944 was not significant. However, in individual fields, damage was severe enough to make evident the potentialities of this disease on soybeans and to emphasize the need for careful study.

"Symptoms: Symptoms are so characteristic that this criterion alone is usually sufficient for identification of wildfire. The necrotic spots on the leaves are variable in size and are nearly always surrounded by a striking wide yellow halo (Fig. 1)."

"Summary: Wildfire, caused by *Pseudomonas tabaci,* is common on soybeans in most of the commercial soybean growing areas of the United States. The damage in isolated areas is severe. Morphologically, physiologically, serologically, and pathologically the organism isolated from soybeans does not differ from isolates of *Ps. tabaci* from tobacco, and the two diseases are considered to be caused by the same organism. Watersoaking of soybean leaf tissue greatly enhances penetration of the leaves by *Ps. tabaci* and spread of the bacteria through the tissue. Physiologic watersoaking was not so effective as storm watersoaking in bringing about penetration. Prolonged watersoaking was not necessary for the growth or dispersion of bacteria within the tissues."

A footnote at the bottom of the first page states: "A publication by the U.S. Regional Soybean Laboratory, a cooperative organization participated in by the Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration; 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." Address: Associate pathologist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

693. Smith, F.H.; Brady, D.E.; Comstock, R.E. 1945. Rancidity of bacon–Effect of antioxidants. *Industrial and Engineering Chemistry* 37(12):1206-09. Dec. [18 ref]
• ***Summary:*** This study shows that all of the antioxidants are effective in retarding the development of peroxides, the effectiveness of the gossypol varying with the concentration used. The induction or keeping period for the treated slices is three to five times longer than for those receiving no antioxidants. Smoking retards the development of rancidity in bacon, while light promotes its development.

Bacon slices dipped in hydrogenated vegetable oil containing .06% soybean lecithin–.01% mixed tocopherols–0.06% isoascorbyl palmitate had an induction period three to five times longer than the control. Address: North Carolina Agric. Exp. Station, Raleigh, N.C.

694. Bavender Special A: New U.S. domestic soybean variety. 1945. Seed color: Yellow (straw), hilum both black and brown.
• ***Summary:*** Sources: Morse, W.J. 1948. "Soybean varietal

names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 1. "Bavender Special–Bavender selection (Iowa)."

USDA Production and Marketing Administration [Grain Branch]. 1948. "Soybean varieties: Descriptions, synonyms and names of obsolete or old and seldom grown varieties." Washington, DC. 25 p. Aug. See p. 3. "Bavender Special–A selection said to have been made from a cross between the Mukden variety and a North Carolina variety by Mr. Bavender, Whitten, Iowa. Maturity, early; pubescence, tawny; flowers, both purple and white; pods, three- and four-seeded; shattering, little; seeds, straw yellow with both black and brown hilum, about 2,668 to the pound; germ, yellow; oil, 20.2 percent; protein, 41.5 percent; iodine number, 137."

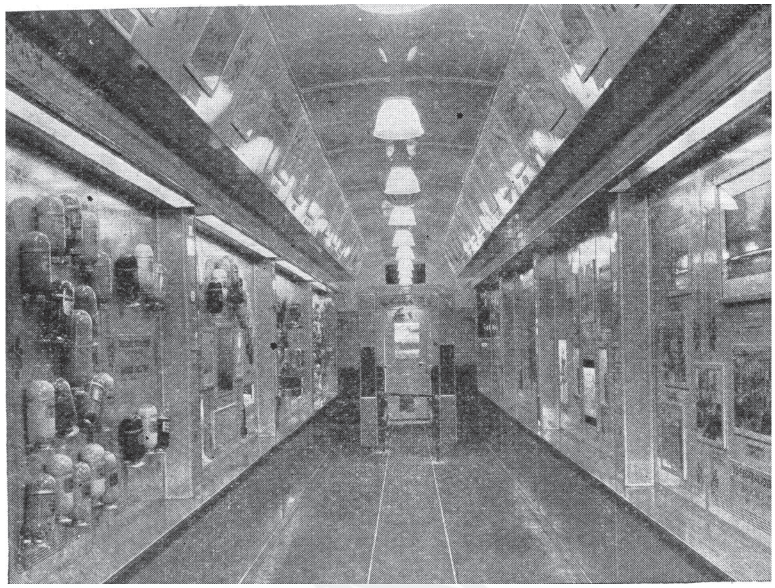
Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 8-9. Bavender Special A is in the USDA Germplasm Collection. Maturity group: III. Year named or released: 1945. Developer or sponsor: Mr. Bavender, farmer, Whitten, Iowa. Literature: 13, 14. Source and other information: Selected from 'Mukden' x an unknown strain from North Carolina. Prior designation: None. Address: USA.

695. Lager, Mildred. 1945. The work of U.S. railroads in promoting soybeans, industrial soy products, and soybean foods (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. 109-13.

• ***Summary:*** "The railroads of the soybean states have perhaps done more to further the industry than any other group; and they have sponsored huge educational projects to improve the quality and quantity of the soybeans and to further their use.

"As early as 1926, soy-processing mills needed increased acreage to enable them to operate throughout most of the year. They asked the cooperation of the railroads in interesting the farmers in growing beans, and as a result various soy trains and soy exhibits toured the states of the corn belt.

"In 1926 [sic, 1927], the Illinois Central in conjunction with the crops department of the University of Illinois organized a three-car train of soy exhibits and two picture cars, in which moving pictures were shown to demonstrate the then recognized practices for growing the crop. This train made some ninety stops in Illinois and was visited by



thousands of farmers. The project helped to stimulate an increase acreage of 44,000 the following year. Later, the program was carried out in Iowa with excellent response.

"Another such project was the Pennsylvania Railroad Soybean Exhibit Car, prepared in cooperation with the American Soybean Association, the U.S. Department of Agriculture, and the state agriculture colleges in the 18 states through which it operated, for the purpose of acquainting industry, agriculture, and consumers with the importance and possibilities of the soybean in our national life."

"Russel G. East, general agricultural agent of the Pennsylvania Railroad, gave the following report on the car's itinerary:

"'Probably no exhibit with a rural background has reached and held the interest of so many urban people. A large supply of literature, including annual reports of the American Soybean Association, bulletins from state experiment stations, United States Department of Agriculture publications, miscellaneous educational material prepared by local interests, and recipes for the soybean and its products were distributed extensively.

"'This traveling exhibit covered 17,643 miles in 18 states and was visited by 198,286 interested people.

"'The Soybean Exhibit Car started its tour at New Brunswick, New Jersey, August 16, 1937. Dr. J.G. Lipman, Dean of the College of Agriculture, very appropriately dedicated the exhibit to the service of the soybean industry in honor of Mr. James Neilson, who was for 50 years a trustee of Rutgers University and grew the first commercial crop of soybeans in America on what is now the New Jersey Experiment Station grounds. Inspection of the soybean experimental plots in the field where the crop was first grown by Mr. Neilson in 1878 was a feature of the dedication ceremonies.

"'The nation's Capitol was the next objective of the

exhibit car, after which it began a tour including New Jersey, Delaware, Maryland, Pennsylvania, Ohio, Indiana, and Illinois.

"'Arrangements were made by the University of Illinois Agronomy Department to place the display on the university campus for the occasion of the annual meeting of the American Soybean Association. This was the climax of the exhibit car's first scheduled tour, traveling from the place where soybeans were first grown commercially and concluding its schedule in the greatest soybean production center on the American continent.

"'In its travels this display proved so popular that it was found necessary to extend the operation into other sections. The new itinerary included visits to fairs, expositions, soybean processing plants, and industries using the soybean in their production programs.

"'Three railroads availed themselves of the opportunity to take this exhibit into their territories. This broadened the scope of the exhibit until it reached from South Dakota on the West to Florida in the South. The interest manifested shows the wide field to which the soybean has become adapted.

"'The Minneapolis and St. Louis Railroad, through their industrial and agricultural department, handled the display over their lines through Illinois, Iowa, Minnesota, and South Dakota. So great was the interest, their original schedule had to be increased to take care of the insistent demands of the people in those states.

"'The agricultural department of the Seaboard Air Line Railway arranged a schedule covering the South Atlantic states. In Florida the Tampa and Orlando Fairs included the display among their agricultural exhibits. Unusual interest was noted in Georgia and the Carolinas. Soybeans were found to be increasing in these states and in eastern Virginia. More than 32,000 people visited the exhibit while on the Seaboard Railway.

"'A final tour was made through the dairy and poultry districts of the East, particularly emphasizing the place of the soybean in feed rations. The largest attendance, outside of fairs and expositions, was found on this trip. Included in this was the time spent on the Coudersport and Port Alleghany Railroad.'

"This exhibit car was dismantled after the tour and was replaced by two portable exhibits that have been visited by some 3,000,000 people. During recent months, owing to the burden of wartime transportation, these exhibits have been kept off the road.

"Another railroad educational project was the Baltimore & Ohio 'Soybean Special' of 1941. This was made possible through the cooperation of the Agricultural Extension service and Agricultural Experiment Station of the University of Illinois, American Soybean Association, National Soybean Processor Association, Baltimore & Ohio Railroad and Alton Railroad and spent 6 weeks on tour throughout the soybean-producing territories of Ohio, Indiana, and Illinois. The train consisted of six coaches, three devoted entirely to soybeans, and the other three for living accommodations for the staff of 20 persons. The three exhibit cars consisted of a general soy exhibit car that covered the field of production and utilization; a farmer lecture car, a program of motion pictures and lectures on soybean varieties, production, and marketing; and a woman's lecture and exhibit car in which a cooking school was conducted and meatless soy loaf, soy date muffins, and soy fudge were served, supplemented by an exhibit of more than 200 food products made from soybeans.

"Two brochures, 'Soybean Recipes' and 'The Magic Plant,' prepared by the Agricultural Development Department of the railroad were distributed from the 'Special.'

"These proved so popular that several reprints have been made and distribution still continues with requests coming from practically every state and several foreign countries The railroad regards it as one of the most successful agricultural and educational projects they have ever conducted."

A photo (p. 112) shows the interior of the soybean exhibit car, Pennsylvania Railroad. Address: Southern California.

696. 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...

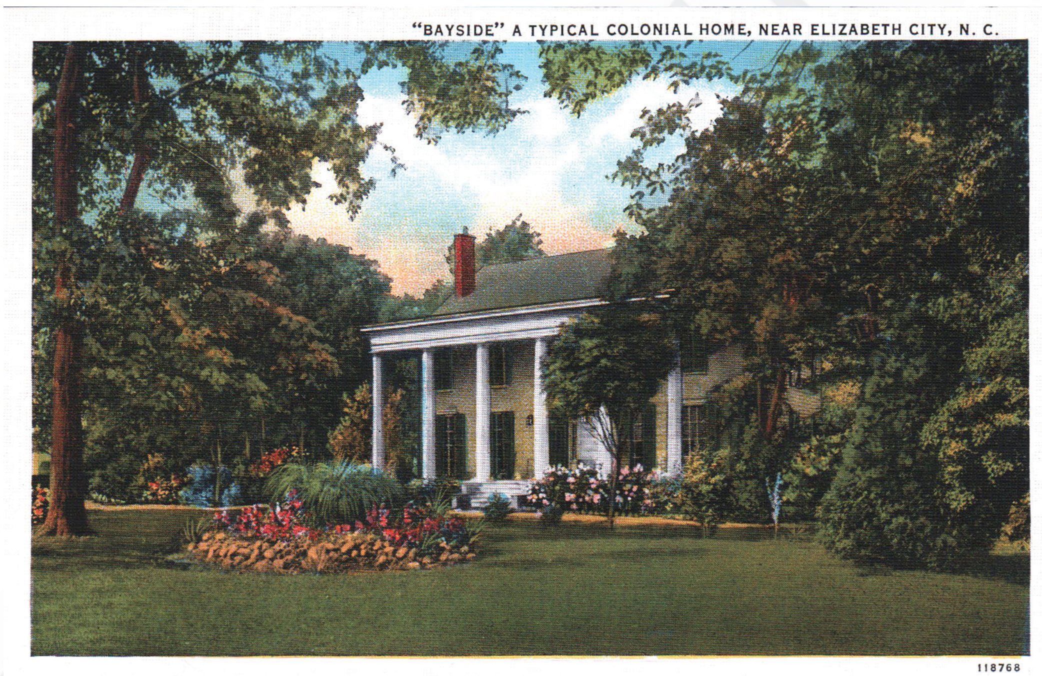
"Miss Elizabeth Groff, under my direction in 1918, made a thorough study of the fermentation of soy sauce in the famous factories of Canton, China, and published the first detailed account of the process in the *Philippine Journal of Science* for 1919."

"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.

697. Hollowell, Margaret. 1945? Who am I? Bay Side, Elizabeth City, North Carolina. 96 p. See p. 75. Undated. 28 cm. [1 ref]



• ***Summary:*** On page 75 is a newspaper clipping titled "Story of how soy beans were introduced here is told by Mrs. Outlaw, Sr. C. Wilson Hollowell recalls how they were planted at Bayside; Production of soy beans as far crop increasing tremendously in America." The article was published in *The Daily Advance* of 2 Nov. 1929 in Elizabeth City. At the bottom of the article Margaret Hollowell has written: "Lucy R. Outlaw (now Mrs. Samuel Wheeler Worthington) brought the bag of 'Japan peas' to C.W. Hollowell when she came to spend Christmas holidays with Mr. H."

Note: This book, located at the Museum of the Albemarle in Elizabeth City, is a sort of a pre-printed, fill-in-the-blanks or scrapbook format. It contents are mostly handwritten or clippings, and it has no index. Only one copy exists. Museum Curator Barbara E. Taylor noted (July 1990)

that "Margaret Hollowell was an historian to the nth degree; she saved everything. The copyright date printed in the book is 1926. Margaret writes on the first pages that she began the scrapbook on 20 Jan. 1930, though some of the newspaper clippings are as early as the 1890s. We believe the last entries to be dated to the mid-1940s."

Margaret died in either late June or early July, 1951. C.W. Hollowell completed "Bayside" in 1856 and lived there until his death. It was a typical two-storied colonial home, with tall white pillars on the front veranda, near Elizabeth City. Address: Elizabeth City, North Carolina.

698. *Crops and Markets* (*USDA*). 1946. Statistics of important crops by state, 1944 and 1945, with comparisons. 23(1):11. Jan.

• ***Summary:*** This publication of the USDA Bureau of Agricultural Economics has a half-page table divided into 3 main parts: (1) Soybeans for beans. (2) Soybeans for hay. (3) Soybeans grazed or plowed under. Statistics are given for all of the following states: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas.

Under the first two of the three main parts are given: Acreage harvested, yield per acre, and production. And under each of these are given statistics for: Average 1934-43, 1944, 1945. Concerning soybeans grown for their beans, the states with the largest production (in 1,000 bu) in 1945 are: Illinois (74,100), Iowa (34,848), Indiana (27,924), and Ohio (20,072).

699. *Crops and Markets* (*USDA*). 1946. Statistics of important crops by state, 1944 and 1945, with comparisons: Soybean acreage for all purposes. 23(1):22. Jan.

• ***Summary:*** This table gives statistics for 30 states: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas.

The 3 main headings are: Grown alone, interplanted, and equivalent solid (Footnote: Acres grown alone plus one-half of the interplanted acres). Under each of these headings are given statistics (in 1,00 acres) for: Average 1934-43, 1944, 1945.

The vast majority of soybeans are now "grown alone" and all of the leading soybean states have *no* interplanted acres. Concerning "equivalent solid," the states with the largest soybean acreage in 1945 are: Illinois (4,120), Iowa (2,013), Indiana (1,705), and Ohio (1,261).

700. 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.

701. 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 II). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 133. April 8. 19? p.

• ***Summary:*** (Continued): Page 9: "Special Topics.

"Discussion of General Soybean Fertility Problems by E.E. Hartwig–The experiments on soybean fertilization being conducted in North Carolina by W.L. Nelson were discussed by E.E. Hartwig.

"In some areas of North Carolina very low soycean yields have been obtained. Experiments are being conducted in which a program of soil testing together with fertilizer and varietal experiments are integrated in an effort to find the best method to increase the yield of soybeans to an economical level.

"Experiments have shown that in many soils applications of lime are necessary. In experiments on five soil types where the pH ranged from 5.0 to 4.1, broad-cast applications of 2000 to 9600 pounds per acre of dolomitic limestone increased the yield in each case. The average increase was 10.9 bushels per acre. It has been found that manganese deficiency will result on some of the dark poorly drained soils in the lower coastal plain if brought above pH 5.8 to 6.0.

"Potash experiments were conducted on seven soil types in which the available K_20 ranged from 28 to 535 pounds per acre. Substantial increases were obtained in all cases where the available K_20 was 103 pounds per acre or less when 60 to 120 pounds per acre of K_20 was side-dressed at first cultivation.

"Phosphate experiments were conducted at seven locations on six soil types. Treble superphosphate was applied in the row at planting at the rate of 40 to 60 pounds per acre of P_20_5. In one case where the soluble P_20_5 was 32 pounds per acre, an application of phosphate increased, the yield from 6.4 to 33.6 bushels. In five cases where the soluble P_20_5 ranged from 50 to 228 pounds per acre an application of phosphate increased the yield, on the average. from 27.5 to 29.4 bushels.

"As a result of these fertilizer trials, it is planned to conduct fertilizer-varietal experiments on farm fields where the yield of soybeans has been less than 20 bushels per acre. In these experiments, lime and phosphate will be applied where needed, before or at planting time, and 150 pounds of muriate of potash will be applied soon after emergence. Ogden, Roanoke and a local variety will be used.

"Studies on Soil Losses with Soybean and Cotton Rotations at the Southern Piedmont Conservation Experiment Station, Watkinsville, Georgia by W.E. Adams–The following report gives the soil losses in soil erosion studies for soybean and cotton rotations for the year 1942. The 57-year average annual rainfall for Watkinsville, Georgia, is 49.48 inches. The 1942 total rainfall was 50.09 inches; or 0.51 inch excess. Rainfall is generally fairly well distributed except for a drop in the spring and fall. The periodic soil losses based on continuous cotton are as follows:

"September-February 13% of year's total soil loss

"March-May 20%

"June-August 67%

"The heavy soil losses during the March-August period are due to the excessive rains which occur during this period. Generally about 6 rains cause approximately 90 percent of the annual soil losses.

Page 10: "Following is the runoff and soil loss summary for 1945 from a 3-year Kudzu-corn rotation on 11 percent slope, Class IV land;

"Crop; Runoff, percent; Soil loss, Tin

"1. Kudzu (no hay) 6.2 .24

"2. Kudzu (no hay) 5.1 .29

"3. Corn–Kudzu 6.4 1.04

"The following 3-year corn-Kobe lespedeza rotation also on Class IV land when compared with the corn-kudzu rotation, illustrates the effectiveness of kudzu in controlling soil and water losses.

"1945 data (average of 2 plots). Crop; Runoff (%); Soil loss (T/ac.)

"1. Oats (seed)–Kobe lesped. for seed 15.5 4.69

"2. Volunteer Kobe lesped. for seed 16.9 2.51

"3. Corn–Oats 14.1 5.48

"Soybean Production in the United States, Past and Future by E.G. Strand–The soybean is a relatively new crop in American agriculture. Fifty years ago the soybean in the United States amounted to little more than a garden curiosity.

However, the merits and possibilities of the plant were recognized by some workers in the United States Department of Agriculture and at some of the State Agricultural Experiment Stations. Consequently, in 1898, there was begun a program of introducing large number of soybean varieties into this country, primarily from eastern Asia, and this was accompanied by a program of improvement through selection and breeding. Thousands of soybean selections were brought in for study and experiment. During the last 40 years the rise of the soybean as an Amrican crop has been dramatic. The acreage grown for all purposes expanded from 50,000 acres in 1907 to 460,000 acres in 1917. By 1924 the planted acreage was approaching 2 million, in 1934 it was over 6 million, and in 1943 it was almost 16 million acres. Since 1942 soybeans have ranked seventh among American crops, exclusive of hay and pasture, in acreage of land occupied. In some counties in the Corn Belt soybeans have occupied more than one-third of the cropland during the war. A substantial industry based on soybeans has been developed, during the last decade.

"From the early part of the century until less than 20 years ago most of the soybeans in this country were grown in the eastern states and in the South. A rapid expansion began in the North Central States in the 1920's, and by 1934 the two leading states were Illinois and Indiana. In 1944 the five leading states were Illinois, Iowa, Indiana, Ohio, and Missouri, and these five states accounted for 84 percent of the acreage harvested for beans in the United States that year. The five leading states in the South in soybeans harvested for beans are now Arkansas, North Carolina, Virginia, Mississippi, and Tennessee.

"At first and for several years, soybeans in the United States were grown primarily as a forage crop. With the adoption of improved varieties for bean production a gradual increase in the proportion harvested for beans began to get underway. The proportion grown for this purpose increased rapidly during World War II. In 1944, 72 percent of the total planted acreage was harvested for beans.

"There has been a strong upward trend in yields of soybeans in tho United. States as a whole since 1924. The yields obtained in the Corn Belt have been the major factor in the national average. Average yields in the Delta fluctuated moderately from 1924 to 1937, and since then have moved upward to a level higher than average yields in the Atlantic Coast region. In the Atlantic Coast region yields have shown little trend since 1931 although the direction was downward before that time. Yields in the five Corn Belt States averaged 60 percent higher than yields in the other two regions during the four years 1941-44.

"The principal uses of soybeans (i.e., the beans) are for processing, for seed, and for feed. Processing for oil and meal constituted a minor use of soybeans until about 1930, and it was not until 1936 that as much as one-half of the domestic production was so used. The volume of processing increased rapidly during the last 10 years. In 1943-44 it was equal to 74 percent of the production.

"From 90 to 98 percent of the soybean oil meal produced in the United States is used for livestock feed. The total quantities used in making soya flour and in the manufacture of industrial products has never been but a minor proportion. As for soybean oil, by far the greatest proportion is used for food purposes (principally in shortening and margarine) but substantial quantities were also used in paints and other industrial products before the war. In 1939 soybean oil comprised 5.6 percent of the totel production of fats and oils (including butter, lard, tallow, and all vegetable oils) from domestic materials in the United States. In 1943, the proportion accounted for by soybean oil was 11.4 percent.

"The important elements in the price of soybeans are the prices of soybean oil and of soybean oil meal. Prices of soybeans in the years ahead will therefore be intimately affected by the general market situation for high-protein feeds and for all fats and oils, for these are highly competitive fields. The factor that will affect the market situation most will be the level of economic activity and employment in the nation. A conservative estimate for the postwar period might be an annual domestic disappearance in the United States of 11 billion pounds of all fats and oils and an annual domestic production of 10 billion pounds. If we assume that soybean oil will account for 8.5 percent of the total domestic production of fats and oils it would mean the harvesting of about 6,850,000 acres of soybeans for beans annually in the postwar period. (This estimate also involves the following assumptions: that yields will average 20.5 bushels per acre, that 70 percent of the soybeans produced will be processed for oil and meal, and, that the average yield of oil per bushel of soybeans processed will be 9.5 pounds. The acreage of cotton assumed in connection with this estimate was about 24 million acres). In addition to the soybeans harvested for beans about 3 million acres of soybeans would perhaps be grown for hay and other uses" (Continued). Address: U.S. Regional Soybean Industrial Products Lab., 205 Old Agricultural Building, Urbana, Illinois.

702. 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 III). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 133. April 8. 19? p.
• ***Summary:*** (Continued): Page 13: "The Bureau of Agricultural Economics is continuing the study of factors affecting the competitive position of soybeans in the United States in the years ahead. As a part of this study meetings were held last fall with several groups of soybean growers in Illinois and Iowa. In most of the areas represented at

these meetings the majority of farmers expressed the desire to reduce their acreages of intertilled crops below the wartime level in order to increase their acreages of oats and clover, and they indicated that this would generally mean proportionately larger reductions in acreages of soybeans than of corn. They made estimates of the acreages of soybeans that would be grown on typical farms under various assumed price situations. They also gave information relative to their experiences and practices in soybean production and on how soybeans fit into their farming operations. This information, together with that obtained from other sources, is being analyzed, at the present time. A report on this study is to be completed in the next few months and should be published within the year.

"Wednesday evening, February 13

"Dr. Milner gave an illustrated lecture on the work being done with soybeans at the Northern Regional Research Laboratory, Peoria, Illinois. Dr. Milner stressed the value of soybean oil in food products and mentioned the request from oil users that emphasis be placed on the development of low iodine number soybean strains. He pointed out that there is some dispute as to what causes reversion in soybean oil after refining. Some investigators hold to the idea that the phosphatide [lecithin] portion of soybean oil is responsible for reversion. However, other refiners express the opinion that the linolenic acid content of the oil is responsible and base their request for varieties with a low iodine number on this basis.

"Thursday. February 14–P.R. Henson, Chairman

"Resumé of Comments on the Origin, Objectives and Present Status of the U.S. Regional Soybean Laboratory, Stoneville, Mississippi 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 in 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 Urbana as the U.S. Regional Soybean Laboratory.

"Early in the war, it was evident that acreage requirements for soybeans would need to be met in part outside of the North Central Region. Considerable progress had already been made in the production of soybeans in limited areas in the South. It was believed that the acreage of soybeans could be expanded in the South if the region had the assistance of the Regional Soybean Laboratory. The Directors of the North Central Region agreed to make the facilities of the Laboratory available to the Southern States, provided additional funds were made available to take care of the increased costs of the expanded program. Arrangements were made accordingly with the understanding that if reductions became necessary at a later date, they would be in the expanded program. The question has also been raised as to whether the southern program was developed as a temporary war-time measure or a permanent part of the Regional Laboratory. This matter should be clarified by the Directors of the Region.

"You as technical collaborators representing the 12 cooperating Southern 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 in the South. 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 of 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 spend 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 Director Dorman with us this year as the official representative of the Southern Experiment Station Directors."

The next long section is titled "Arranging of the Uniform Tests, Groups IVS to VIII for 1946," by L.F. Williams. It gives the name and source of each strain [variety] that will be tested in these maturity group areas in 1946. Interesting private strains are Dortchsoy #2 and #7, and Coker Selection. The main sources of the seeds are Urbana, Illinois. Stuttgart, Arkansas. North Carolina Agr. Exp. Station. Stoneville, Mississippi. Louisiana Agr. Exp. Station. Bureau of Plant Industry Station, Beltsville, Maryland. Address: U.S. Regional Soybean Industrial Products Lab., 205 Old Agricultural Building, Urbana, Illinois.

703. 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.

704. U.S. Regional Soybean Laboratory. 1946. Recommendations for planting, care and taking of records for the Uniform Soybean Seed Treatment Test, 1946. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 134. Undated. 3 p.

• ***Summary:*** See next page. "One chemical treatment (2 oz. Arasan per bu.) is used in this test. Five lots of seed, each having characteristics of inferior quality, are employed. Each plot consists of two randomized rows of one variety, one row treated and one row untreated. The plots are arranged in four randomized blocks,

"1. Planting. Since yield will not be taken in this test, spacing of rows and length of rows are relatively unimportant. Apparently most cooperators intend to plant the seed in 8-foot rows. There are 100 seeds in each packet for each row. The row numbers are on the packet, and field plans accompany these instructions. Dates of planting are optional. In the case of three dates of planting, it is recommended that the first date be two weeks before normal, the second about normal, and the third two weeks after the normal date. In the case of two dates, the two earlier times would perhaps be best. Where only one date of planting is made, it should be about two weeks before the normal date. These recommendations are based upon the assumption that the beneficial effect of seed treatment will be most pronounced on earlier plantings. The untreated seeds should be planted first or by different persons in order to avoid carryover of chemical to the untreated seeds. To avoid loss of chemical from the seed, drop the treated seed directly from the envelope. The identity of the seed is as follows:

"1. Lincoln x Richland hybrid encrusted with mildew from Wisconsin.

"2. Volstate with low germination from North Carolina.

"3. Ottawa Mandarin with weather damage from Minnesota.

"4. Rose Non-Pop with low germination from North Carolina.

"5. Giant Green, weather damage and low germination. This lot is from Illinois and produces mostly *Alternaria* and *Aspergillus* in culture.

"2. Records. The final stand records obtained should be sent in as soon as possible. Other information desired is as follows:

"1. Type of soil.

"2. General soil fertility.

"3. Previous crop.

"4. Date of last soybean crop.

"5. Method and date of soil preparation.

"6. Moisture conditions at planting time.

"7. Moisture conditions between planting and final stand counts.

"8. Daily soil and air temperatures if possible (Maximum and minimum).

"9. Accurate notes on apparent disease control, particularly bacterial leaf spots, mildew, and seedling blights such as *Rhizoctonia* and *Pythium.*"

On pages 2 and 3 are diagrams concerning the 1st, 2nd, and 3rd planting dates. For each of the three, Blocks A through D are shown. For each block is given the Row, the Treatment, and the Variation.

Note: Even though this document is undated, we can estimate the date by looking at the dates of No. 133 (8 April 1946) and No. 135 (29 April 1946)–the documents in this series numbered just before and after this No. 134, which was probably published in mid-April 1946. Address: U.S. Regional Soybean Industrial Products Lab., 205 Old Agricultural Building, Urbana, Illinois.

705. Allington, William B. 1946. Phytopathological notes: Bud blight of soybean caused by the tobacco ring-spot virus. *Phytopathology* 36(4):319-22. April. [4 ref]

• ***Summary:*** Contents: Introduction and brief review of the literature. Symptoms. Identification of the virus.

The article begins: "A disease of soybean caused by the tobacco ring-spot virus has been responsible for substantial losses in yield in the midwestern producing areas in recent years. It is not definitely known how long significant damage has been occurring but the losses in 1943 and 1944 exceeded all previous records and ranks this disease among the most destructive of the soybean.

"Pierce (1934) noted the destructive nature of this virus on soybean and certain other legumes, but did not observe its occurrence in nature. Samson (1942) reported finding the disease in experimental plantings of vegetable soybeans in Indiana in 1941, Melhus (1942) observed it in Iowa in 1942, and later Johnson (1943) reported the disease on soybean in Ohio. It is likely that at that time, it was distributed extensively throughout the midwest in small amounts but had escaped detection."

Photos show: (1A) A soybean plant infected with the bud blight showing the characteristic curving of the terminal pod. (1B) Pod symptoms resulting from infection near blossoming time. Note distorted and shrunken pods. (Photograph 1B courtesy of Dr. B. Koehler of the Illinois Agricultural Experiment Station.)

A footnote at the bottom of the first page states: "A publication by the U.S. Regional Soybean Laboratory, a cooperative organization participated in by the Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration; and the Agricultural Experiment Stations of Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan,

First Planting Date

Block A Row	Treat.	Var.	Block B Row	Treat.	Var.	Block C Row	Treat.	Var.	Block D Row	Treat.	Var.
1	T	1	11	T	2	21	U	4	31	T	1
2	U		12	U		22	T		32	U	
3	T	2	13	U	3	23	U	5	33	U	2
4	U		14	T		24	T		34	T	
5	U	4	15	U	1	25	T	3	35	U	5
6	T		16	T		26	U		36	T	
7	U	3	17	T	4	27	U	1	37	T	4
8	T		18	U		28	T		38	U	
9	U	5	19	U	5	29	U	2	39	T	3
10	T		20	T		30	T		40	U	

Second Planting Date

Block A Row	Treat.	Var.	Block B Row	Treat.	Var.	Block C Row	Treat.	Var.	Block D Row	Treat.	Var.
1	U	2	11	T	5	21	T	3	31	U	3
2	T		12	U		22	U		32	T	
3	U	5	13	U	1	23	U	2	33	U	1
4	T		14	T		24	T		34	T	
5	U	3	15	T	3	25	T	1	35	U	5
6	T		16	U		26	U		36	T	
7	T	1	17	T	4	27	U	5	37	T	4
8	U		18	U		28	T		38	U	
9	T	4	19	U	2	29	T	4	39	T	2
10	U		20	T		30	U		40	U	

Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Virginia, and Wisconsin." Address: Associate pathologist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

706. Lehman, Samuel G. 1946. Control of bacterial pustule of soybean by dusting (Abstract). *Phytopathology* 36(5):405. May.
• ***Summary:*** Among materials tested, only copper dusts reduced the disease. Address: North Carolina.

707. Carr, Robert B. 1946. Soybean varieties in the Yazoo-Mississippi Delta, 1944-1945. *Soybean Digest.* July. p. 12-13.
• ***Summary:*** "The Delta Experiment Station, a branch of the Mississippi Agricultural Experiment Station, located at Stoneville, Mississippi, began its soybean research program in 1920, and by 1942 this program became one of the station's major projects. Since that period there has been a gradually increasing interest in soybeans in the Delta. The initiation of the southern regional program in 1943, with headquarters for the Southern states at the Delta Station, resulted in an expanded breeding and testing program under Mississippi conditions. In 1944 and 1945, introductions, progenies, selections and varieties under test numbered approximately 3,000."

"These investigations, concerned primarily with the production of better varieties of soybeans for industrial utilization and adapted to Delta conditions, may be divided rather broadly into: (1) The development of superior material by hybridization and through selections within introductions and established varieties; and (2) subsequent evaluation through field tests of these selections and varieties as to their date of maturity, yield, seed quality, and oil and protein content.

"Grouped According to Maturity: The 2,000 to 2,500 hybrid lines of approximately 75 crosses now under observation, represent the best blood lines of varieties adapted to northern, southeastern and southern conditions. These crosses were made by Dr. Leonard F. Williams of the U.S. Regional Soybean Laboratory, Urbana, Illinois, and Dr. E.E. Hartwig and Mr. J.A. Rigney of the U.S. Regional Laboratory and the North Carolina Agricultural Experiment Station, Raleigh, North Carolina, respectively. The maturity range of this material extends from early August to late November. In 1944 approximately 30 of the most promising commercial varieties were in the uniform variety yield tests and approximately 200 other varieties and selections were in preliminary yield tests. In 1945 the number of varieties in the uniform tests was increased to approximately 40, and the number in the preliminary test, including hybrid lines, to approximately 600. During 1944 and 1945 a number of these tests were conducted at several locations to determine the adaptation of these varieties and strains to conditions in the Yazoo-Mississippi Delta.

"Since the normal maturity of existing varieties, adapted to southern conditions, ranges from early September to early November, the varieties tested were grouped according to maturity in order to obtain more accurate information on the performance of each variety. They were grouped as follows: (1) early strains maturing prior to September 15; (2) medium strains, October 1 to October 15; (3) medium-late strains, October 15 to November 1; and (4) late strains, those maturing after November 1. At present there are no promising varieties which normally mature between September 15 and October 1.

"Plantings were made on four major soil types in the Delta, extending from the northern to the southern part of the area. The soils for the several locations are: Dubbs silt loam at Tunica; Robinsonville very fine sandy loam at Stoneville; Yazoo silt loam at Anchorage; and Sharkey clay soil (commonly known as 'buckshot') at Onward.

"Plant height and lodging notes were taken on the varieties as they matured. Yields were determined from the weight of seed harvested from a 16-foot section from each of the four one-row plots of each variety. All yields were analyzed statistically to determine whether the differences were significant. At some locations the two seasons varied to such an extent, primarily in the amount and distribution of rainfall, that the yield and rank of some varieties was quite different.

"The quality and size of seed of each variety was recorded, and a composite sample taken for chemical analysis. All analyses were made by the U.S. Regional Soybean Laboratory at Urbana, Illinois. Two-year average yields for 1944-45, other agronomic and morphologic data, percentage of protein, oil, and the iodine numbers of the oil are summarized by maturity groups in tables 1, 2, 3, and 4.

"Early Varieties: Many planters have expressed an interest in a soybean that can be combined before the peak of the cotton picking season. This has assumed increasing importance as the labor supply dwindled during the war years. Consequently, one of the aims of the soybean breeding program at the Delta Experiment Station is to develop an early maturing variety of soybeans.

"The early maturing strains being tested at the present time by the Delta Station are better adapted to northern than to southern conditions, 'being among the best for Kentucky, Missouri, southern Illinois and southern Indiana, where they mature during the cool fall months, producing excellent yields of high quality seed. Under Delta conditions, however, the same strains mature from late August to early September.

"The highest yielding early varieties in the Delta in 1944-45 were: C101, a new strain developed by the Indiana Agricultural Experiment Station; and S100 developed by the Missouri Agricultural Experiment Station..."

Continues to discuss: More early varieties. Medium

varieities (Ogden). Medium-late varieities (Roanoke, Volstate). Late varieities (Delsta, Mamloxi, Mamotan, Nanda).

Tables give a "Summary of agronomic and chemical data for the soybean varieties and strains, 1944-45." (1) Early maturing strains. (2) Medium maturing strains. (3) Medium-late maturing strains. (4) Late maturing strains.

A map shows the Mississippi Delta, located between the Mississippi River and the Yazoo River (which meet at Vicksburg), and the various locations where the soybean tests are conducted. Address: Asst. Agronomist, Delta Branch Exp. Station, Stoneville, Mississippi.

708. Staff of the Southern Section of the U.S. Regional Soybean Laboratory. comps. 1946. Results of the Cooperative Uniform Soybean Tests: Part II. Southern States–1945. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 136. July. 110 p. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/45soybook.pdf

• ***Summary:*** This entire document, including the cover, is typewritten.

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.

"(Not for Publication)

"July 1946

"RSLM 136."

Contents: Introduction. Cooperation. Location of cooperative nurseries. Map of Southern Region. Methods. Uniform Test, Group III. Uniform Test, Group IV-S. Uniform Test, Group VI. Uniform Test, Group VII. Uniform Test, Group VIII. Uniform Dates of Planting Tests.

Pages 4-5: Location of cooperative nurseries and cooperators.

Page 6 (Fig. 1): Map of southern states showing location of most of the cooperative uniform tests, 1945. Page 6a: Subdivisions of the Southern Region (from left to right): West (Texas and Oklahoma), Delta (Louisiana, Mississippi, Arkansas, Missouri), Upper and Central South (Tennessee, Kentucky, West Virginia), Southeast (including all of Alabama, Georgia, Florida, and South Carolina), and East Coast (North Carolina, Virginia).

Page 7: Methods: Tell show 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, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U.S.D.A.

709. 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.

710. 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.

"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.

711. Toole, Eben H.; Toole, Vivian K. 1946. Relation of temperature and seed moisture to the viability of stored soybean seed. *USDA Circular* No. 753. 9 p. Sept. [8 ref]

• ***Summary:*** "Seed of Mammoth Yellow and Otootan soybeans grown in North Carolina in 1933 was adjusted to four different moisture contents and stored at five controlled temperatures."

"With the natural moisture of approximately 13.5 percent the seed was dead after 5 months' storage at 30ºC. and after 2 years at 20º. Full viability was kept for 3 years at 10º, but germination fell rapidly after that. Practically full germination was maintained for 10 years at 2º and full germination at -10º.

"Seed dried to 8 to 9 percent moisture showed little or no loss of germination when stored at 30ºC. for 1 year, but the fall in germination was very rapid after 1 year. Seed stored at 20º germinated 90 percent after 5 years and lost viability gradually in subsequent years. This seed stored at 10º, 2º, and -10º did not change in germination in 10 years." Address: 1. Senior Physiologist; 2. Asst. Botanist. Both: Div. of Fruit and Vegetable Crops, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA.

712. Roanoke: New U.S. domestic soybean variety. 1946. Seed color: Yellow (straw), hilum light brown to brown.

• ***Summary:*** Sources: Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 7. "Roanoke–North Carolina Experiment Station selection."

USDA Production and Marketing Administration [Grain Branch]. 1948. "Soybean varieties: Descriptions, synonyms and names of obsolete or old and seldom grown varieties." Washington, DC. 25 p. Aug. See p. 15. "Roanoke–Selection, North Carolina 41-90, from a mixed lot of seed by the North Carolina Agricultural Experiment Station in 1941. Maturity, late; pubescence, gray; flowers, white; pods, two- to three-seeded; shattering, little; seeds, straw yellow with light brown to brown hilum, about 3,000 to the pound; germ, yellow; oil, 21.8 percent; protein, 40.1 percent; iodine number, 132."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 16-17. Roanoke is in the USDA Germplasm Collection. Maturity group: VII. Year named or released: 1946. Developer or sponsor: North Carolina AES (Agric. Exp. Station) and USRSL (U.S. Regional Soybean Laboratory). Literature: 13, 14. Source and other information: Rogue in 'Nanking'. 'Nanking' was PI 71.597 from the University of Nanjing, Nanjing, China, in 1927. Prior designation: N41-90. Address: USA.

713. Thurman, Benjamin H. Assignor by mesne assignments to Benjamin Clayton (doing business as Refining Unincorporated, Houston, Texas). 1947. Recovery of valuable fractions from glyceride oils. *U.S. Patent* 2,415,313. Feb. 4. 10 p. Application filed 20 Sept. 1943. 1 drawing. [4 ref]

• ***Summary:*** On page 1 of this patent is an elaborate diagram ("flow sheet") showing how many valuable fractions can be recovered from glyceride oils. "Such vegetable oils may be cottonseed oil, corn oil. soya bean oil, rape seed oil, sunflower seed oil, sesame seed oil, etc."

"This invention relates to the recovery of valuable fractions from glyceride oils and more particularly to a method by which a number of valuable constituents usually present in small amounts in glyceride oils are recovered as an incident to a rapid and economical refining process without the destruction of the oil or of other valuable constituents. The invention also relates to an improved

phosphatide product substantially free of sterols and other unsaponifiables."

Note: Soy is mentioned 5 times in this patent, always as "soya bean oil." Address: Charlotte, North Carolina.

714. 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.

715. *SoyaScan Notes.* 1947. Soybean growers and distributors, soybean seed, and soybean breeders (private) in the Soybean Blue Book (Overview). Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** The Soybean Blue Book was first published in

1947. If you scan the various issues until the mid-1970s, you will find an evolution of the three closely related concepts described above. The 1947 issue contains a full page titled "Edible soybean growers and distributors" (p. 89). The varieties grown are listed alphabetically. Under each variety is the name and address of the grower or distributor offering that edible soybean variety. The index entry is "Edible soybean growers."

In 1951 the title of the section has changed to "Soybean growers and distributors" (p. 142). The index entry is still "Edible soybean growers." The half-page section is divided equally into "Vegetable soybean seed" (11 companies listed alphabetically name) and "Soybean seed–wholesale" (9 companies listed alphabetically by state).

In 1955 the title and size of the section are unchanged (p. 158). But now the "Soybean seed–wholesale" part comes first and is larger (17 companies listed alphabetically by state). Only 8 companies sell "Vegetable soybean seed." They are now listed alphabetically by state. Gurley Milling Co. (Selma, North Carolina) is a new entry in both parts. Trisler Seed Farms (Fairmont, Illinois) is a new wholesaler.

In 1960 the title of the half-page section has changed to "Soybean seed" and is listed as such in the index. 32 companies are listed alphabetically by state. After most is a list of the varieties they sell.

In 1965 the title of this section is still "Soybean seed" but it has now more than doubled in size to 1¼ pages. 72 companies selling soybean seed are listed alphabetically by state. New listings include: C. Wesley Randall (Oskaloosa, Iowa), North Star Seeds (Springfield, Minnesota), Coker's Pedigreed Seed Co. (Hartsville, South Carolina; Coker Hampton 266, Coker Stuart, Coker 240), and L.B. Wannamaker Seed Co. (St. Matthews, South Carolina; Bragg). Eight companies sell "Vegetable soybean seed" are listed alphabetically by state. They include W. Atlee Burpee Co., Strayer Seed Farms, and T.W. Wood & Sons (Richmond, Virginia). Three vegetable varieties are listed: Bansei, Kim, and Kanrich.

In 1970 the title is still "Soybean seed" but the listings occupy only three-fourths of a page. There is no separate section for "Vegetable soybean seed."

In 1972, after passage of the landmark Plant Variety Protection Act in 1970, the section on "Soybean seed" has expanded to about 2 pages. It is listed in the index in two places: "Seed, soybean" and "Soybean breeders (private)"–the latter for the first time. 74 companies selling soybean seed are listed alphabetically by state. At the end, under "Vegetable soybean seed," four companies are listed: Jacob Hartz (Stuttgart, Arkansas). Farmer City Grain (Farmer City, Illinois). Strayer Seed Farms (Hudson, Iowa), and Gurley's Inc. (Selma, North Carolina). Six different vegetable varieties are sold. On p. 165 is a 2/3 page ad titled "Where a world of soybean growers put their trust," by Jacob Hartz Seed Co.

In 1973 the section titled "Soybean seed" is still about 2 pages, but now there are subdivisions (A-level heads) for each state. Within each state the companies are listed alphabetically by city. There are 66 listings. At the end, under "Vegetable soybean seed," three companies are listed. The two index terms are unchanged.

In 1975, for the first time, the section is titled "Soybean Breeders (Private)." Surprisingly, there are 12 listings, alphabetically by state.

716. *Soybean Blue Book.* 1947. Soybean production [statistics, USA]. p. 20-32.

• ***Summary:*** This section consists of many tables of U.S. soybean acreage, yield, and production statistics: (1) Soybean production in the United States, 1924-1946. Source: Div. of Agricultural Statistics, Bureau of Agricultural Economics, USDA. For each year the following 10 columns are given: Acres planted: Grown alone, interplanted, equivalent solid. Acres harvested: For beans, for hay, grazed, plowed under or abandoned. Average yield per acre harvested: For beans (bushels), for hay (tons). Total production: For beans (thousand bushels), for hay (thousand tons). Total production of soybeans grew from 4.9 million bu in 1949 to 196.7 million bu in 1946.

(2) Soybeans: Supply and utilization in the United States, 1924-1946 (1,000 bushels). For each year, beginning October 1, the following 10 columns are given: Supply: Total stocks Oct. 1, production, imports, total supply. Utilization: Seed, feed, processing, exports, other uses, carryover Sept. 30.

(3) Soybeans: Acreage, yield and production 1924-1946 by states. The columns given for each state are the same as those for table (1). A complete table is given for each of the following states (which appear alphabetically by state name): Alabama, Arkansas, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Mississippi, Missouri, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, Wisconsin. Minnesota (1933-1947). Other states, 1946 only: West Virginia, Texas, Nebraska, New Jersey, New York, North Dakota, Oklahoma, South Dakota.

717. *Soybean Blue Book.* 1947. Processors of soybeans [USA and Canada]. p. 44-64.

• ***Summary:*** Processors are listed by state (alphabetically), and within each state alphabetically by city. For each firm is given the officers, brand names, type of processing equipment, processing capacity, and storage capacity. "Information was obtained through questionnaires sent directly to the processing companies.

Arkansas–Blytheville: Swift & Co. Little Rock: Rose City Cotton Oil Mill. West Memphis: Arkansas Mills.

California–Fresno: Oil Seed Products Co. Oakland: Albers Milling Co.

Illinois–Alhambra: Alhambra Grain & Feed Co. Bloomington: Funk Bros. Seed Co. Cairo: Cairo Meal and Cake Milling Co. Cairo: Swift & Co. Champaign: Swift & Co. Chicago: Allied Mills, Inc. Chicago: Central Soya Co., Inc. Chicago: The Glidden Co. Chicago: Spencer Kellogg & Sons. Chicago: Swift & Co. Decatur: Decatur Soy Products. Decatur: Spencer Kellogg & Sons. Decatur: A.E. Staley Mfg. Co. Galesburg: Galesburg Soy Products Co. Gibson City: McMillen Feed Mills. Kankakee: Bordens Soy Bean Products Co. Mascoutah: Ph.H. Postel Milling Co. Monmouth: Ralph Wells & Co. Nashville: Huegely Elevator Co. Pana: Shellabarger Soybean Mills. Peoria: Allied Mills, Inc. Quincy: Quincy Soybean Products Co. Roanoke: Eureka Milling Co. Rock Falls: Sterling Soybean Co. Springfield: Cargill, Inc. Taylorville: Allied Mills, Inc. Virden: Hulcher Soya Products.

Indiana–Bunker Hill: Ladd Soya Co. Danville: Hendricks County Farm Bureau Co-op. Assn. Decatur: Central Soya Co. Ft. Wayne: Central Soya Co. Frankfort: Swift & Co. Lafayette: Ralston Purina Co. Marion: Hoosier Soybean Mills. Portland: Haynes Soy Products. Rushville: Rush County Farm Bureau Co-op. Assn.

Iowa–Belmond: General Mills, Inc., Chemical Div. Cedar Rapids: Cargill, Inc. Centerville: Pillsbury Mills, Inc. Clinton: Pillsbury Mills, Inc. Des Moines: Spencer Kellogg & Sons, Inc. Des Moines: Swift & Co. Dike: Farmers Cooperative Co. Dubuque: E.E. Frith Co. Eagle Grove: Boone Valley Cooperative Processing Assn. Fairfield: Doughboy Industries. Fort Dodge: Borden's Soybean Processing Co. Fort Dodge: Cargill, Inc. Gladbrook: Central Iowa Bean Mill. Hubbard: Hubbard Soybean Mill, Inc. Iowa Falls: Ralston Purina Co. Manly: North Iowa Cooperative Processing Assn. Marshalltown: Marshall Mills, Inc. Martelle: Farmers Cooperative Elevator. Muscatine: Hawkeye Soy Products. Muscatine: Muscatine Processing Corp. Plainfield: Roach Soybean Mills. Quimby: Simonsen Mill–Rendering Plant. Ralston: Farmers Cooperative Assn. Redfield: Iowa Soya Co. Sac City: Williams Milling Co. Sheldon: Big 4 Cooperative Processing Assn. Sioux City: Sioux Soya Co. Spencer: Cargill, Inc. Washington: Cargill, Inc. Waterloo: Borden's Soy Bean Processing Co. West Bend: West Bend Elevator Co.

Kansas: Coffeeville [Coffeyville]: Consumers Cooperative Assn. Soybean Mill. Emporia: Kansas Soybean Mills, Inc. Girard: Farmers Union Jobbing Assn. Hiawatha: Thomson Soy Mill. Kansas City: Kansas Soya Products Inc. Wichita: Soy-Rich Products, Inc.

Kentucky–Henderson: Ohio Valley Soybean Cooperative. Louisville: Buckeye Cotton Oil. Co. Owensboro: Owensboro Grain Co.

Louisiana–Alexandria: Red River Cotton Oil Co.

Michigan–Concord: Concord Soya Corp. Saline: Soybrands, Inc.

Minnesota–Mankato: Mankato Soybean Products, Inc. Minneapolis: Archer Daniels Midland Co. Minneapolis: Cargill, Inc. Minneapolis: General Mills, Inc. Minneapolis: Spencer Kellogg & Sons, Inc. Preston: Hubbard Milling Co.

Missouri–Kansas City: Ralston Purina Co. Kennett: Hemphill Soy Products Co. Mexico: M.F.A. Cooperative Grain & Feed Co. St. Joseph: Dannen Grain & Milling Co. St. Louis: Blanton Mill, Inc. St. Louis: Ralston Purina Co. Trenton: Central Farm Products Co.

Nebraska–Fremont: Fremont Cake & Meal Co. Lincoln: Gooch Milling & Elevator Co. Omaha: Allied Mills, Inc.

New York–Buffalo: Spencer Kellogg & Sons, Inc. Oswego: Oswego Soy Products Corp.

North Carolina–Clayton: Central Oil & Milling Co. Farmville: Farmville Oil & Fertilizer Co. Hartford: Southern Cotton Oil Co. New Bern: New Bern Oil & Fertilizer Co.

North Dakota–Grand Forks: North Dakota Mill & Elevator.

Ohio–Bellevue–Spencer Kellogg & Sons, Inc. Circleville: John W. Eshelman & Sons. Circleville: Ralston Purina Co. Cortland: Richards Milling Co. Delphos: Delphos Grain & Milling Co. Fostoria: Swift & Co. Lexington: Lexington Soy Products Co. Marion: McMillen Feed Mills, Inc. Ohio City: Holland Pioneer Mills, Inc. Painesville: A.E. Staley Mfg. Co. Springfield: Farm Bureau Cooperative Assn. Toledo: Toledo Soybean Products Co. Wooster: Soya Processing Co.

Oklahoma–Oklahoma City: Producers Cooperative Oil Mill.

Pennsylvania–Jersey Shore: Penna Soy Bean Co.

South Dakota–Sioux Falls: Western Soybean Mills.

Tennessee–Memphis: Buckeye Cotton Oil Co. Tiptonville: West Tennessee Soya Mill, Inc.

Virginia–Norfolk: Davis Milling Co., Portsmouth: Allied Mills, Inc. Portsmouth: Monsanto Chemical Co.

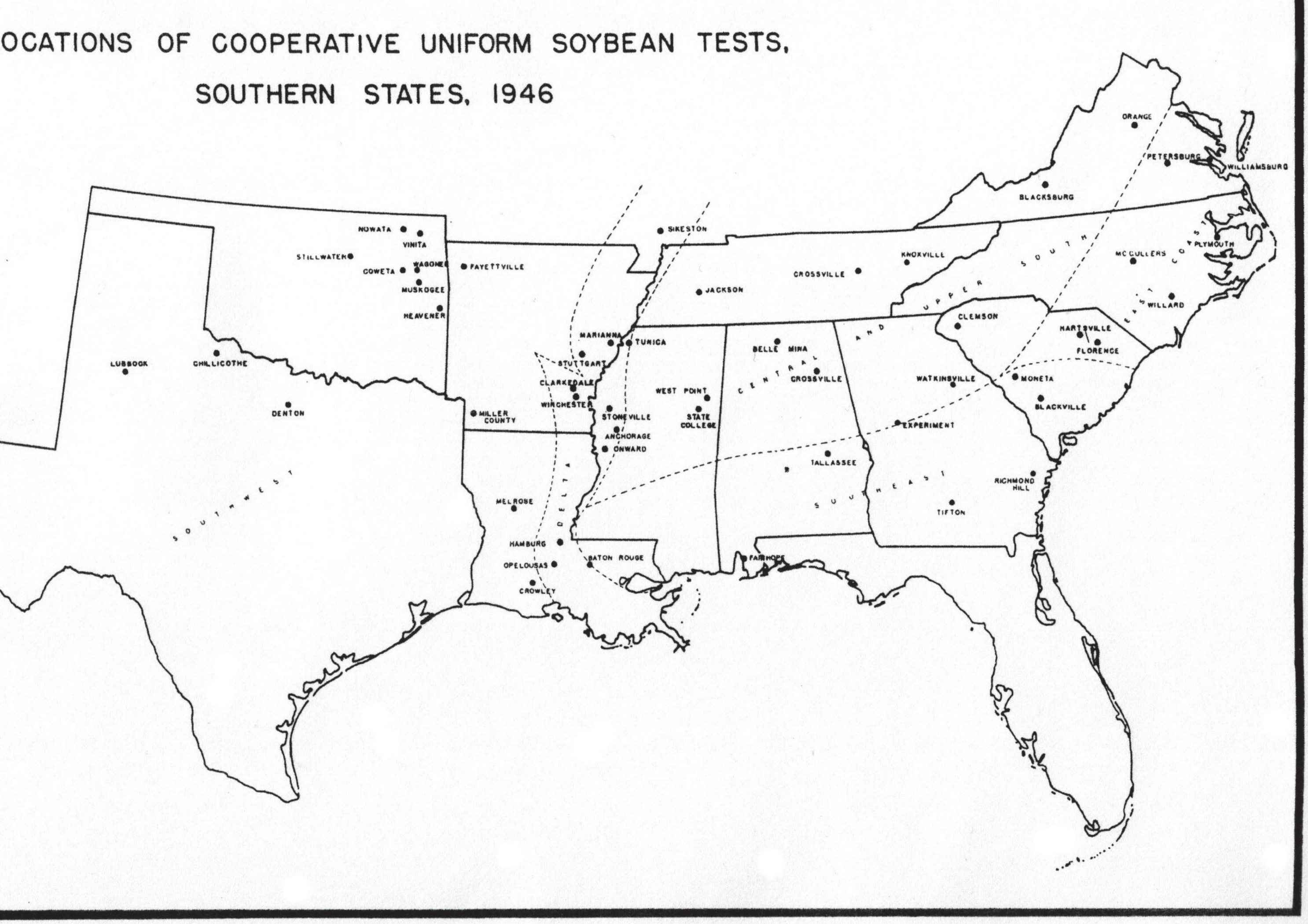
Wisconsin–Janesville: Janesville Mills, Inc.

Canada–Toronto: Dominion Linseed Oil Co. Toronto: Toronto Elevators Ltd. Toronto: Victory Mills, Ltd.

Note: This is the earliest document seen (Nov. 2007) which appears to show clearly that M.F.A. [MFA; Missouri Farmers Association] is now processing soybeans in Mexico, Missouri.

718. Lehman, Samuel G. 1947. Powdery mildew of soybean (Abstract). *Phytopathology* 37(6):434. June.

• ***Summary:*** In 1936 and 1944 powdery mildew was found in the pathology greenhouse at Raleigh, North Carolina. Peritheca present were of the genus *Microsphaera.* In Sept. 1945, *Microsphaera* was found on soybeans at several locations in eastern North Carolina. Varietal reaction to the disease was noted. Discusses: Erysiphe, Microsphaera, Erysiphe polygoni. Address: North Carolina Agric. Exp. Station, & Div. of Forage Crops & Diseases, USDA Bureau of Plant Industry, Soils & Engineering, cooperating.



719. Staff of the U.S. Regional Soybean Laboratory, Southern Section. comps. 1947. Results of the Cooperative Uniform Soybean Tests, 1946: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 141. June. 118 p. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/46soybook.pdf

• ***Summary:*** Except for the cover, this document is typewritten.

Contents: Introduction. Cooperation. Location of uniform tests [outline map of southeastern United States]. Weather summary. Methods. Uniform test, Group III. Uniform test, Group IV-S. Uniform test, Group VI. Uniform test, Group VII. Uniform Test, Group VIII. Preliminary Group V. Effect of location on composition. Disease investigation.

"Introduction: Breeding to develop adapted high-yielding varieties of soybeans, having a composition most suited to industrial utilization, is the chief objective of the cooperative program between the U.S. Regional Soybean Laboratory and the State Agricultural Experiment Stations of the Southern States. Active breeding programs are under way at a number of locations, representative of a wide range in environmental conditions. The free exchange of material for preliminary study between cooperative breeders is providing an excellent basis for the evaluation of new strains over the region. Many new strains from this program have been selected from hybrid populations for further study. All promising material is classified into maturity groups and is grown along with check varieties at a sufficient number of locations to enable agronomists to determine the value of these strains over a wide range of environmental conditions.

"Strains adapted to the Southern States are entered in the progressively later-maturing tests, Groups IV-S, VI, VII, and VIII. At normal planting dates, the varieties and strains of Group IV-S mature from late August to early September. The varieties and strains of Group VI mature in early October, those of Group VII in late October, and those of Group VIII in early November. The maturity of the varieties within these groups are progressively later across the Upper South and earlier in the Lower South.

"At the time the southern program was initiated in 1943, strains had not been developed of a maturity between Macoupin or S100 of Group IV, and Ogden-Arksoy varieties of Group VI. Varieties of this maturity would be particularly desirable as the early maturity and harvest would allow more time for seed-bed preparation and fall seeding of winter grains, an excellent cropping sequence in the South. The acreage per combine could also be materially increased by growing varieties of different maturities. In this connection, a group of new strains of Group V maturity, developed in the cooperative breeding program, were grown in preliminary

tests at a number of locations in 1946. The better strains of this group were selected by the collaborators and entered as Uniform Test Group V in 1947 regional tests."

Pages 4-5: Location of cooperative nurseries and cooperators.

Page 6 (Fig. 1): Map of southern states showing location of most of the cooperative uniform tests, 1945. Page 6a: Subdivisions of the Southern Region (from left to right): West (Texas and Oklahoma), Delta (Louisiana, Mississippi, Arkansas, Missouri), Upper and Central South (Tennessee, Kentucky, West Virginia), Southeast (including all of Alabama, Georgia, Florida, and South Carolina), and East Coast (North Carolina, Virginia).

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, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U.S.D.A.

720. Nelson, W.L.; Hartwig, E.E. 1947. Profitable soybean yields in North Carolina. *Better Crops with Plant Food* 31(6):6-10, 40-41. June/July.

• ***Summary:*** "Successful production of soybeans in the Southeast is largely dependent upon an adequate supply of plant nutrients and a good stand of an adapted variety (fig. 1).

"The 1939-44 reported yield of soybeans in North Carolina was 10.9 bushels per acre. Yields such as these are not profitable. As a rule, little fertilizer or lime is used on soybeans or on the crops in rotation with soybeans. Soybeans, however, require potash and phosphorus just like cotton, tobacco, corn, or any other crop (fig. 2). While the amounts removed by soybeans vary with location, season, and variety, it should be noted that approximately twice as much K2O [potassium oxide] as P2O5 [phosphoric anhydride] is removed.

"Experimental work conducted in North Carolina the past few years shows that yields of 30 to 40 bushels per acre can be regularly expected if proper production practices are followed. These important practices were found to be as follows:

"(a) Liming the soil with dolomitic limestone in accordance with its requirements as shown by soil tests.

"(b) Fertilizing with adequate amounts of potash and phosphorus.

"(c) Planting and securing a good stand of to adapted variety."

Figures show: (1) Photo of a soybean experiment on a Norfolk sandy loam low in available nutrients, particularly potash. The average state yield by application of points a-c above. (2) Ten bar graphs showing the amount of phosphorus and potash removed by each of five crops (the yield is shown for each crop; soybeans are 40 bushels per acre): Soybeans, tobacco, peanuts, cotton and corn. Soybeans remove the most of these two soil nutrients. Address: Agric. Exp. Station, Raleigh, North Carolina.

721. *Soybean Digest.* 1947. Williams is dead. July. p. 30.

• ***Summary:*** Prof. Charles B. Williams, age 76, first dean of the School of Agriculture and a well known research worker with soybeans at North Carolina state College, Raleigh, died of a heart attack at his home in Raleigh on June 24.

He was a member of the North Carolina State College faculty for over 53 years. His research was conducted largely in the fields of soybeans, soil surveys and fertilizers. In 1918 the *Country Gentlemen* selected him as one of the seven top ranking men in the U.S. in agricultural research.

722. Cartter, J.L. 1947. Research on soybeans. *Soybean Digest.* Aug. p. 12-14, 17.

• ***Summary:*** A talk given on Feb. 28, 1947 at the Soybean Conference, Northern Regional Research Laboratory, Peoria, Illinois, discusses some of the accomplishments of the Regional Soybean Laboratory at Urbana.

Editor's introduction: "A comprehensive breeding and disease control program, tailor-made to fit the changing needs of the times, has been developed by the U.S. Regional Soybean Laboratory. Mr. Cartter has been agronomist in charge of the Laboratory at Urbana since 1942."

"We plan to tell you this morning about the organization of the U.S. Regional Soybean Laboratory and some of the accomplishments. We will also discuss the soybean disease investigations of the Division of Forage Crops and Diseases and mention some of the accomplishments of that work. The U.S. Regional Soybean Laboratory was organized in 1936, being the third of a series of laboratories initiated under the Bankhead-Jones Act. The Soybean Laboratory as originally set up was a cooperation between the Bureau of Plant Industry, Soils, and Agricultural Engineering; the Bureau of Agricultural and Industrial Chemistry; and the 12 states of the North Central region.

"In 1942 the work on industrial utilization of the soybean was transferred to the Northern Regional Research Laboratory. At that same time, there was an urgent need developing for additional vegetable oils and high-protein feeds to meet the demands of the war period. At the request of the experiment station directors of the Southeastern states and with the permission of the directors of the North Central states, the work of the Laboratory was expanded to include the two regions. The purpose of the Laboratory as set forth in a cooperative agreement approved by the North Central directors in October 1942 reads as follows:

"'The object of the research to be done under this memorandum is to develop, through breeding, adapted superior strains or varieties of soybeans for industrial

purposes and to obtain facts relating to the effect of variety, soil, climate, fertilizers, minor elements, and disease on the growth methods of production, and composition of soybean seed for industrial uses.'

"Work during the first few years was devoted to fundamental studies on the methods of breeding soybeans and on exploring the factors affecting accuracy of nursery trials. Along with this work we also began the collection of soybean introductions and selections to serve as a foundation stock of germ plasm for the breeding work. Along with these fundamental studies and the collection of foundation material, an extensive program of breeding was initiated.

"The development of improved varieties of soybeans, in early years, came through selections from introductions obtained from the Orient. This first work, which occupied the period up to the last few years, resulted in the development of such varieties as Dunfield, Illini, Manchu, Richland, and many of the other varieties with which we have been familiar in the past and which have played an important part in the establishment of soybeans as a major crop.

"New, improved soybean varieties are now produced largely by hybridization. Most of the crosses that are being developed through the cooperative program are made at four or five breeding centers and the better of the segregating plant populations are distributed in an early stage to all the interested experiment stations so that further selection can be done in the area for which the strains are being developed.

"In connection with the evaluation of new strains, the establishment of an analytical section in the Laboratory has permitted the use of chemical analysis as a tool in the breeding work. In the past it has been customary to make selection only for yield, lodging resistance, seed quality, maturity, and such other agronomic factors that could be observed. The use of chemical analysis has increased tremendously the opportunities for developing varieties that are superior for industrial use, as well as superior in yield.

"After strains produced through the breeding work have become sufficiently fixed as to type, the better of them are placed in preliminary nurseries. The best of these are entered in what we have designated as the 'Uniform Soybean Tests' which have been set up to give a critical evaluation of the top strains that are being developed through the breeding program. The varieties and strains we are studying in the Uniform Soybean Tests are divided into maturity groups, and starting with the very earliest, adapted to North Dakota and Minnesota, we have designated these as the Uniform Test, Groups 0, I, II, III, etc., extending down to Group VIII which is composed of very late strains adapted to the southern part of the Gulf Coast Region of the United States; During the past season nurseries were planted at 44 locations in the North Central states and at 52 locations in the South.

"Accomplishments of the Breeding Program: In regard to accomplishments we will mention first some of the progress in the Southeastern states. In 1943 and for the next 2 years, the Uniform Tests which we established in cooperation with the state experiment stations of the region were composed mostly of the named varieties that were available and were being recommended by the state stations. These studies indicated that Ogden, which was then grown to a limited extent, was outstanding in the upper half of the Southern region, being the highest in yield and oil content of the strains under test, and being very lodging resistant. It is now the principal variety in this area. Ogden, however, is rather short especially on poor soils, and has a tendency to shatter. It is now being used extensively in crosses to carry its desirable qualities into new strains that are taller and hold their seed better.

"Roanoke, a selection from a mixed seed lot, has been developed at the North Carolina Experiment Station by Jack Rigney of the agronomy department and Edgar Hartwig of the Laboratory. Roanoke is some 10 days later than Ogden, being of about the same maturity as Volstate. It has been outstanding in the central South, slightly out-yielding Volstate, and having an oil content about 0.7 percent higher.

"A selection out of a cross Haberlandt x Ogden is showing much promise in recent yield tests. This strain has the yield of Ogden combined with the taller and better seed-holding habit of the Haberlandt variety. In general it is adapted to less fertile soils than Ogden and embodies the high oil content characteristic of the Haberlandt. Many of these new strains will rapidly replace the older varieties, as their value is realized and seed stocks become available.

"Up to this year there have been no particularly outstanding strains of the maturity of Group V, that is, for material to be grown through Tennessee, northern Arkansas, and Oklahoma. We are starting in 1947 a Group V nursery which will contain strains from crosses between Dunfield x Arksoy, Haberlandt x Dunfield, and a number of other crosses between the better northern and southern strains. We feel confident that through this breeding program strains will be developed that will be superior and well adapted to this area.

"Southeastern States: In the southeastern part of the United States some difficulty has been encountered in obtaining strains with good seed quality. It has been found that varieties coming from the Nanking region of China are able to develop good seed under these conditions. Many of these types, such as Monetta, Nanking, Palmetto, and Missoy, have been crossed with such high-yielding, high-oil-content strains as Odgen and Volstate, and selections from these crosses have been obtained that give indication of being superior to any of the strains now available for the southeastern Coastal Plains region. One of these new strains from a cross Ogden x Missoy entered in Uniform Test, Group VII, in 1946 led these strains in yield in the Southeast this first year.

"Turning to the North Central States, the first few years of the Laboratory work, so far as the development of

varieties and strains was concerned, was devoted mainly to the agronomic and chemical evaluation of the varieties that were available. Among the strains released on the basis of the evaluation were Patoka, Gibson, and Earlyana developed by the Indiana Experiment Station; Chief, developed by the Illinois Station; and Boone, developed by the Missouri Station. By growing strains in the Uniform Nurseries at many locations in a region, it has been possible to evaluate them in a relatively short period of time. This is due to the fact that within a single year the seasonal. conditions will vary considerably from place to place giving the equivalent of several crop years of information within a single season." Continued. Address: Agronomist in Charge, Regional Soybean Lab., Urbana, Illinois.

723. Jeter, F.H. 1947. A North Carolina pioneer [C.B. Williams]. *Soybean Digest.* Aug. p. 17.


C. B. WILLIAMS

• ***Summary:*** "Like a voice in the wilderness, C.B. Williams, agronomist for the North Carolina Experiment Station, and one-time director, cried out 30 years ago that the soybean was one of the most valuable plants ever to come to the state. I met Mr. Williams for the first time in the summer of 1914. That next November, I began work at State College as extension editor under the newly established agricultural extension service. One of the first jobs I was called upon to do was to help Mr. Williams sell soybeans to the farmers of the state. He stood almost alone. But he was indomitable in the courage of his convictions.

"Not only did be get samples of the beans from the farmers down in Hyde County, or from Camden, his native county, but he encouraged oil mills to buy the beans for crushing purposes and then he made suggestions to manufacturing concerns about using the beans for varnishes, paints, and other uses. That was pioneer work in those days. It was before the crusading of Henry Ford and others interested in chemurgy.

"Many a time, I have seen the learned agronomist crunching a bit of cracker or cookie made from soybean flour and, though the refining process had not been perfected, he claimed that it was delicious.

"Perhaps, if he had let his claim remain at 'nourishing' and left off the matter of taste, he would have been more successful in having the soy flour adopted as staple item of diet.

"But, having charge of the experimental plots and all of the research work in agronomy conducted by the state of North Carolina at that time, Mr. Williams saw to it that all new introductions of soybeans were tested in this state. He conducted variety demonstrations, fertilizer demonstrations, and breeding work. He wrote pages of solid copy for the newspapers and local farm magazines and he used the old Farmers' Institutes and their successor, the extension meeting, to promote the growth of soybeans. In a way he was successful. North Carolina adopted the soybean for a brief period. Some new varieties were originated; studies were made as to shattering; the two-wheeled mechanical soybean harvester was invented; and the place of the bean in the crop rotations of that day was investigated. The first commercial manufacture of soybean oil and oil meal in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Co. of Elizabeth City in Pasquotank County, N.C. This came largely at Mr. Williams insistence. The mill crushed about 20,000 bushels of soybeans at that time; and the manager of the mill said that changing over from crushing cottonseed to crushing the soybeans did not involve an expense greater than $5. Brought in by Sea Captain: Mr. Williams once told me that the first soybeans coming to North Carolina were brought to Hyde County about 1870 by an old sea captain who secured the beans in the Orient. In those days, men sailed the seven seas from the sand bound coast of eastern North Carolina. Later the beans came to Camden County and to old Edenton and to Elizabeth City and, still later, began to be distributed about over all of the coastal country. The growers called them Japan peas, coffee berries, and other names. They are still known in that section as 'peas.'

"As the soybean began to spread from the coastal lowlands across the state to the mountains, tobacco growers said the land was made too fertile by the legume. Other kinds of troubles seemed to follow the bean when it was planted for a number of years on the farm. The tobacco growers did not know about crowding more plants on the more fertile soil or balancing the increased nitrogen by more phosphate and potash, and so the beans lost favor. The Midwest took them on, but from that time production began to decline in North Carolina.

"They are coming back now as Tarheel growers realize that they had just about lost something very valuable.

New varieties more suited to actual farming conditions in this section have been originated by such men as Dr. E.E. Hartwig, J.A. Rigney, and their agronomy associates.

"But the man who gave the soybean to the South was Prof. Charles Burgess Williams. He was born in Camden County, N.C.; educated at State College where he was graduated in the first class; and served the state with lasting devotion until his death from a heart attack on June 25, 1947. He was 76 years old at the time of his death. He was the first dean of Agriculture at State College and its first agronomist. During his prime, he probably knew more about the crops and soils of his native state than any other man. He was primarily responsible for the active soil survey work undertaken, and he based his fertilizer and crop variety recommendations upon field experiments conducted on the several soil types. He was not a man who could be rushed into rash statements, but his convictions were deep; and I think that, even now, he is still somewhat disappointed in his fellow North Carolinians who would not see in the soybean the crop that he believed it to be."

A portrait photo shows C.B. Williams.

724. Gurtz, Robert F.; Miller, B.R.; Becker, J.A.; Peters, J.H. 1947. Soybeans: Production, farm disposition and value, by states, 1924-44. Washington, DC: Bureau of Agricultural Economics, USDA. 16 p. Oct.

• ***Summary:*** "Soybean production has expanded tremendously in the 21 years covered by this publication–from less than 5 million bushels in 1924 to over 190 million bushels in 1944. Farm disposition of the crop likewise has undergone many changes. In 1924 about 15 percent of the crop was used for seed on farms where produced, 25 percent was fed to livestock and the remaining 60 percent was sold. By 1944 the quantity of seed used on farms where produced accounted for 6 percent, only 2 percent was fed and sales amounted to 92 percent of production."

A table shows the statistics for the USA (total) and each state with significant soybean production. Unless otherwise indicated, the statistics start with the year 1924: Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa, Missouri, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, New York (1934), Pennsylvania (1934), Minnesota (1934), Texas (1934), New Jersey (1938), Nebraska (1938), South Dakota (1940), North Dakota (1942). Each table contains the following information: Year. Production. Farm disposition: Used for seed (total, on farms where grown), fed to livestock, sold. Season average price per bushel received by farmers. Value: Value of production, value of sales. Address: Crop Reporting Board, Washington, DC.

725. *Soybean Digest.* 1947. 25 years as a processor [A.E. Staley Mfg. Co.]. Oct. p. 8-9.

• ***Summary:*** "Celebrating the 25th anniversary of the beginning of its soybean processing operations, A.E. Staley Manufacturing Co. was honored at the annual dinner of All-Illinois Agricultural Conference, Decatur, Illinois, September 20.

"A.E. Staley, Jr., president of the company, was presented with a large bronze plaque from the Association by John McCaffery, president of International Harvester Co., principal speaker.

"Inscription on the plaque read: 'Presented to A.E. Staley Manufacturing Co. on the 25th anniversary of its first soybean processing operations, in recognition of the pioneer work of A.E. Staley and his associates which has meant so much to the farms of Illinois and other states and the city of Decatur Association of Commerce of Decatur, Illinois. Sept. 30, 1947.'

"Staley's points out, in an anniversary booklet entitled 'The Wonder Bean,' that when the firm began its processing operations [in 1922], the soybean was almost unknown to American farmers. Now it is the fourth largest [U.S.] cash grain crop, surpassed only by corn, wheat and oats.

"When the late A.E. Staley was in the starch business in Decatur and worrying about the decline in productivity of farm acres which were being depleted by successive plantings of corn during the years of World War I, he remembered how valuable soybeans had been–back on the home farm in North Carolina in the years just after the Civil War–in building up soil through use in crop rotation.

"And so, from 1916 to 1922, Mr. Staley had representatives travel throughout the Midwest, extolling the virtues of soybeans.

"The campaign was a gradual success. From 1914, when only 1,000 acres of soybeans were grown for seed, the figure doubled each year. By 1919 the planting was 15,000 acres and 30,000 bushels of soybeans were threshed out.

"When farmers started threshing soybeans, instead of growing them for hay or to plow back into the ground to enrich the soil, they began looking for a market for the threshed beans. This demand caused Staley to announce he would put in a soybean processing plant at Decatur, Illinois, which would buy all beans offered from the 1922 crop.

"The first unit, although its capacity was only 500 bushels daily, operated only 74 days during the 1922-23 season, because of the lack of beans. Mr. Staley was optimistic, however, that more would be grown, and kept on increasing the size of the unit.

"Public unfamiliarity with soybean oil and meal prompted Staley's to undertake educational work in conjunction with a sales program. Demand for soybean oil meal was whetted by articles in *The Staley Journal* and in farm publications and gradually created a market among feed dealers.

"Staley's 2 million dollar hexane extraction plant began operation in 1945, and supplements operation of Staley's

expeller plants at Decatur and Painesville, Ohio. Capacity of the extraction plant alone is 40 times the capacity of Staley's first unit."

A large portrait photo shows A.E. Staley, Jr., president of the A.E. Staley Mfg. Co., Decatur, Illinois.

A large illustration shows: "Pilot plant which is nearing completion at A.E. Staley Manufacturing Co., Decatur, Ill. Architect's drawing shows how the building will appear when completed. Proposed new manufacturing processes and plant layouts will be tested in this building before final approval is given for the projects."

726. Goss, Warren H. 1947. Report of investigation of target: Hansa-Muehle A.G. (Document part). In: W.H. Goss. 1947. The German Oilseed Industry. Washington, DC: Hobart Publishing Co. 248 p. See p. 24-34.

• ***Summary:*** Contents: Official description of target: Hanseatische Mühlenwerke A.G., more generally known as Hansa Mühle A.G., Hamburg-Neuhof, Alsterdamm 3. Target No. FA/18 and T5/82. Period of investigation: 7 Aug. 1945. Names of participants in investigation: W.H. Goss. Names of persons interviewed. Mr. Kruse, Director. Dr. Mayr., Chemist. Mr. Depmer, Engineer. Mr. Miller, Superintendent. Detailed presentation of information obtained: General, soybean extraction, phosphatide recovery, refinery, fatty acids, extraction of other oilseeds, expeller mill, soy flour, ethyl esters in margarine, hydrolysis of cellulose.

Hanseatische Muehlenwerke A.G., "is one of the more famous oilseed mills in the world, partly because of its large size and partly because it was here that the widely-used paternoster or Bollmann type solvent extraction equipment was developed by Dr. Hermann Bollmann starting immediately after World War I. When this development began, the company was experiencing financial difficulties related to the war, and funds for embarking on the new venture were obtained from a group of Hamburg bankers who still own most of the company's stock.

"During the twenty years following the first World War, the Bollmann system of extraction was developed gradually. In 1924, one Bollmann extractor was sold to an American firm–The Eastern Cotton Oil Co. in Norfolk, Virginia. The extractor was said to have a capacity of 80 tons of soybeans per day and was used on soybeans grown in North Carolina."

Table I shows 15 mills using Bollmann extractors and their capacity per 24 hours. The mills that process soybean are located in Germany, Belgium, USA, France, Netherlands, Italy, Hungary, and Switzerland; they include Central Soya Co. (Indiana, 70 tons of soybeans), Archer Daniels Midland Co. (Illinois, 300 tons of soybeans).

Hansa-Muehle made no soy flour; the largest producer of soy flour in Germany was the C.F. Hildebrandt Co. in Hamburg. At one time Hansa-Muehle furnished extracted soybean meal to a "Deback Co." on Wendenstrasse, and it was processed to produce low-fat flour.

727. Hartwig, E.E.; Nelson, W.L. 1947. Soybeans in North Carolina. *Soybean Digest.* Nov. p. 11-13.

• ***Summary:*** "In 1882 a soybean later designated as Mammoth Yellow was introduced into the northeastern section of North Carolina. This variety proved to be well adapted to the Tidewater area of North Carolina and Virginia and the soybean gained a foothold in America. Soybean production in that area was for the purpose of forage production or for seed to be sold in other areas.

"Many of these seeds were planted in more northern states where the variety would not mature. Consequently, it could be used for forage purposes only and growers had to come back to North Carolina for seed stocks each year. This market was lost when earlier maturing varieties were introduced into the Cornbelt. However, in 1915, 200,000 bushels of North Carolina grown beans were crushed by local cottonseed mills.

"The first statistics for the soybean crop were in 1909 when it was reported that 12,000 acres were grown in North Carolina with an average yield of 12 bushels per acre. A survey made in 1916 of 50 farms in the Tidewater area on which soybeans were grown found yields ranging from 4 to 39 bushels per acre with an average yield of about 19 bushels per acre.

"In the early years of soybean production, harvesting for seed presented a difficulty. The mule drawn one-row beater was developed for row planted beans, and under favorable conditions saved from 50 to 75 percent of the crop. With the development of the combine harvester most of the one-row beaters have been replaced.

"Soybean production in the Carolinas is confined largely to the Coastal Plain area. Here a large part of the crop is planted in rows and is harvested for seed. The Coastal Plain can be divided into the Tidewater area immediately along the coast in which the soils are rather low lying and high in organic matter, and the upper part of the Coastal Plain which has lighter soils. The Tidewater area is not as well suited to the culture of tobacco, cotton, or peanuts as the upper part of the Coastal Plain so soybeans have occupied a much larger percentage of the cultivated acreage. In some of the Tidewater counties of North Carolina, 35 to 45 percent of the cultivated acreage is planted to soybeans. Although soybeans are usually considered better adapted to the Tidewater area, equally good yields have been obtained on the sandier soils of the Upper Coastal Plain. In the Piedmont area a large portion of the beans grown are seeded solid after small grain and cut for hay.

"In the Tidewater area soybeans are planted to occupy the land for the full season or after mid-June following Irish potatoes. When grown as a full season crop they are usually grown in rotation with corn. Farmers in this area consider that soybeans have a definite beneficial effect on the physical condition of their soils. In the more southern sections of

the state and in South Carolina, soybeans are often planted after small grain is harvested. Excellent seed yields can be obtained with the late plantings but yields will decrease sharply in most years if the crop is planted after June 20.

"Relatively few varieties have gained prominence in North Carolina. The Mammoth Yellow variety which grew so well in the region produced seed relatively low in oil content, and shattered its seed quite readily upon maturity. Mammoth Yellow matured in late October. About 1907 the Tokyo and Haberlandt varieties were introduced. Neither of these varieties offered any improvement in seed holding but Haberlandt did have a higher oil content. Tokyo matures in late October and Haberlandt matures in early October. About 1936 the T.W. Wood Seed Co. of Richmond, Virginia, introduced a variety named Woods Yellow which was reported to be a selection from Mammoth Yellow. Woods Yellow holds its seed fairly well, has a rather low oil content, and produces a rank, coarse plant somewhat difficult to combine. In recent years Woods Yellow has been the most popular variety, although Tokyo and Haberlandt have been quite popular in some areas.

"CNS Popular: Another of the old varieties is Biloxi, a late, rank-growing, brown-seeded type. Biloxi has been largely interplanted with corn for soil improvement or for grazing. Several varieties, Palmetto, Missoy, Clemson, Nanking, and CNS, derived from introductions from Nanking, China, make excellent growth in the Upper Coastal Plain of South Carolina and Georgia. All of these varieties have low oil content and with the exception of CNS shatter quite badly. CNS is now grown to greater extent than any other variety in this group.

"Varieties now recommended for North Carolina are Ogden and Roanoke. Ogden, developed by the Tennessee Agricultural Experiment Station, was first grown on a field scale in North Carolina in 1944, and has been well received by soybean growers. Ogden has a medium growth type, stands very well, has a good oil content, and shatters less than Tokyo and Haberlandt. Ogden will usually hold its seed at least 2 weeks after it has reached combine maturity. It matures about October 10 to 15. During the 1946 season Ogden demonstrated that it could tolerate an excess of moisture better than some other varieties on the low lying poorly drained soils.

"In the spring of 1946, the variety Roanoke was released from the North Carolina Agricultural Experiment Station as a result of cooperative research with the U.S. Regional Soybean Laboratory. Roanoke is a late-October-maturing bean, medium tall in growth habit, holds its seed extremely well, and has the highest oil content of any soybean adapted to the southern states. Its average oil content for the past 3 years at the Experiment Station farm near Raleigh is 21.9 percent as compared with 19 percent for Woods Yellow. Roanoke can be expected to give higher seed yields than Woods Yellow if plant nutrient requirements are adequately supplied. Since Roanoke is a taller growing variety than Ogden it has a greater tendency to lodge, especially on heavier soils. However, the added height is usually an advantage in the Upper Coastal Plain. Roanoke is also well adapted to the Coastal Plain of South Carolina.

"A rather extensive breeding program was initiated in 1942 to develop better adapted varieties. This program was expanded in 1943 in cooperation with the U.S. Regional Soybean Laboratory. In addition to high yielding ability, improvement in seed holding, lodging resistance, chemical composition, seed quality, and disease resistance are considered highly important. During the past season (1946) approximately 25,000 F2 plants and over 4,000 single plant progeny rows were grown for selection purposes. Approximately 500 new strains, mostly selections from crosses, were grown in replicated yield trials at several different locations. Some of these strains give promise of improvement over existing varieties.

"There is little hope for raising the low average yield for North Carolina to any appreciable extent by breeding alone. The production of a profitable yield of soybeans demands an adequate supply of plant nutrients and the success of soybeans in the Southeast will depend upon satisfying the nutrient demands. Unfortunately the soybean early gained the reputation of getting along without any fertilizer. In addition to being grown without the addition of any fertilizer, soybeans are also quite often grown in rotation with crops receiving only light applications of fertilizer.

"When one drives through the Coastal Plain area in mid-summer potash deficiency as shown by foliar symptoms is readily apparent and wide spread. However, numerous experiments during the past few years have demonstrated that yield responses can be expected from potash applications even when plants appear to be making normal growth and show no foliar symptoms. Not so conspicuous but equally widespread is the need for limestone. Many of the soils of the Tidewater area have a pH value of 5 or below. These soils give excellent responses to applications of dolomitic limestone. However, liming in excess of pH 6.0 will cause manganese deficiency on some soils. Most of the Coastal Plain soils are better supplied with phosphate than with limestone or potash, but phosphate is equally necessary in producing satisfactory seed yields.

"The present fertilizer recommendations for soybeans in North Carolina are as follows:

"(1) Lime in accordance with needs as determined by soil analysis and

"(2) Apply 400 pounds of 0-10-20 fertilizer per acre, unless beans are grown in rotation with a heavily fertilized truck crop.

"A 40-bushel crop of beans removes approximately 30 pounds of P_205 [phosphoric anhydride / phosphoric acid] and 60 pounds of K_20 [potassium oxide] from the soil. Results during the past few years indicate that 30 to 40 bushels

of beans per acre can be safely expected with the use of an adapted variety and a complete fertilization program." Continued: Address: 1. Associate Agronomist, U.S. Regional Soybean Lab., Bureau of Plant Industry, Soils & Agricultural Engineering, Agricultural Research Administration, USDA; 2. North Carolina Agric. Exp. Station.

728. Hartwig, E.E.; Nelson, W.L. 1947. Soybeans in North Carolina (Continued–Document part II). *Soybean Digest.* Nov. p. 11-13.

• ***Summary:*** (Continued): "On Coastal Plain Area: During 1946 nine variety-fertility experiments were carried to completion in the Coastal Plain area of North Carolina. These tests included the varieties Ogden, Roanoke, and the local variety; each variety was grown on limed and unlimed soil, with and without 400 pounds of 0-10-20 fertilizer. The average yield for the Ogden variety in these nine experiments was as follows: no treatment 22 bushels; lime alone, 24.8 bushels: 400 pounds 0-10-20, 27.2 bushels; lime plus 400 pounds 0-10-20 fertilizer, 34.4 bushels.

"A good illustration of the need of a balanced fertility program are the results obtained in one of these experiments on the O.P. Wells farm in Duplin County on a Dunbar fine sandy loam. The Ogden variety produced 22.5 bushels with no treatment, 22.4 bushels with fertilizer, 32.8 bushels with lime alone and 37.7 bushels with lime and fertilizer. If this farmer had used only fertilizer with no lime he could easily have supported the long standing idea that fertilization of soybeans did not pay. His soil had a pH of 5.2 and 1 ton of dolomitic limestone was applied.

"In another experiment on a Norfolk loamy fine sand very low in potash and having a pH of 5.8 the following yields were produced; no treatment, 5.0 bushels; lime alone, 2.6 bushels; 400 pounds 0-10-20, 22.1 bushels; lime plus 400 pounds 0-10-20, 31.9 bushels (see Fig. 1).

"Returns from Fertilizers: Some will concede that fertilization might pay where yields are extremely low. However, in an experiment on an Elkton silt loam in Pasquotank County a yield of 42 bushels was obtained with no treatment and 48 bushels with application of 400 pounds 0-10-20–a return of $16.50 for a $7.00 investment. In several instances yields of approximately 30 bushels have been obtained with no treatment and increases of at least 10 bushels obtained following treatment. While excellent yield responses have been obtained following applications of lime and an 0-10-20 fertilizer, there still may be other factors limiting yield in some instances such as the physical condition of the soil or minor elements. Either excesses or deficiencies of rainfall may seriously curtail yields but fluctuations due to weather are minimized with good fertilizer practices.

"Along with an adapted variety and sound fertilizer practices a good stand is essential to high yields. In an experiment conducted in the Tidewater area in 1944 using the Ogden and Volstate varieties with 12, 6, 4 and 2 plants per foot, the average yields of the two varieties were 42, 37, 32 and 25 bushels respectively. At another location the same year under extremely dry conditions no yield response was obtained.

"Last year a farmer cooperator combined approximately 25 bushels per acre from his Haberlandt beans with an average stand of two plants per foot. His same seed planted in the variety-fertility experiment with an average stand of eight plants per foot at maturity produced 35 bushels per acre. In addition to usually giving an increase in yield, the more thickly planted beans get off to a faster start and materially aid in weed control. This in itself is considered sufficient justification for thicker planting. Also from the standpoint of weed control, a 36-inch row is favored over a 42-inch row as the middles are more quickly and completely shaded and weed growth is retarded. Present rate of planting recommendations are to plant 10 to 12 seed per foot. When planting in 36-inch rows approximately 1 bushel per acre will be required with either Ogden or Roanoke varieties.

"While research in varietal improvement, fertilization, diseases, and cultural practices will be continued, an active extension program under the supervision of Dr. E.R. Collins, in charge of Agronomy Extension is under way to make the 12-14 bushel state average yield a thing of the past. In 1947 each county agricultural agent in the Coastal Plain area of North Carolina had at least one demonstration putting the best production practices known into use. This demonstration consisted of 1 acre limed in accordance with need at least 2 months before planting and fertilized with 400 pounds 0-10-20 fertilizer. Care was taken that the fertilizer was not in direct contact with seed. Good quality Ogden or Roanoke seed were planted at the rate of 10 to 12 beans per foot in 36-inch or 42-inch rows. Beans were planted in a well prepared seed bed between May 1 and 20th and cultivated to control weeds. One-half acre of beans were planted on either side of the demonstration acre and handled according to the farmer's usual practices. Harvesting of these beans will help many farmers to realize that they too can produce a good yield of soybeans.

"With the gradual decline in cotton acreage and improvement in corn fertilization practices, additional acres will probably be released for the production of other crops. Soybeans can readily fit onto this land and will produce profitable yields when adequately fertilized. Numerous cotton seed mills (hydraulic press type) each year process the present soybean crop and are interested in increased production. The expanding livestock industry gives promise of an expanding local market for protein feeds."

Photos show: (1) Response to potash fertilizer in a field of Ogden soybeans having a Norfolk loamy fine sand very low in potash. (2) A field showing soybeans planted in beds for drainage purposes on a low lying soil in the Tidewater area. Roanoke variety, seed yield 41 bu per acre. (3) Woods

Yellow variety left, Roanoke right, showing rapid early growth characteristic for Roanoke. Soybean variety-fertility experiment in Duplin Co. Seed yield of Woods Yellow 29.7 bu per acre, Roanoke 36.4 bu per acre. Address: 1. Associate Agronomist, U.S. Regional Soybean Lab., Bureau of Plant Industry, Soils & Agricultural Engineering, Agricultural Research Administration, USDA; 2. North Carolina Agric. Exp. Station.

729. Henson, Paul R. 1947. Soybeans for the South. *Yearbook of Agriculture* (*USDA*) p. 338-343. For the years 1943-47. [3 ref]

• ***Summary:*** "Several new varieties of soybeans have been developed that strengthen the position of soybeans, as an oil crop for industrial use in the South. The new kinds are of wide adaptation, and the southern farmer now has a much better opportunity to select a high-yielding variety suited in his own cropping practices.

"And, looking to the future, breeding programs are going forward all over the South. Large numbers of new strains and hybrid lines are being tested, or are under observation at many of the southern experiment stations. Crosses have been made and promising early strains having a high oil content are being selected from crosses between high-yielding, high-oil northern varieties and adapted southern varieties. Several non-shattering hybrid lines that appear to have good yielding ability are under test. Lines resistant to bacterial pustule have been selected from crosses with CNS and other southern varieties. Crosses between high-yielding grain types are expected to bring us productive strains better adapted to the lower Coastal Plain section of the Southeast.

"It is not unreasonable to expect that from all this material many new strains will soon be developed, fully capable of meeting the needs of the southern farmer for an oil bean and of overcoming several circumstances that have been handicaps to growing soybeans there: The lack of adapted varieties, the conflict with cotton for labor during the harvest season, and adverse climatic conditions during the late fall and winter.

"Two areas produce more than 90 percent of the soybeans grown in the South for industrial use: The Coastal Plain soils of North Carolina and Virginia and the Mississippi Delta sections of Arkansas, Tennessee, Mississippi, and Louisiana. Only 17.5 percent of the total soybean acreage in the South was harvested for beans during the 10-year period, 1934 to 1943. The average yield then was 11.1 bushels an acre. In 1945, after several better kinds became available, 27.6 percent of the total acreage was harvested for beans, and the average yield, 13.8 bushels an acre, was 24 percent above that from 1934 to 1943.

"To meet the demand for more oil during the war and to encourage an expansion of soybean plantings in the South by developing varieties adapted to the section so it, too, could help fill the need, the facilities of the United States Regional Soybean Laboratory at Urbana, Illinois, were expanded in 1942 to include 12 Southern States in a cooperative soybean improvement program. Southern headquarters for the region were located at the Delta Branch Experiment Station at Stoneville, Mississippi.

"To achieve the chief aim of the program–the development of adapted higher-yielding sorts for industrial uses–varieties must be developed that not only yield more, but resist shattering, lodging, and diseases, and have a content of oil and protein most desirable for industrial uses. Such new varieties, besides, must fit into the varied rotations and cropping practices characteristic of the different sections of the South. Cotton farmers of the Delta section of Arkansas, Mississippi, and northern Louisiana want a high-yielding variety that will mature in August or early September so they can better use their labor supply. Others want a kind that will mature in September or early October, so that winter grains or alfalfa may be planted after the soybeans are combined. Possibly a somewhat different type is needed in the East and Southeast, where soybeans are often planted after oats or, as in southern Alabama, after early potatoes. The farmers of Oklahoma and Texas want a productive, drought-resistant variety that will develop and mature seed during dry summers. All these factors had to be considered.

"The principal varieties that were being grown for beans when the southern soybean program was initiated were Arksoy, Arksoy 2913, Ralsoy, Mamredo, and Macoupin in the central and upper South; Wood's Yellow, Herman, and Tokyo, in the East; and Palmetto, Mamloxi, Clemson, and Nanking in the South and Southeast. Two new strains, Ogden and Volstate, had been developed and released by the Tennessee Agricultural Experiment Station, but had not been grown to any extent over the South at that time.

"Breeding and selection work to develop better adapted varieties are under way at most of the southern experiment stations in the cooperative program. New strains are entered in the uniform tests across the region as rapidly as they are developed. The varieties are grouped by maturity, in conformity with the system established by the Regional Soybean Laboratory in 1938. The varieties and strains of the Uniform Tests, groups 0 to IV, are adapted to the Northern States. The southern varieties are entered in the progressively later maturing groups of VI, VII, and VIII. Through the mid-South, the strains of group VI normally mature from October 1 through October 15, those of group VII, October 16 to 30, and group VIII, November 1 and later. The maturity of these groups is a few days later across the upper South and earlier in the lower South. Varieties of late September maturity, group V, have not yet been developed. Because of the interest in very early maturing beans, the varieties and strains of group IV are being grown at a number of locations across the upper South. Cooperators in the region carefully note

yields, with other agronomic and morphologic data. Seed samples from the tests are sent to the Urbana laboratory for chemical analyses. All data on new varieties are taken from the regional variety tests. Because the varieties in the tests were regrouped in 1944, only 2-year averages are given.

"The new, early-maturing strain, S100, has consistently yielded above the commercial varieties of this maturity. It is a rogue out of Illini, and was developed under the direction of B.M. King, agronomist of the Missouri Agricultural Experiment Station. The seeds are yellow and medium in size. S100 is tall-growing, with gray pubescence and white flowers. The principal objection to it is its low content of oil. It yields well and is well adapted along the northern rim of the southern region, but excellent yields of good quality beans have been obtained from it as far south as Stoneville.

"Ogden is the most productive soybean of midseason maturity for the South. It was developed from a selection from the cross, Tokyo x P.I. 54610, by the late H.P. Ogden, associate agronomist of the Tennessee Agricultural Experiment Station. Ogden is erect, bushy, and medium tall. It has gray down on leaves and stems–pubescence–and purple flowers. The seeds are olive yellow, medium in size, and high in quantity of oil. It is more resistant to leaf diseases, particularly bacterial pustule, than the other kinds of the same maturity. But under very dry conditions Ogden will shatter shortly after maturity. Shattering appears to be more severe on light-textured, infertile soils. Ogden is well adapted to the central and upper part of the South; it has led all varieties of group VI maturity in yield in 19 out of 23 tests where 2-year average yields are available–an outstanding record in view of the wide variation in soil and climatic conditions across the South. Breeders of soybeans have made many crosses of Ogden with nonshattering varieties, and a number of promising nonshattering, high-yielding, hybrid lines from the crosses have been put under test.

"Two other new kinds, Volstate and Roanoke, of late October maturity, group VII, are distinctly superior to the old varieties. Volstate, also of Tennessee origin, was selected by H.P. Ogden at the same time from the same cross (Tokyo x P.I. 54610) as Ogden. It is medium tall, with gray pubescence and white flowers. It matures 10 days to 2 weeks later than Ogden and produces high yields of excellent yellow seed." Continued. Address: Agronomist, U.S. Regional Soybean Lab., Stoneville, Mississippi, in the Bureau of Plant Industry, Soils and Agricultural Engineering.

730. Henson, Paul R. 1947. Soybeans for the South (Continued–Document part II). *Yearbook of Agriculture* (*USDA*) p. 338-343. For the years 1943-47. [3 ref]
• ***Summary:*** (Continued): "Roanoke was selected as a single plant from a mixed seed lot in the fall of 1941. The strain was developed under the direction of J.A. Rigney, associate agronomist of the North Carolina Agricultural Experiment Station, in cooperation with E.E. Hartwig of the Department. It was entered in the Regional Variety Test, group VII, in 1944. Its excellent showing the first year in the tests and in other tests in North Carolina left little doubt as to its superiority. It resembles Volstate in appearance, with gray pubescence, and yellow seed of medium size. Roanoke is higher in oil and has yielded slightly more than Volstate. Both varieties are superior to Wood's Yellow in yield, resistance to shattering, and content of oil. Seed stocks of Roanoke were increased in 1945. Approximately 500 bushels of certified seed were available for further increase in 1946.

"Volstate and Roanoke are adapted to an area that includes the lower half of Arkansas and the upper third of Louisiana, extending eastward through the mid-South, the Piedmont, and Coastal Plain areas of North Carolina; neither is adapted to the lower South and Southeast.

"A third promising variety, CNS, is like Roanoke and Volstate in maturity. CNS was selected out of the Clemson variety by J.E. Wannamaker of St. Matthews, South Carolina. Plants of CNS are of medium height, with tawny pubescence and purple flowers. The yellow, medium-size seeds number approximately 3,400 to the pound, compared to Palmetto's 3,700 seeds to a pound. The oil content of CNS is low, but it is higher than that of Palmetto. CNS is well adapted to the Coastal Plain soils of South Carolina, Georgia, and Alabama and is resistant to bacterial pustule, a serious leaf disease. Breeders have used CNS in crosses to get resistant varieties adapted to other regions.

"The new late-maturing varieties, Pelican, Acadian, and L.Z., appear to be promising for the lower South. All three were selected from crosses made by John P. Gray, associate agronomist of the Louisiana Agricultural Experiment Station. Their seed is yellow, with dark-brown or black hilums, and medium small to small in size. Acadian has 3,520 seeds to the pound, L.Z. 3,890, and Pelican 3,950. The oil content of each is much higher than Wood's Yellow and Mamloxi. All 3 are tall-growing types, but lodge very little in the lower Coastal Plain area. They hold their seed well and shatter much less than established varieties. Pelican, Acadian, and L.Z. have been tested for 3 years in the Uniform Variety Test, group VIII. They have yielded equally well through the southern half of the region, but are particularly well adapted in southern Louisiana and to the Coastal Plain soils in southern Alabama and Georgia."

"Acknowledgments: Several men helped plan and conduct the investigations in the southern soybean program. Among the collaborators and other workers of southern experiment stations who assisted are: H.R. Albrecht, E.F. Schultz, and Otto Brown of Alabama; C.K. McClelland and E.M. Cralley of Arkansas; George E. Ritchey of Florida; R.P. Bledsoe and U.R. Gore of Georgia; John P. Gray of Louisiana; J.F. O'Kelly, H.A. York, and Robert B. Carr of Mississippi; J.A. Rigney and S.G. Lehman of North Carolina; H.W. Staten of Oklahoma; W.R. Paden and E.E.

Hall of South Carolina; John B. Washko of Tennessee; E.B. Reynolds, R.C. Potts, K.F. Manke, J.R. Quinby, W.L. Jones, P.J. Lyerly, Harold D. Lynn, and P.B. Dunkle of Texas; T.B. Hutcheson, M.H. McVicker, G.D. Jones, and R.P. Cocke of Virginia."

Tables: (1) Comparison of the agronomic properties of S100, Gibson, Patoka, Macoupin, Boone, two-year average, 1944-45.

(2) Comparison of the agronomic properties of Ogden, Arksoy 2913, Mamredo, Ralsoy, two-year average, 1944-45.

(3) Comparison of the agronomic properties of Roanoke, Volstate, Wood's Yellow, CNS and Palmetto, two-year average, 1944-45. Address: Agronomist, U.S. Regional Soybean Lab., Stoneville, Mississippi, in the Bureau of Plant Industry, Soils and Agricultural Engineering.

731. Pellett, Frank Chapman. 1947. American honey plants: Together with those which are of special value to the beekeeper as sources of pollen. 4th ed. Revised and enlarged. New York, NY: Orange Judd Publishing Co., Inc. 467 p. See p. 376-78. 200 Illust. 24 cm. [2 soy ref]

• ***Summary:*** The soybean is considered a minor honey plant. As the acreage planted to soybeans steadily expands, "it becomes of increasing interest to the beekeeper. Information concerning its value as a source of nectar is meagre. It is well known that under some conditions it yields nectar, yet under other conditions the bees do not seem to find it attractive. Just what conditions of soil and climate are most favorable are not yet entirely known. Reports from different sections upon the plant in Illinois during the time of his observation, beekeepers from some localities write to say that bees work upon them from morning until night. Another report (from Tennessee) states that the bees work soy beans freely from about 9 a.m. until sunset. A North Carolina beekeeper reports that they work from early morning until about noon, or not later than 1 o'clock p.m. Further observation concerning the behavior of the plant under different conditions will be necessary to reconcile these reports.

"The honey from this source is light in color, of peculiar but pleasing flavor and rather thin and light in body. A sample received by the writer from Mr. J.R. Pinkham, of Washington, N.C. [North Carolina], granulated rather quickly, but would be graded as a high quality honey in most markets. The flavor is very distinctive and should command a ready market once the trade becomes accustomed to it.

"Concerning the yield Mr. Pinkham writes: 'Notwithstanding that the bees only seem to work on soy beans part of the day and that it does not seem to yield regularly every day, a strong colony of Italians [Italian bees] will store from 100 to 250 pounds in thirty or forty days, which about covers the blooming period of the plant. I had one colony which filled 175 sections this year.' (1922).

"In contrast to the above report Mr. Joe Gass, of Tyner, Tennessee, writes that he had been unable to secure any surplus from soys, although the bees worked them freely and they bloomed at a time when nothing else was to be had. He found them valuable, however, as they kept the bees busy at a time when otherwise they would have been robbing, and stored some very light honey in the brood chamber. Mr. Pinkham writes that soybeans do not seem to yield as heavily on uplands as on the black swamp or Pocosin silt.

"Harold Kelly of Forest Glen, Maryland, writes that his bees within reach of about fifty acres of soybeans worked the blossoms freely, gathering more than their immediate needs but not storing surplus. They honey was amber in color, slightly on the dark side but of mild flavor. While not important, the beans do supply a light honeyflow in his locality at a time when there has usually been a dearth.

"In 1944 there were numerous reports of light yields of honey from soybeans. In most cases the surplus from this source was small..."

"In a letter to the author, J.E. Eckert reported that while living in North Carolina he observed that the bees gathered a surplus from soybean in the coastal section east of Washington. The honey was extra light amber in color, of good flavor and granulated quickly. An average of one to two supers were produced in summer when no other source was available.

"In Louisiana Everett Oertel reported that he had observed the bees to work soybeans lightly some years but had seen no honeyflow from this source.

"There is little to indicate that the soybean is an important honey plant anywhere although it does at times yield some nectar. The fact that bees may work one variety at times while neglecting others blooming nearby, indicates a variation in nectar yield which might be increased by selection."

A list of 36 publications consulted is given on p. 9-11. Pellett lived 1879-1951. Address: Hamilton, Illinois.

732. Staley (A.E.) Manufacturing Co. 1947. The wonder bean. Decatur, Illinois. 32 p.

• ***Summary:*** Contents: Introduction. Oldest soybean processor started operations 25 years ago. Research develops new products... broadens demand for soybeans. Top rank for soybean meal among protein concentrates. Soy flour helped us during shortage [in World War II]. Infinite variety in products made with soybean derivatives. Nutrient made from soybean speeds streptomycin production [it stimulates the growth of the organism which excretes the miraculous new germ-killer]. A story of two missionaries who talked about soybeans. Farmers who grow soybeans must make three decisions (what type of seed to use, whether to plant in rows or solidly, and whether to sell the beans immediately after harvesting or store for later sale). Research paves the way for greater usefulness. Facts about A.E. Staley Manufacturing Co.

"The story of Staley's entry into the soybean processing

business really harks back to about 1873. Here in the words of the late A.E. Staley, founder of the firm which bears his name, is what happened: 'My father attended a Methodist conference in North Carolina. There was one of the church missionaries attending this conference who had returned from China and brought back a bushel or such quantity of soybeans and told a story regarding their great food and commercial value. My father brought back a handful of these beans and repeated the story to the family.

"'He did not want to bother with the beans and I–then six or seven years old–planted them. [Note: A.E. Staley was born on 25 Feb. 1867, so he apparently planted them in about 1873 or 1874.] I grew the first soybeans I have heard of being grown in this country. We continued to grow the beans on our farm after that.'

"Many years later, when Mr. Staley was in the starch business in Decatur and worrying about the decline in productivity of farm acres which were being depleted by successive plantings of corn during the years of World War I, he remembered how valuable soybeans had been–back there in North Carolina in the years just after the Civil War [1861-1865]–in building up soil through use in crop rotation.

"And so, from 1916 to 1922, Mr. Staley had representatives travel throughout the midwest, extolling the virtues of soybeans: explaining that, planted in rotation, they improve the yield of other crops in the rotation, improve the tilth of the soil, help control weeds, increase the nitrogen content of the soil, help control the corn borer and other corn pests, stand drouth better than corn, made a 'surer' crop, can be handled with ordinary farm equipment."

Staley started crushing soybeans in the fall of 1922. The company's first processing plant, although its capacity was only 500 bushels daily, operated only 74 days during the 1922-23 season, because of the lack of soybeans. Address: Decatur, Illinois.

733. 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.

734. 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.

735. 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].

736. 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].

737. Lehman, Samuel G.; Graham, J.H. 1948. Results from dusting soybeans with copper in 1947 (Abstract). *Phytopathology* 38(7):570. July.
• ***Summary:*** Discusses Bacterial diseases. Dusting soybean with a mixture consisting of tribasic copper, wheat flour, DDT and Cherokee clay reduced a severe leaf disease of unidentified cause and increased the yield significantly. Address: North Carolina.

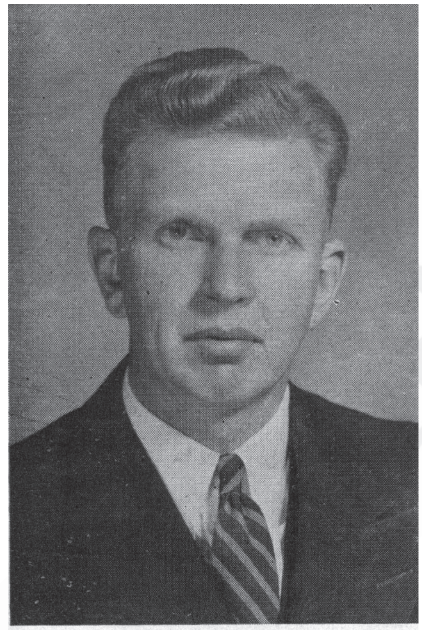
738. Lehman, Samuel G.; Graham, J.H. 1948. Soybean seed treatment tests in North Carolina in 1947 (Abstract). *Phytopathology* 38(7):571. July.
• ***Summary:*** Emergence was increased and diseased seedlings decreased more by Arasan than by Spergon.

739. Hartwig, Edgar E. 1948. Breeding soybeans for the southern states. *Soybean Digest.* Sept. p. 28-29.
• ***Summary:*** "Certain qualities are desired in a soybean variety regardless of where it is grown. These qualities are high seed yield, good seed quality, high percentage of oil and protein, adaptability to combine harvesting, and freedom from disease injury. However, one quality which does differ markedly both in requirements and behavior is maturity. Maturity and adaptation to specific environments are characteristics which make southern varieties different from Cornbelt varieties.

"Nearly 30 years ago plant physiologists learned that soybeans were very sensitive to length of day. That is, some types will begin to flower and develop seed with 16 hours of daylight while other varieties will not begin to reproduce until day length is 14 hours or less. Under the day length conditions occurring at Memphis during the growing season all strains adapted to the central Cornbelt area will begin flowering in about 30 days after emergence. Consequently they make only limited growth and mature too early to give maximum seed yields. On the other hand a variety like Ogden which makes good growth and matures about October 10 at Memphis will not mature before frost in central Illinois.

"During the past several years we have been evaluating soybean varieties with regard to their specific qualities and characteristics. We are not only interested in learning which are the best strains available but also what characteristics each strain possesses so that we might use these good qualities in our improvement program.

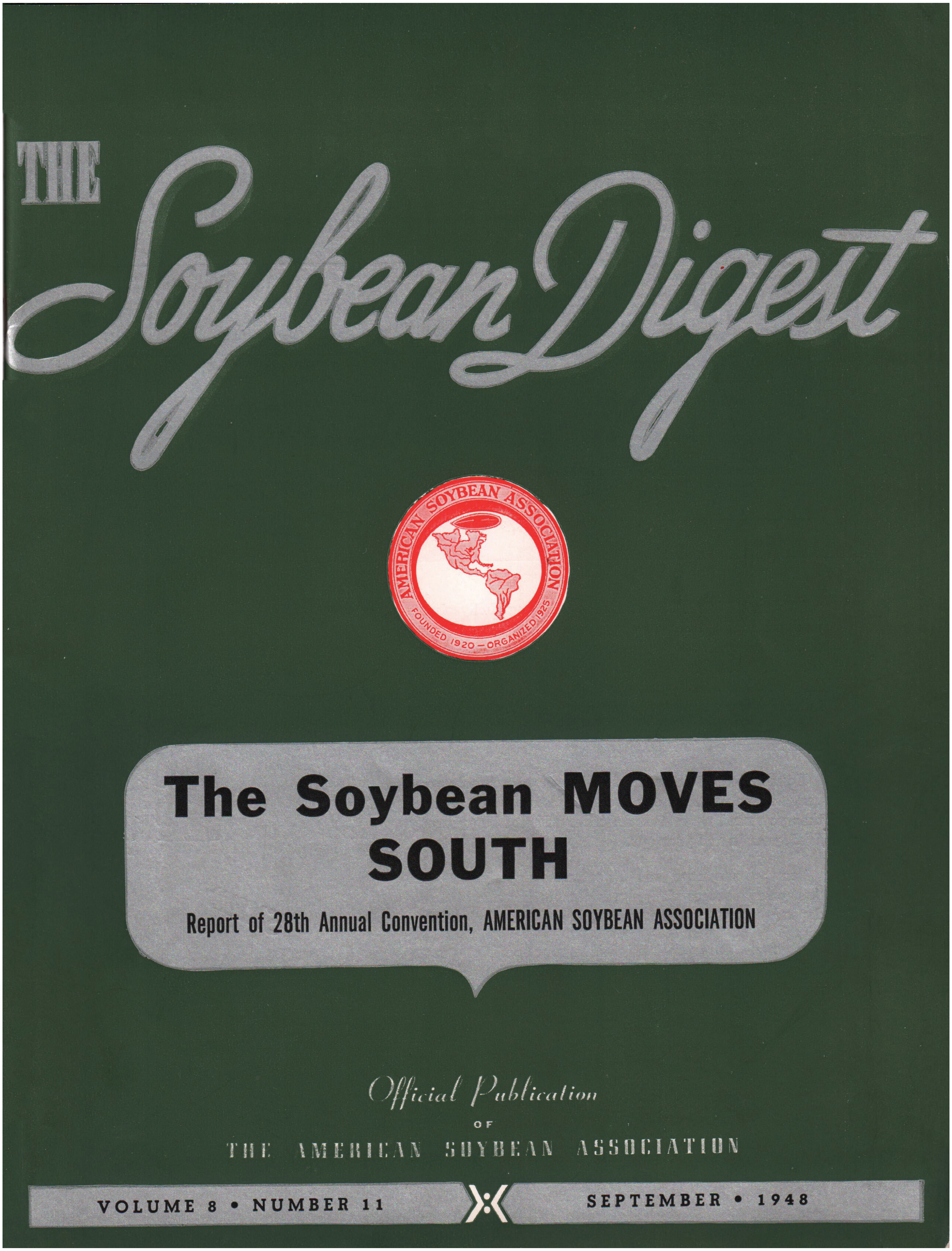
"Soybeans are a self pollinated crop. Once a variety is established as a uniform type, we have practically no chance of making any improvement by selection within that variety. To make improvement we must have variability. To get this variability it is necessary to make crosses between types possessing the different characteristics and selecting in later generations. Some of the more advanced work has dealt with getting improved seed holding, adaptation to specific areas, and disease resistance.



E. E. HARTWIG

"One of the varieties well adapted for seed production in much of the South is Ogden. The Ogden variety gives excellent seed yield, stands up well, is moderately resistant to the bacterial leaf diseases, and has a quite satisfactory oil content. However, Ogden will shatter under some conditions and also sometimes produces seed of poor quality. One of the types chosen to combine with Ogden to correct these weaknesses was the Ralsoy variety. This variety has excellent seed holding qualities, but gives much lower seed yields, especially when the fertility level is such that Ogden will yield 35 to 40 bushels per acre. Ralsoy also is quite susceptible to bacterial pustule and wildfire.

"The problem then is to maintain as many Ogden qualities as possible but still add seed holding. Since the genes conditioning the various characteristics segregate and recombine more or less at random in the F2 and later generations it is necessary to observe rather large numbers in order to obtain the desired combination. Disease susceptible and shattering plants or lines can be eliminated in the second or third generation by observation, but we have no method of predicting by observation which strains are going to be the best seed producers. To pick out the best yielding strains it is necessary to grow them at several locations to evaluate their adaptation to different environments. After testing numerous strains from the cross Ralsoy x Ogden, one of the most promising strains is N45-2994. While this strain has not been tested thoroughly enough to know its adaptability, it appears to possess many of the good qualities of each parent. Other strains with good seed holding qualities have also been



THE Soybean Digest

AMERICAN SOYBEAN ASSOCIATION
FOUNDED 1920 — ORGANIZED 1925

The Soybean MOVES SOUTH

Report of 28th Annual Convention, AMERICAN SOYBEAN ASSOCIATION

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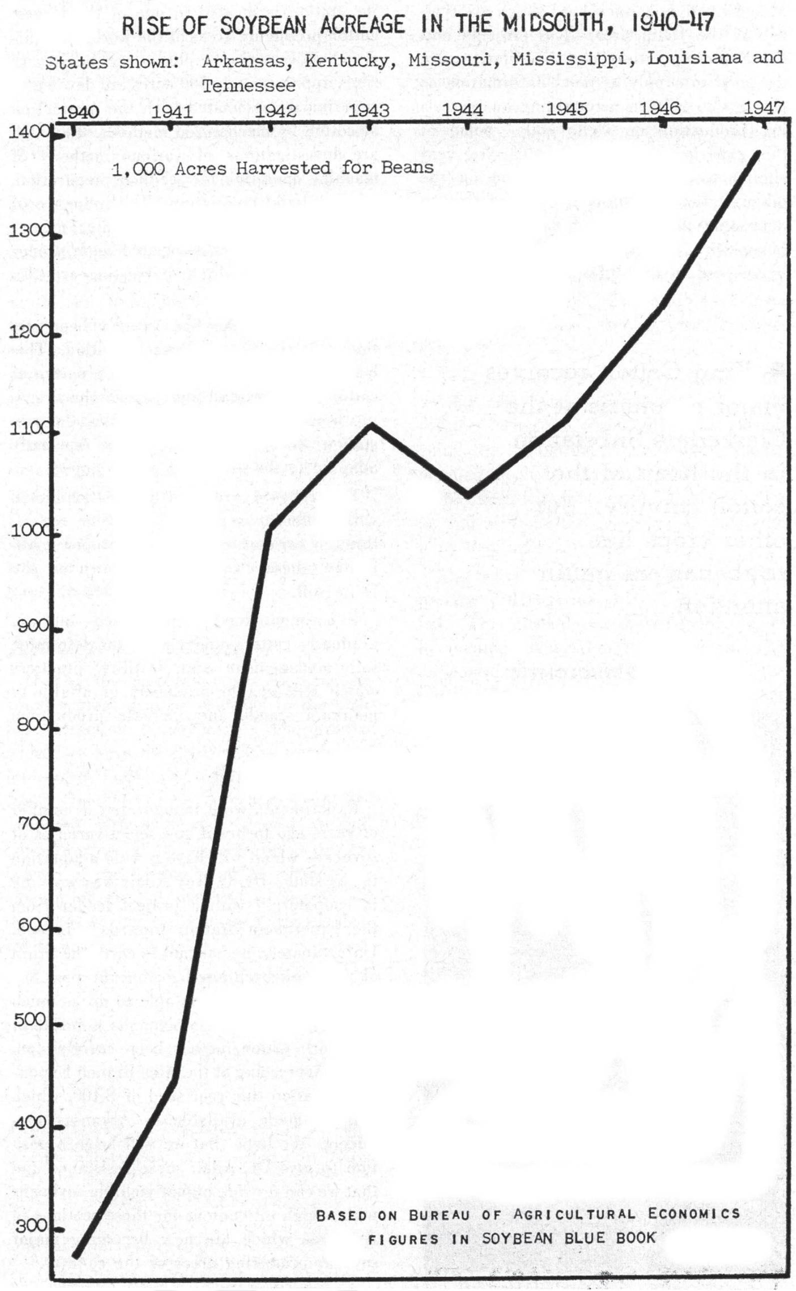


crossed with Ogden to bring about improvement in seed holding. We believe that some of these crosses will give non-shattering strains equal in other respects to Ogden.

"Chinese Strains: Several types introduced from the vicinity of Nanking, China, such as Palmetto, Missoy, Nanking, and CNS make excellent growth on the Coastal Plain soils of the lower Southeast. However, each of these strains has a low oil content. Crosses have been made using these types with Ogden, Volstate, and Roanoke. Selections from these crosses are now in advanced stages of testing. Some of the better strains such as N45-3563, N45-3728, and N46-2652 possess many of the growth qualities of Palmetto and Missoy plus approaching Roanoke in seed holding and oil content. It is anticipated that some of these strains will provide good seed varieties in an area where the varieties like Ogden and Roanoke have not been too well adapted.

"Another phase of the breeding program has been directed toward transferring resistance to bacterial pustule and wildfire [a bacterial foliage disease of soybeans, caused by *Pseudomonas* varieties] to the better seed producing types. Both of these diseases are frequently present in soybean fields. One of the first strains to be identified as carrying a high degree of resistance to both bacterial pustule and wildfire was the variety CNS. CNS as a variety is not well adapted for production in the two major production centers of the South–the coastal plain area of North Carolina and Virginia or the Delta area of Arkansas and Mississippi In these areas it lodges badly, produces low seed yields, and has a low oil content.

"The first crosses using CNS as a parent were made in 1943. Its resistance to bacterial pustule appears to be rather simply inherited. However, from the first cycle crosses strains which carried the desired degree of disease resistance have not equalled Ogden or Roanoke in seed production or oil content in their areas of best adaptation. These strains do equal CNS in disease resistance and surpass it in agronomic qualities. The better strains from the crosses with CNS carrying resistance to bacterial pustule and wildfire have been crossed with the best agronomic types for the different production areas of the South. It should not be long before types carrying a high degree of resistance to these two bacterial leaf diseases along with good seed production and high oil content will be available.

"Several insects frequently cause severe defoliation in the region. One of the worst offenders is the velvetbean caterpillar. On several occasions differential feeding has been observed when velvetbean caterpillars have moved in on a nursery containing different strains. However, each of these least desired strains has been observed to be severely defoliated by the same insect when grown alone. Consequently we do not have sufficient differences upon which to base a program for resistance to velvetbean caterpillar attack at the present time. The insect can be controlled by dusting. Very few varieties have been available to fill a maturity gap between such varieties as Patoka and Gibson which are grown in southern Indiana and Ogden which is about 3 weeks later. This season a considerable acreage has been planted of the variety S-100 which fits in

very well between these other varieties in maturity. S-100 is recognized as carrying somewhat lower oil content than other popular varieties, and a somewhat greater degree of susceptibility to the wildfire disease. These qualities will probably restrict the use of S-100 as a variety. Other strains derived from crosses between productive Cornbelt varieties and medium early Southern types are now in test. In preliminary trials some of these strains which are similar to S-100 in maturity have surpassed it in other qualities, especially oil content.

"Good Soil Needed: While it is possible to breed superior varieties of soybeans which will give higher seed yields because of better adaptation to specific environments and a better complement of genetic factors for yield, it must also be recognized that the seed yield of any variety is closely associated with the productive capacity of the soil. A 40-bushel soybean seed crop removes in the seed the equivalent of 300 pounds 0-10-20 [NPK] fertilizer. If the phosphate and potash supply in the soil limits production to 20 bushels per acre, little is to be gained by planting a variety having a higher yield potentiality. Very often improvement in fertilization practices is the first step necessary toward improving seed yields. Likewise other cultural practices such as stand and weed control cannot be neglected if high yields are expected.

"At the present time varieties like S-100, Ogden, Roanoke, and Acadian offer maturity range for production in almost any area of the South. Each of these strains has the capacity to produce high seed yields in areas where adapted, providing of course that the nutrient requirements are fulfilled. It is recognized that these and other varieties have limitations and breeding work is in progress to correct some of these defects. Furthermore, it is recognized that progress in any breeding program is dependent on knowledge of the inheritance of the various qualities and characteristics. We, therefore, are interested in problems directed toward gaining further genetic information as well as practical improvement." Address: Agronomist, U.S. Regional Soybean Lab., Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, USDA.

740. *Soybean Digest.* 1948. The soybean moves south. Sept. p. 25.
• ***Summary:*** "The soybean is moving south. Statistics prove it. Soybean acres and yield jumped 5-fold during war and postwar years in the six Midsouth states, Arkansas, Kentucky, Missouri, Mississippi, Louisiana and Tennessee. At the same time acreage and yield tripled in the 12 Southern states served by the U.S. Regional Soybean Laboratory.

"But the South is only once again claiming her own. An old sea captain, we are told [by A.E. Staley, Sr.], first brought soybeans direct from the Orient to North Carolina. Planters grew them there as 'Japan peas.' Under the prodding of such enthusiasts as the late C.B. Williams at the North Carolina Experiment Station, the growing of soybeans spread rapidly in the South.

"The first American-grown soybeans were processed in North Carolina; and they were first processed by solvent-extraction in Virginia.

"In 1920 the five leading soybean states were all in the South. But in following years Southern farmers lost interest, due to lack of suitable varieties, the lack of harvesting machinery, and mainly perhaps, to the pull of past habits that tied them to a single crop. The Nation's soybean center shifted to the Cornbelt. By 1935 Missouri was the only Southern state included in the first five in soybean production.

"During the war and postwar the South turned again to soybeans. She is now growing far more of them than ever. The combine has come in to make them more profitable. The call for diversified farming is at last beginning to be heeded in the South as elsewhere. New and better varieties such as S-100 and Roanoke are coming from the experiment stations.

"The soybean at no time lacked for true friends in the South. There were men who believed in its ultimate triumph there–breeders working for private firms and the Regional Soybean Laboratory and the state experiment stations, growers who kept on planting the crop, and agricultural leaders like J.B. Crain who built processing and refining plants, grew large acreages themselves and induced others to follow suit.

"These men were quietly at work preparing for the day of the soybean's return. Their work is now rewarded. No one now can doubt that the soybean along with cotton and other typical Southern crops will remain to share in the South's destiny."

Note: This is the earliest document seen (Nov. 2016) that contains the word "Midsouth."

741. *Soybean Digest.* 1948. Soybean Lab changes: Paul R. Henson. Sept. p. 104.
• ***Summary:*** "Paul R. Henson, coordinator for the work of the U.S. Regional Soybean Laboratory in 12 Southern states since June 1942, has become leader of the miscellaneous legume project of USDA's Division of Forage Crops and Diseases.

"Henson was transferred from the Delta Branch Experiment Station at Stoneville, Mississippi, to Beltsville, Maryland, in June.

"Henson has been succeeded at Stoneville by Dr. E.E. Hartwig, located at the North Carolina Experiment Station, Raleigh, North Carolina, at the time of his new assignment. Dr. Hartwig has been a member of the Regional Laboratory staff since February 1943, and has been in charge of USDA's soybean investigations in North and South Carolina. He assumed his duties at Stoneville Sept. 1.

"Herbert W. Johnson, a graduate of the University of Tennessee, has taken Dr. Hartwig's place at Raleigh." A

portrait photo shows Paul Henson.

742. USDA Northern Regional Research Laboratory. 1948. Soybean processing mills in the United States. *USDA Bureau of Agricultural and Industrial Chemistry.* CA-5. 14 p. Sept. • ***Summary:*** Footnote: "This is a revision of AIC-26 [Nov. 1943]–Revised June 1946 under the same title."

"The following list of soybean processing mills is divided into three parts: (1) Mills specializing in soybeans. (2) Mills processing soybeans on part-time basis. (3) Distribution of soybeans processed by solvent extraction, screw press, and hydraulic press methods (Estimates based on data compiled by Bureau of the Census in cooperation with the Northern Regional Research Laboratory). A year by year table from crop year 1936-37 to 1946-47 (Oct. to Oct.) shows the number of tons processed and the percentage of the total processed by each of the three processes. The percentage processed by solvent extraction doubled from 13.2% to 26.6% while the percentage processed by hydraulic press dropped by half from 18.4% to 9.5%. The total tons of soybeans processed rose 8.2 fold from 619 to 5,107 during the 11 year period.

Processors are listed by state (alphabetically), and within each state alphabetically by city. Three symbols are used (in parentheses) to express each plant's processing capacity in tons of soybeans per day: S = Small–less than 50. M = Medium–50 to 200. L = Large–more than 200. Three other symbols are used to express the type of soybean processing equipment used: X = Extraction (solvent). P = Screw press [or expeller]. H = Hydraulic press.

"1. Mills specializing in soybeans. Arkansas–West Memphis: Arkansas Mills, Inc. (MX). Wilson: Wilson Soya Corporation (MXP). Delaware–Laurel: Laurel Processing Co. (SX).

"Illinois–Alhambra: Alhambra Grain and Feed Co. (SP). Bartonville: Allied Mills, Inc. (LP). Bloomington: Funk Brothers Seed Co. (MP). Ralston Purina Co. (LX). Champaign: Swift and Co. (LXP). Chicago: Archer-Daniels-Midland Co. (MX). The Glidden Co. (LXP). Spencer Kellogg and Sons, Inc. (LP). Colchester: Colchester Processing Co. (SP). Decatur: Archer-Daniels-Midland Co. (LXP). Decatur Soy Products Co. (MP). Spencer Kellogg and Sons, Inc. (LXP). A.E. Staley Manufacturing Co. (LXP). Galesburg: Galesburg Soy Products Co. (MP). Gibson City: Central Soya Co., Inc. (LXP). Kankakee: Borden's Soy Processing Co. (MX). Mascoutah: Phillip H. Postel Milling Co. (SP). Monmouth: Ralph Wells and Co. (SP). Nashville: Huegly Elevator Co. (SP). Norris City: Norris City Milling Co. (SP). Pana: Shellabarger Soybean Mills (MP). Poplar Grove: Northern Illinois Processing Corporation (SP). Quincy: Quincy Soybean Products Co. (MP). Roanoke: Eureka Milling Co. (SP). Rock Falls: Sterling Soybean Co. (SP). Springfield: Cargill, Inc (MP). Taylorville: Allied Mills, Inc. (MX). Virden: Hulcher Soy Products Co. (SP).

"Indiana–Bunker Hill: Ladd Soya, Inc. (MP). Danville: Hendricks County Farm Bureau Cooperative Association (SX). Decatur: Central Soya Co., Inc. (LXP). Frankfort: Swift and Co. (MX). Indianapolis: The Glidden Co. (LX). Lafayette: Ralston Purina Co. (MP). Marion: Hoosier Soybean Mills (MP). Oaktown: Knox County Farm Bureau Cooperative Association (SP). Portland: Haynes Soy Products, Inc. (MP). Rockport: Martin Serrin Co., Inc. (SP). Rushville: Rush County Farm Bureau Cooperative Association (SP). Wabash: Wabash County Farm Bureau Cooperative Association (SP).

"Iowa–Belmond: General Mills, Inc. (LX). Cedar Rapids: Cargill, Inc. (MX). Iowa Milling Co. (MP). Centerville: Pillsbury Mills, Inc. (MP). Clinton: Pillsbury Mills, Inc. (MX). Des Moines: Spencer Kellogg and Sons, Inc. (LX). Swift and Co. (MP). Dike: Farmers Cooperative Association (SP). Dubuque: E.E. Frith Co. (SP). Eagle Grove: Boone Valley Cooperative Processing Association (SP). Fairfield: Doughboy Industries, Inc. (MP). Fayette: Fayette Soybean Mill (SP). Fort Dodge: Cargill, Inc. (LXP). Gladbrook: Central Iowa Soybean Mill (MP). Hubbard: Boone Valley [Cooperative] Processing Association (SP). Iowa Falls: Ralston Purina Co. (LXP). Manly: North Iowa Cooperative Processing Association (SP). Marshalltown: Marshall Mills, Inc. (SP). Martelle: Farmers Cooperative Elevator (SP). Muscatine: Hawkeye Soy Products Co. (SP). Muscatine Processing Corporation (MX). New Hampton: Eastern Iowa Milling Co. (SP). Plainfield: Roach Mills (SX). Quimby: Simonsen Mill Rendering Plant (MP). Ralston: Farmers Cooperative Association (SP). Redfield: Iowa Soya Co. (MX). Sac City: Williams Milling Co. (MP). Sheldon: Big Four Cooperative Processing Association (MP). Sioux City: Sioux Soya Co. (MP). Spencer: Cargill, Inc. (SX). Washington: Cargill, Inc. (MX). Waterloo: Borden's Soy Processing Co. (LXP). West Bend: West Bend Elevator Co. (SP).

"Kansas–Coffeyville: Consumers Cooperative Association Soybean Mill (MP). Emporia: Kansas Soya Products Co., Inc. (MXP). Girard: Farmers Union Jobbers Association (SP). Hiawatha: Thomson Soy Mill (SX). Kansas City: Kansas Soya Products Co., Inc. (MP). Wichita: Soy-Rich Products, Inc. (MXP). Kentucky–Henderson: Ohio Valley Soybean Cooperative (MXP). Louisville: Buckeye Cotton Oil Co. (LXP). Louisville Soy Products Corporation (MX). Owensboro: Owensboro Grain Co. (MXP).

"Maryland–Baltimore: Soya Corporation of America (MP). Michigan–Concord: Concord Soya Corporation (SP). Saline: Soybrands, Inc. (SX). Minnesota: Lakeville: Consumers Soybean Mills, Inc. (MP). Mankato: Honeymead Mankato, Inc. (LXP). Minneapolis: Crown Iron Works Co. (SX). Preston: Hubbard Milling Co. (SP).

"Missouri–Kansas City: Ralston Purina Co. (MP). Kennett: Hemphill Soy Products Co. (MP). Mexico: MFA Cooperative Grain and Feed Co. (MP). New Madrid:

Buckeye Cotton Oil Co. (MX). St. Joseph: Dannen Mills, Inc. (MXP). St. Louis: Blanton Mill, Inc. (MP). Ralston Purina Co. (MP). Pennsylvania–Jersey Shore: Pennsylvania Soybean Cooperative Association (SP). Rossmoyne Processing Co. (?). Paoli: The Great Valley Mills (?). South Dakota–Sioux Falls: Western Soybean Mills (MP).

"Tennessee–Tiptonville: West Tennessee Soya Mill, Inc. (LXP). Virginia–Harrisonburg: Central Chemical Corporation of Virginia (SP). Norfolk: Davis Milling Co. (SP). Portsmouth: Allied Mills, Inc. (MP). Wisconsin–Janesville: Janesville Mills, Inc. (SP). Menomonie: Northwest Cooperative Mills (SP).

"Mills processing soybeans on part-time basis." Alabama (6 mills), Arkansas (13), California (7), Florida (1), Georgia (7), Illinois (2), Iowa (2), Kansas (1), Louisiana (9), Minnesota (2), Mississippi (13), Missouri (1), New York (2), North Carolina (14), North Dakota (1), Ohio (2), Oklahoma (13), Pennsylvania (2), South Carolina (4), Tennessee (4), Texas (27), Wisconsin (1).

Note: This is the earliest document seen (Sept. 2016) that mentions Crown Iron Works Co. in connection with soybeans or with solvent extraction plants.

743. *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.

744. Fisher, H.J. 1948. Report on inspection and analysis of commercial fertilizers, 1948. *Connecticut Agricultural Experiment Station, Bulletin* No. 525. 48 p. Dec. [51 ref]

• ***Summary:*** Connecticut law regulates commercial fertilizers. "The seller is responsible for proper labeling of each package of fertilizer, for the registration of each brand sold or offered for sale, for the payment of the required analysis fee and for the payment of the tonnage tax."

"Cottonseed, linseed, and soybean meals, when sold or used for fertilizer purposes, must be registered as fertilizers and the specified fees paid thereon. For such products the registration fee is $10.00 for each brand, payable annually, and six cents per ton tonnage fee, payable semi-annually. These fees are entirely apart from those required by the feeding stuffs statute."

Under "Soy bean oil meal" (p. 28) is only one product / brand: "Gilt Edge Brand, Central Oil & Milling Co., Clayton, North Carolina." Found: 7.42% nitrogen. Guaranteed: 6.56% nitrogen. Address: Chemist in Charge, New Haven, Connecticut.

745. Bailey, Alton Edward. ed. 1948. Cottonseed and cottonseed products. Their chemistry and chemical technology. New York and London: Interscience Publishers, Inc. xxiii + 936 p. Illust. Subject index. Author index. 24 cm. Series: Fats and Oils; a Series of Monographs on the Chemistry and Technology of Fats, Oils, and Related Substances. [500+* ref]

• ***Summary:*** Contents: 1. History of cotton and the United States cottonseed industry, by Maurice R. Cooper. Early history of cotton and cottonseed: Early use of lint cotton, early crushing of cottonseed. Important developments since 1700 in production and consumption of lint cotton: improvements in spinning and weaving (John Kay's "flying shuttle"), development of the saw gin (by Eli Whitney in 1793, to separate the lint from the seed), expansion in cotton production and consumption. Table 1. Imports of cotton into the United Kingdom and imports from the United States as a percentage of total imports in specified calendar years from 1697 to 1945 (in terms of 478-lb. net bales). Table 2. Manufactures of cotton: Number of establishments, number of wage earners, value of products, and total cotton consumption in the United States in specified years, 1831-1939. History and growth of cottonseed crushing in the United States: Early inventions and developments in the domestic industry (Even in the U.S. much of the cottonseed

produced was unused until the latter part of the 19th century. Early recorded experiment for the production of oil in 1768 by Dr. Otto, a Moravian, of Bethlehem, Pennsylvania. On 2 March 1799 a Mr. C. Whiting was issued a patent for "a process for extracting oil from cottonseed." In 1802 Benjamin Waring of Columbia, South Carolina, was operating an oil mill in which he crushed flaxseed, sesame seed, and some cottonseed; Waring's mill was still operating in 1829. Cottonseeds were hard to grind. The first patent for a cottonseed hulling machine was issued on 31 March 1814 to J. Lineback of Salem, North Carolina. An 1829 patent improved on Lineback's method, as did others in the 1850s), legislation relative to seed disposal. Growth of the industry following the Civil War ("The census of 1860 reported a total of seven cottonseed crushing mills in operation in 1859,..."). Table 3. Cottonseed oil mills: Number of mills, number of wage earners, quantity of seed crushed, and value of products in the United States in specified years, 1859-1939 (the total number of mills peaked at 882 in 1914. The total amount of cottonseed crushed first reached 5 million tons in about 1925). Table 4. Number of cottonseed oil mills in the United States, by states in specified years, 1859-1939 (in 1899 Georgia had the most mills at 17; in 1939 Texas had the most at 144). Table 5. Value of cottonseed products in the United States, 1874-1943 (the products were cottonseed oil, cake and meal, hulls, and linters; linters are the short fibers that cling to cottonseeds after the first ginning). Table 6. Production of cottonseed, cottonseed oil, cake and meal, hulls, linters, and cottonseed crushed in the United States, 1871-1941. Development of markets for cottonseed products. Table 7. Estimated uses of cottonseed oil in the United States, 1874-75 to 1911-12 (in million lb. The main uses in 1911 were in lard compound, soap making, cooking and baking). Table 8. Cottonseed oil exported from the United States and estimated uses made of such exports, 1874-75 to 1911-12 (in 1,000 barrels; each barrel weighs 389 lb). Cottonseed oil: History of cottonseed oil utilization. Development of oil processing methods (David Wesson. Bleaching, deodorizing, hydrogenation, Sabatier and Senderens, the Normann patent issued in 1903. "passed to the British firm of Joseph Crossfield & Sons, from which Procter & Gamble acquired the American rights in 1909. Crisco was on the market by 1911"). Cottonseed cake meal. Cottonseed hulls. Linters. Trade Associations and their relation to the industry's development: Original association, Texas association, interstate and national associations. Bibliography (25 references) plus 44 footnotes.

Soy is mentioned in this book on pages 183, 432, 443, 645, 670, 673, 737, 744, 756-57, 772.

Page 670: For many years cottonseed oil was the dominant oil in the U.S. market. The supply was significantly larger and the price generally lower than that of competing oils produced in the USA. It was generally preferred for use in edible products. Its main competitors were lard and imported oils: coconut, palm, palm-kernel.

The situation has changed markedly in the past 10-15 years with the rapid increase in the domestic production of soybeans and soybean oil. "In 1930 only 14.4 million pounds of refined soybean oil were produced in the United States, increasing to 105.1 million pounds in 1935 and, By 1940 it had increased to 533.2 million pounds, and in 1944 domestic refined soybean oil production reached 1,245.8 million pounds, passing that of cottonseed oil.

Page 673: Production of soybean meal first exceeded that of cottonseed meal in the 1941-42 season, and in 1944-45 totaled 3.6 million tons compared with 1.9 million tons of cottonseed meal.

Page 737: Table 182: In 1940 the 3 leading oils were cottonseed oil (68.8%), soybean oil (17.7%) and peanut oil 1.9%. However in 1944 soybean oil (47.4%) passed cottonseed oil (37.4%) to become the leading oil used in U.S. shortening manufacture.

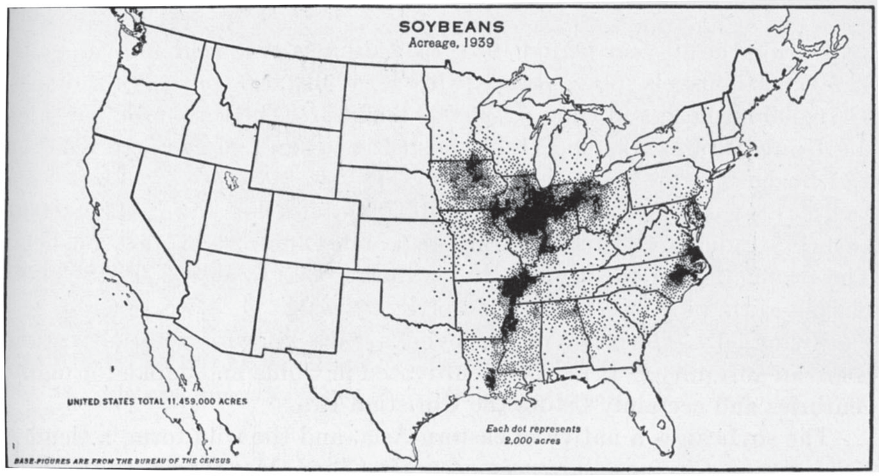
Page 757: Table 189: In 1942 166.4 million pounds of cottonseed oil and 133.3 million pounds of soybean oil were used in the manufacture of margarine in the United States. In 1945 the gap had narrowed, but cottonseed oil was still ahead: 215.0 million pounds of cottonseed oil and 211.1 million pounds of soybean oil were used in the manufacture of margarine in the United States. Address: Votator Div., The Girdler Corp., Louisville, Kentucky.

746. Hutcheson, Thomas Barksdale; Wolfe, Thomas Kennerly; Kipps, Michael Smith. 1948. The production of field crops: A textbook of agronomy. 3rd ed. New York, NY: McGraw-Hill Book Co. xv + 430 p. Illust. Maps. Index. 24 cm. [8 soy ref]

• ***Summary:*** The chapter on "Harvesting and storage of grain crops" as two sections (p. 124, 131) on soybeans; the second concerns shrinkage during storage.

The chapter on "Haymaking" has a section on legumes which states (p. 137): "Soybeans may be cut for hay over a period of several weeks with good results. Other things being equal, soybeans are best harvested when the seeds are well formed and before the lower leaves turn yellow."

Chapter 25, titled "Soybeans (Soja max)" has the following contents (p. 253-62): Introduction. World production. Production in the United States. Historical. Varieties and their distribution. Classification of varieties (based on Morse and Cartter 1939) based on earliness of maturity and four uses of the seed. Composition. Botanical. Uses: Food, oil, hay, silage. Culture: Seeds, time of seeding, rate of seeding, depth of seeding, inoculation, fertilization (with phosphorus and potassium), methods of seeding. Cultivation. Time of cutting for hay. Curing soybean hay. Time of cutting for seed (The best varieties yield from 25-40 bu/acre). "Maximum yields of 50 or more bushels to the acre have been reported from North Carolina and Tennessee (Morse 1929). Methods of harvesting seed. Topics for



discussion.

Facing the title page is a full-page map (from the USDA Yearbook, 1943-47) showing "Agricultural research in the United States." It shows: (1) Headquarters of State Agricultural Experiment Stations. (2) Regional laboratories. (3) Bankhead-Jones laboratories. (4) Other research centers.

Another large map (p. 253), based on figures from the Bureau of the Census shows soybean acreage in the United States in 1939. Most of the acreage is concentrated in the Corn Belt states and along the Mississippi River into southern Louisiana. A secondary center is in eastern North Carolina. Practically no soybeans are grown west of 97 degrees longitude.

Thomas K. Wolfe was born in 1892. Address: 1. Dean of the School of Agriculture, Formerly Agronomy Dep. Head, Virginia Polytechnic Inst.; 2. Director of Distribution, Southern States Cooperative, Formerly Prof. of Agronomy, Virginia Polytechnic Inst. and Agronomist, Virginia Agric. Exp. Station; 3. Assoc. Prof. of Agronomy, Virginia Polytechnic Inst. All: Blacksburg, Virginia.

747. Hartwig, Edgar E.; Bounds, Elaine. comps. 1949. Results of the Cooperative Uniform Soybean Tests, 1948: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 149. Feb. 116 p. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/48soybook.pdf

• ***Summary:*** Except for the cover, this document is typewritten.

Contents: Introduction. Cooperation (gives cooperating person's name, city, and state). Location of nurseries [on outline map of south-eastern USA]. Weather data. Methods. Uniform test, Group IV. Preliminary uniform Group IV. Uniform test, Group V. Preliminary uniform Group V. Uniform test, Group VI. Preliminary uniform Group VI. Uniform test, Group VII. Preliminary uniform Group VII. Uniform test, Group VIII. Disease investigations.

Page 1: "Introduction: The program of the U.S. Regional Soybean Laboratory includes developing and evaluating soybean varieties for industrial utilization. As a means of evaluating present varieties and new strains developed through breeding, replicated plantings are made under a wide variety of environmental conditions. Because soybean strains are very sensitive to photoperiod, it has been necessary to classify types into maturity groups. For convenience these maturity groups are designated Group 0, I, II, to VII, VIII, extending from north to south. This report includes a summary of agronomic and chemical characteristics of varieties and new strains for the Southern States. Maturity groups included are IV, V, VI, VII, and VIII.

"The cooperative program between the Soybean Laboratory and the states in the southern region was initiated in 1943. At that time there was only limited information available showing the regions of adaptation of the existing varieties of soybeans. During the first few years most of the strains included in the uniform nurseries were established varieties. As agronomic and chemical data were accumulated on these strains, the poorer producers were eliminated from the tests. At the present time, the material grown in the regional nurseries comprises top-producing varieties and new selections from the breeding programs. This testing program gives agronomic and chemical data from a wide variety of conditions. Because of these tests, the breeder can get new strains into production in a minimum amount of time.

"A wide range of soil and climatic conditions exist in the region. It is too much to expect that any one variety should give top performance in all areas where a particular maturity group is to be grown. As an aid in recognizing regional adaptation, the region has been subdivided into five rather broad areas, which still represent a wide range of soil types. These are: (1) the East Coast, consisting of the Coastal Plain of Virginia, North Carolina, and the upper half of South Carolina; (2) the Southeast, consisting of the Coastal Plain soils of the lower half of South Carolina, Georgia, Florida, Alabama, and Mississippi; (3) the Upper and Central South, including the Piedmont soils between the Coastal Plain and Mississippi Delta; (4) the Delta area, composed of the alluvial soils from the Mississippi River in Missouri, Arkansas, Tennessee, Mississippi, and Louisiana; and (5) the West, or Southwest, comprising the western half of Arkansas and Louisiana, Oklahoma and Texas. A map is included to illustrate those areas.

"As further aid in interpreting yield responses, rainfall data is reported for many of the locations where nurseries were grown. Since much of the summer rainfall is from local showers, rainfall is reported only for those locations where records were taken close to the nurseries. Daily minimum

and maximum temperatures are reported from representative locations for the production areas.

"Rates of fertilization [sic, are] is reported for those locations where the plots wore fertilized. Soil type is reported for all locations."

Pages 3-4: Location of cooperative nurseries [and cooperators].

Unnumbered page: Map of southern states showing location of most of the cooperative uniform tests, 1948.

Page 5: 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).

748. 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.

749. 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.

750. *Soybean Digest.* 1949. Seed directory (Ad). March. p. 55.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, North Carolina, Ohio, and Wisconsin. For each listing is given the amount and varieties of seed available, and whether certified or uncertified. Most of the entries are for individual farmers. More than half the listings are from sources in Illinois.

Companies include: Robert L. Dortch Seed Farms, Scott, Arkansas, selling Grade A certified Dortchsoy 2, Dortchsoy 7, Dortchsoy 31. Strayer Seed Farms, Hudson, Iowa, selling Bansei and Lincoln.

Varieties include (* = most or all are certified): Bansei, Bavender, Dortchsoy (2, 7, and 31), Earlyana*, Flambeau*, Hawkeye* (by far the most popular variety listed), Hong Kong*, Lincoln*, Loredo [Laredo], Manchu, Ogden, Ottawa Mandarin, Richland*, Rickard Korean, Roanoke, Viking.

751. Graff, Henry F. 1949. The early impact of Japan upon American agriculture. *Agricultural History* 23(2):110-15. April. [32 ref]
• ***Summary:*** This pioneering and extremely important article on the early history of the soybean in America contains many pre-1860 citations, cited here for the first time, concerning farmers testing soybeans in Mississippi, Indiana, Ohio, New York, Connecticut, Missouri, New Hampshire, North Carolina, Kentucky, Virginia, Maryland, Delaware, and Pennsylvania. Many of these early citations are from "Letters and Reports of the Agricultural Division of the Patent Office, 1839-60." Address: Dep. of History, Columbia Univ., New York.

752. 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.

753. 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.

754. 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].

755. **Product Name:** Soybean Oil, and Soybean Oil Meal.
Manufacturer's Name: Buckeye Cotton Oil Company.
Manufacturer's Address: Raleigh, North Carolina.
Date of Introduction: 1949 September.
Ingredients: Soybeans.
How Stored: Shelf stable.
New Product–Documentation: National Soybean Processors Association. 1949. Year book, 1949-1950 (Association year). Chicago, Illinois. 73 p. [Sept.]. See p. 16. Members: The Buckeye Cotton Oil Co. has mills at: Cincinnati 1, Ohio (W.H. Knapp), Louisville, Kentucky (R.B. Williams), New Madrid, Missouri (R.H. Norris), Raleigh, North Carolina (L.M. Sneed), Memphis, Tennessee (W.R. Flippin & T.F. Horn).

Gantt, B.J. 1959. "Buckeye manufacturing history." [Memphis, Tennessee]. 21 p. Unpublished typescript. Courtesy Procter & Gamble Co. archives. The mill at Raleigh, North Carolina, started solvent extraction of oilseeds on 1 April 1959. As of 1958 this mill crushes both soybeans and cottonseed using solvent extraction.

756. National Soybean Processors Association. 1949. Year book, 1949-1950 (Association year). Chicago, Illinois. 73 p. • ***Summary:*** On the cover (but not the title page) is written: "Year Book and Trading Rules, 1949-1950." Contents: Constitution and by-laws (incl. committees, code of ethics). Officers, directors and committees for 1949-50. Membership of the National Soybean Processors Association. Trading rules governing the purchase and sale of soybean oil meal. Appendix to trading rules on soybean oil meal: Official methods of analysis (moisture, protein, oil, crude fiber–official, sampling of soybean oil meal). Trading rules on soybean oil. Appendix to trading rules on soybean oil: Uniform sales contract, standard specifications for crude soybean oil for technical uses, methods of analysis (A.O.C.S. official methods): Refining loss (expeller and hydraulic soybean oil)–Ca 9a-41, refining loss (extracted soybean oil)–Ca 9b-46, refining loss (degummed hydraulic and extracted types soybean oil)–Ca 9c-49, refining loss (degummed expeller type soybean oil)–Ca 9d-49, bleaching test (refined soybean oil)–Cc 8b-49, grading soybean oil for color (N.S.P.A. tentative method), color–Wesson method using Lovibond glasses–Cc 13b-45, sampling–C 1-47, flash point (A.O.C.S. tentative method–Cc 9b-48). Moisture and volatile matter: Vacuum oven method–Ca 2d-25. Break test–Modified Gardner method–Ca 10-40. Iodine value–Wijs method–Cd 1-25. Unsaponifiable matter–Ca 6a-40.

Handwritten: *Soybean Farming* is now available; prices are given for non-members and members, for 100 to 1,000 copies. Assessments: Regular $.0004 per bushel, 40 cents per 1,000, $400 per million. Max. $3,200 per year. Min. $100 per year. July 6 meeting decreases the regular assessment to $0.0003 per bushel.

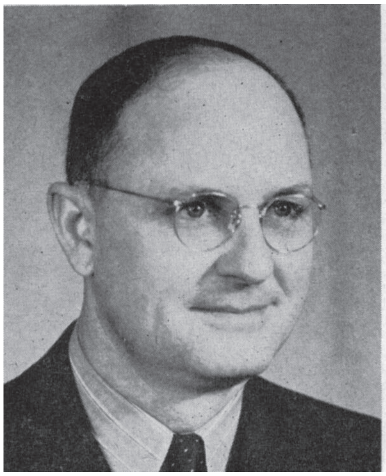
The section titled "Officers, directors, and committees" (p. 12-15) states: President: R.G. Houghtlin. V.P., Chairman Executive Committee: G.G. Golseth. Secretary: W.L. Shellabarger. Treasurer: H.E. Carpenter. Executive Committee: R.G. Golseth, Chairman, H.E. Carpenter, E.A. Cayce, Philip S. Duff, W.H. Eastman, Jasper Giovanna, R.G. Houghtlin, W.L. Shellabarger.

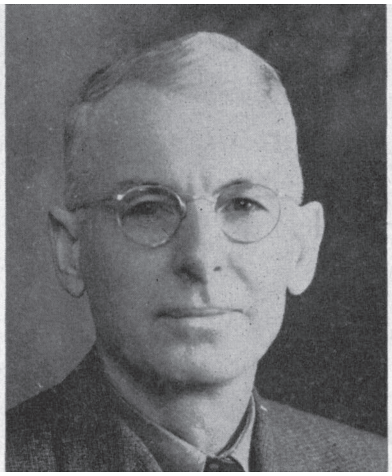
Board of Directors (Term expiring Sept. 1950): D.O. Andreas, E.A. Cayce, Jasper Giovanna, R.G. Golseth, H.R. Schultz, H.R. Scroggs. (Term expiring Sept. 1951): Dwight Dannen, Roger Drackett, W.H. Eastman, R.B. Jude, W.H. Knapp, Karl Nolin. (Term expiring Sept. 1952): S.E. Kramer, Philip S. Duff, D.W. McMillen, Jr., Clarence E. Peters, J.J. Quinlan, Ralph Wells.

Standing committees: For each committee, the names of all members (with the chairman designated), with the company and company address of each are given–Traffic and transportation. Technical. Soybean grades and contracts. Oil trading rules. Meal trading rules. Crop improvement. Soybean research council. Uniform rules and standards for soybean oil meal. Safety and insurance. Lecithin. Regional: Ohio, Michigan, and East; Illinois, Indiana, Kentucky, Wisconsin; Iowa, Minnesota, Nebraska, South Dakota; Missouri, Kansas, and Mississippi River Delta Sections. Handwritten on blank facing pages: Nominating committee.

Reception committee. Official weights committee. Crop Improvement steering committee. Two new members (people; Francis E. Calvert, The Drackett Co., Oct. 1949).

The following organizations, and individuals are members of NSPA: Albers Milling Co., Los Angeles, California (W.P. Kyle). Allied Mills, Inc., Board of Trade Bldg., Chicago, Illinois; Peoria, Illinois; Taylorville, Illinois; Omaha, Nebraska; Portsmouth, Virginia. Archer-Daniels-Midland Co., Box 839, Minneapolis 2, Minnesota; Chicago, Illinois; Decatur, Illinois; Fredonia, Kansas. Big 4 Cooperative Processing Assn., Sheldon, Iowa (Chas. W. Hanson). Blanton Mill, Inc., St. Louis, Missouri (Ross A. Woolsey, Jr.). Boone Valley Cooperative Processing Assn. Eagle Grove, Iowa (Edward Olson); Hubbard, Iowa (D.E. Weld). Borden's Soy Processing Co., Chicago 4, Illinois (C.E. Butler -> J.R. Pentis); Kankakee, Illinois; Waterloo, Iowa. Buckeye Cotton Oil Co. (The), Cincinnati, Ohio (W.H. Knapp); Louisville, Kentucky; New Madrid, Missouri; Raleigh, North Carolina; Memphis, Tennessee. Cargill, Inc., Minneapolis, Minnesota (D.O. Andreas); Springfield, Illinois (Eric Nadel); Cedar Rapids, Iowa (C.W. Bohlander); Fort Dodge, Iowa (H.E. Marxhausen -> R.F. Hubbard); Spencer, Iowa (W.J. Wheeler); Washington, Iowa (Hugo Lensch). Central Iowa Bean Mill, Gladbrook, Iowa (Paul H. Klinefelter). Central Soya Co., Inc., Fort Wayne 2, Indiana (E.W. McMillen, Jr.); Gibson City, Illinois (T.H. Allwein); Decatur, Indiana (C.I. Finlayson); Marion, Ohio (R.W. Fay). Clinton Industries, Inc., Clinton, Iowa (E.W. Myers). Colchester Processing Co., E. St. Louis, Illinois (E.L. McKee). Concord Soya Corporation, Concord, Michigan (Harold K. Rapp; crossed out). Consumers Co-op Assn., Kansas City 13, Missouri (F. Dean McCammon). Consumers Soybean Mills, Minneapolis 15, Minnesota (Riley W. Lewis). Dannen Grain & Milling Co., St. Joseph, Missouri (Dwight L. Dannen). Decatur Soy Products Co., Decatur, Illinois (Jasper Giovanna). Delphos Grain and Soya Products Co., Delphos, Ohio (Floyd E. Hiegel). Doughboy Industries, Inc., Fairfield, Iowa. Drackett Co. (The), Cincinnati 32, Ohio (Roger Drackett). Eastern Iowa Milling Co., New Hampton, Iowa (G.A. Ward). Farmers Cooperative Assn., Ralston, Iowa (Karl Nolin). Farmers Cooperative Co., Dike, Iowa (C.M. Gregory). Farmers Cooperative Elevator, Martelle, Iowa (H.B. Lovig). Fayette Soybean Mill, Fayette, Iowa (L.A. Rose). Fremont Cake and Meal Corp., Fremont, Nebraska (Harry E. Wiysel). Frith (E.E.) Company Inc., Dubuque, Iowa (E.M. Weicher). Funk Bros. Seed Co., Bloomington, Illinois (H.A. Abbott). Galesburg Soy Products Co., Galesburg, Illinois (Max Albert). General Mills, Inc., Chem. Div., Minneapolis 1, Minnesota (W.H. Eastman); Belmond, Iowa (E.E. Woolley). Glidden Co. (The), Chicago 39, Illinois (R.G. Golseth). Gooch Milling & Elevator Co., Lincoln 1, Nebraska (M.R. Eighmy). Haynes Soy Products Inc., Portland, Indiana (Clarence E. Peters). Hemphill Soy Products Co., Kennett, Missouri (W.A. Hemphill). Holland Pioneer Mills, Inc., Ohio City, Ohio (G.A. Holland). Honeymead Products Co., Mankato, Minnesota (L.W. Andreas); Hoosier Soybean Mills, Inc., Marion, Indiana (J.H. Caldwell, Jr.). Huegely Elevator Co., Nashville, Illinois (J.W. Huegely). Hulcher Soy Products, Virden, Illinois (Norman E. Hulcher). Iowa Milling Co., Cedar Rapids, Iowa (Jos. Sinaiko). Iowa Soy Co., Redfield, Iowa (H.R. Straight). Ipava Farmers Processing Co., Ipava, Illinois (F.P. Brown). Janesville Mills, Inc., Janesville, Wisconsin (A. Roger Hook). Kansas Soya Products Co. (The), Emporia, Kansas (Ted W. Lord); Kansas City 3, Kansas (Richard W. Lord). Ladd Soya, Inc., Bunker Hill, Indiana (Wayne Ladd). Lexington Soy Products Co. (The), Lexington, Ohio (H.E. Carpenter). Louisville Soy Products Corp., Louisville, Kentucky (H.A. Miller). Marshall Mills Inc., Marshalltown, Iowa (J.I. Johnson). Muscatine Processing Corp., Muscatine, Iowa (G.A. Kent). North Iowa Cooperative Processing Association, Manly, Iowa (Glenn Pogeler). Northwest Cooperative Mills, St. Paul, Minnesota (Anthony H. Roffers). Ohio Valley Soybean Co-op, Henderson, Kentucky (G.W. Allen). Owensboro Grain Co., Owensboro, Kentucky (William M. O'Bryan). Pacific Vegetable Oil Corp., San Francisco 7, California (B.T. Rocca, Jr.). Pillsbury Soy Mills, Clinton, Iowa (H.R. Schultz); Centerville, Iowa (H.R. Schultz). Postel (Ph. H.) Milling Co., Mascoutah, Illinois (A.S. Lee). Quincy Soybean Products Co., Quincy, Illinois (Irving Rosen). Ralston Purina Co., St. Louis 2, Missouri (D.B. Walker); Kansas City, Missouri (F.G. Franze); Lafayette, Indiana (Ralph Guenther); Iowa Falls, Iowa (H.N. Johnson); Circleville, Ohio (A.V. Couch); Champaign, Illinois -> Bloomington, Illinois (N.B. Morey). Roach Soybean Mills, Plainfield, Ohio (Howard L. Roach). Shellabarger Soybean Mills, Inc., Decatur 30, Illinois (W.L. Shellabarger). Simonsen Mill Rendering Plant, Quimby, Iowa (W.E. Simonsen). Sioux Soya Co., Sioux City 2, Iowa (J.L. Ward). Southern Cotton Oil Co. (The), Goldsboro, North Carolina (W.V. Westmoreland); Tarboro, North Carolina (W.A. Moore). Southland Cotton Oil Co., Paris, Texas (Richard H. Blyth). Soya Processing Co., Wooster, Ohio (H.H. Heeman). Soya Extraction Div., Continental Grain Co., Columbus 9, Ohio (D.H. Wilson–company crossed out). Soy-Rich Products, Inc., Wichita, Kansas (Ralph S. Moore). Spencer Kellogg and Sons, Inc., Buffalo 5, New York (Robert B. Jude); Chicago, Illinois; Decatur, Illinois; Des Moines, Iowa; Bellevue, Ohio (Harry Stokely). Sterling Soybean Co., Inc., Rock Falls, Illinois (Edward J. McGinn). Swift & Co., Union Stock Yards, Chicago 9, Illinois (S.E. Cramer). Thomson Soya Products, Hiawatha, Kansas (A.G. Thomson). Toledo Soybean Products Co., Toledo, Ohio (J.H. Brown). Wells (Ralph) & Co., Monmouth, Illinois (Ralph Wells). West Bend Elevator Co., West Bend, Iowa (R.W. Jurgens). Western Soybean Mills, Sioux Falls, South Dakota (E.A. Woodward). Williams Milling Co., Sac City, Iowa (Leo W. Williams).





Organizations represented on committees: U.S. Regional Soybean Laboratory, Urbana, Illinois (John C. Cowan, R.T. Milner).

Handwritten: New members added since publication of the Trading Rules Book–1949. Falk & Co., Pittsburgh, Pennsylvania (Willard Lighter, Jan. 1950). Minnesota Linseed Oil Co., Minneapolis 21, Minnesota (R.J. Lundquist, May 1950). Farmers & Merchants Milling Co., Glencoe, Minnesota (L.H. Patten, Mgr., May 1950). Riverside Oil Mill, Marks, Mississippi (William King Self, Aug. 1950). Planters Manufacturing Co., Clarksdale, Mississippi (A.K. Shaefer, Sept. 1950).

Associate Members: Arcady Farms Milling Co., Chicago 6, Illinois. Armour & Co., Chicago 9, Illinois (John H. Noble). Aubrey & Co., Louisville, Kentucky. Best Foods, Inc., New York, NY. Capital City Products Co., Columbus, Ohio. Cooperative Mills Inc., Baltimore 30, Maryland. Cox (Chas. M.) Co., Boston, Massachusetts. Foxbilt Inc., Des Moines, Iowa. Humco Co. (The), Memphis 1, Tennessee. Kraft Foods Co., Chicago, Illinois. Lever Bros Co., Lever House, Cambridge, Massachusetts. Pittsburgh Plate Glass Co., Paint Div., Pittsburgh, PA. Procter & Gamble Co., Cincinnati, Ohio. Spartan Grain & Mill Co., Inc., Spartanburgh, South Carolina. Tuckers (Mrs.) Foods, Inc., Sherman, Texas. Wilson & Co., Chicago, Illinois. Handwritten: New Associate Members: Clark Mills Inc., Minneapolis 15, Minnesota. Address: 3818 Board of Trade Building, Chicago 4, Illinois.

757. *Soybean Digest.* 1949. Honorary life members [American Soybean Assoc.]: Keller E. Beeson, Jacob Hartz Sr., E.F. ("Soybean") Johnson. Sept. p. 36, 85, 86.
• ***Summary:*** Keller E. Beeson, extension agronomist at Purdue University and former president of ASA, was born on March 18, 1894 at Columbia City, Indiana. Now deceased, he had been an extension agronomist at Purdue beginning in 1924. He cooperated with the railroads in running the educational "Soybean Special" trains through Indiana. Before the days of the Soybean Digest, Mr. Beeson pioneered the preparation of the printed report of the annual meeting, which was ready for distribution at the meeting. He also started the mimeographed circular letters that went out at intervals to the membership. These were forerunners of the Digest.

"Jacob Hartz, Sr., Arkansas farm and seed leader, and onetime president of ASA, was born at Racine, Wisconsin, on April 4, 1888 the son of German immigrants. He was one of eight children. Because of his father's poor health he was forced to leave school after completing the eighth grade. At the age of 20 he went to work as a traveling salesman for the P & O Plow Co. and spent several years in Arkansas.

"In 1917 Mr. Hartz moved to Wheatley, Arkansas, and went into the hardware business. In 1924, he moved to Stuttgart, Arkansas, his present home. There he joined his father and A.R. Thorell in the Hartz-Thorell Supply Co. which grew and prospered and became the leading farm machinery business in the state.

"It was early in this business that Mr. Hartz became interested in soybeans and started on the journey that was to make him one of the soybean pioneers and leaders of the South. Hartz was looking for a soil building crop to save the rice farmers of the Grand Prairie section of Arkansas who were driving themselves to ruin with a one-crop program of rice. Rice takes a tremendous amount of nitrogen from the soil and nothing was being done to replace this needed element.

"In conjunction with the Peoples National Bank of Stuttgart [in about 1925] the Hartz-Thorell Co. bought 25 bushels of Laredo soybeans. These beans were put out with key farmers over the Grand Prairie in small quantities and were planted on land that had been in rice the previous year. When the beneficial results that followed were noted [the rice farmers used the soybeans as a hay crop], a never ending search for the most suitable varieties was begun. Mr. Hartz and his partner soon found themselves in the seed business [starting about 1926] where the former has remained ever since.

"Mr. Hartz had a manifold job, the chief of which

his boys have always referred to as 'Pop's Preaching the Soybean Gospel' to farmers and agricultural leaders in Arkansas and the South. In their contacts and travels many years later they are continually running into men who say that Mr. Hartz started them in the soybean business. He found a market for the farmer's bean crop and was instrumental in having favorable freight rates established for soybeans and other Arkansas farm products.

"In 1936 the Hartz-Thorell Supply Co. designed and constructed what remains the most modern and efficient seed cleaning processing plant in the South. "The Hartz-Thorell partnership was dissolved in June, 1942. Mr. Hartz and his two older sons, B.J. and Jake, Jr., acquired the seed end of the business which they operate under the title Jacob Hartz Seed Co.

"Mr. Hartz worked diligently in several seed organizations such as the Arkansas Seed Growers Association, the Arkansas Seed Dealers' Association, and the Southern Seedsmen Association. He was elected president of the first two and first vice-president of the third, a South-wide seed dealers association. In all of the organizations he has fostered the soybean and guided its progress. He served many years on the Arkansas State Plant Board. In this capacity he helped in the first certification of soybean seed in the state.

"There is one other organization that he has helped to build, one that is dear to his heart, the American Soybean Association. He was elected the first Southern director and has served in that capacity until the present. He is a former vice president of the Association.

"The above are some of the things that long ago earned for Mr. Hartz the deserved title of 'Soybean King of Arkansas.'"

"E.F. Johnson, affectionately known as 'Soybean' by an entire industry, ha been a real pioneer and has made a contribution both as a grower and processor. He was born at Stryker, Ohio, 59 years ago [ca. Oct. 1889]. He received his education at the University of Indiana, Purdue University, and Ohio State University. He started his first soybean plots in the spring of 1912 and has been a grower ever since. At present, he is a producer of edible varieties. He was a teacher of extension work for 7 years and an assistant professor for 2 years. For a time he was agricultural director for the Soo Line. He is now affiliated with the Delphos Grain & Soya Products Co., Inc., at Delphos, Ohio. He served as president of both the American Soybean Association and the National Soybean Processors Association, and as treasurer of the latter organization. He has been actively interested in the National Farm Chemurgic Council since its inception. Mr. Johnson has always been very active in the work of the American Soybean Association, serving on programs and committees. One of the early annual meetings of the Association was held on his farm. He was one of those whose efforts and encouragement brought about the founding of the *Soybean Digest.*"

Photos show: (1-3) Individual portraits of Keller Beeson, Jacob Hartz, Sr., and E.F. Johnson. (4) Three U.S. Regional Soybean Laboratory agronomists at the ASA convention: Dr. Lewis Saboe, Columbus, Ohio; Leonard F. Williams, Urbana, Illinois; Albert H. Probst, Lafayette, Indiana.

Note 1. Concerning E.F. "Soybean" Johnson: There are many published lists of the presidents, officers, and directors of the American Soybean Association (ASA). E.F. Johnson is never listed as a president, or as an officer, or as a director of the ASA. In 1937-38 he was elected president, chairman of the executive committee, and chairman of the statistical committee of the National Soybean Processors Association (NSPA). Strangely enough, one E.C. Johnson of Stryker, Ohio (the same small town in which E.F. Johnson was born and raised and lived until the 1930s) was vice-president of the ASA in 1924 and 1925, yet several extensive searches by experts in Stryker, Ohio, can find no evidence that a person named E.C. Johnson ever lived in Stryker (See 1999 letter from Jane Anderson of Stryker). Her theory is that E.F. and E.C. were one and the same person.

Note 2. This is the earliest article seen that mentions the Delphos Grain & Soya Products Co.

758. Collins, E.R.; Powell, L.A. 1949. An approved soybean program for North Carolina. *Better Crops with Plant Food* 33(8):22-23, 45. Oct. [2 ref]

• ***Summary:*** "Tests conducted cooperatively by the North Carolina Experiment Station and Extension Service, with W.L. Nelson supervising the fertility studies and E.E. Hartwig supervising the variety tests and the breeding program, resulted in a summary of nine points necessary for profitable soybean yields. These steps were listed as follows:

"1. Have your soil tested and limed when needed. 2. Provide adequate fertility. 3. Prevent fertilizer injury. 4. Plant an adapted variety. 5. Provide enough plants. 6. Treat seed to prevent seedling diseases. 7. Prepare a good seedbed. 8. Control weeds early. 9. Control insects." Address: 1. Head, Agronomy Extension, North Carolina State College, Raleigh, NC; 2. County Agent, Currituck Co., NC.

759. *Illinois Central Magazine.* 1949. Soybeans: The miracle crop. Illinois Central helped establish crop in Illinois, which today leads the entire country in production. 38(5):8-9. Nov.

• ***Summary:*** Contents: Introduction. Once little known in America. Railroad took lead. Illinois raises big third. Is leading vegetable oil. Widespread medicinal use. Harvest is one of greatest.

Not many years ago, the soybean "was known to Americans only as the zestful Chinese sauce used to pour over chow mein and chop suey.

"In less than two decades soybeans have become a heavy tonnage crop for the railroads. Soybean traffic on the Illinois Central has continued to grow by leaps and bounds

during the past 14 years. In 1935 the railroad handled approximately 175,000 tons of beans amounting to 4,300 cars with a revenue of $367,000. By 1948, soybean tonnage had reached the astounding total of more than a million tons loaded in more than 20 thousand cars with a revenue of $2,701,453, an all-time high."

"This phenomenal growth in tonnage is a tribute to the early faith and efforts of the Illinois Central in promoting soybean cultivation among the farmers along its lines. Grown on only a few thousand acres in 1922, soybeans advanced in the succeeding 25 years to become the fourth largest cash grain crop in the United States.

"The leguminous plant, identified with the history of China as a source of food for man and beast for thousands of years, was introduced into this country in 1804. However it remained only a curiosity for more than a century. A shortage of vegetable oils during World War I focused attention to the soybean as a possible source for an oil substitute. After that war the first commercial plantings were established in North Carolina. However, soybean cultivation migrated westward to become firmly developed in the Corn Belt states of the middle west, where more favorable growing conditions were found.

"Railroad Took Lead: During the initial period of development of the soybean industry, the Illinois Central took a key part in promoting its expansion in the Corn Belt states. The first step in this direction occurred in 1927, when a special 'Soybean Train' was operated in Illinois under the supervision of the Agricultural Department in co-operation with the University of Illinois and several soybean processing establishments. This train attracted great attention. More than 33,000 farmers visited it to learn of the economic value of soybeans as a cash crop for their farms. Farmers soon turned from growing a few acres of beans for hay to planting thousands of acres for threshing and shipment of carload volumes at harvest time. The greenish-yellow beans went to processing mills, where chemists were busy discovering more and more commercial and industrial uses. Corn Belt states, which at times have suffered from a one-crop system, welcomed this supplemental crop that promised to bring new-found wealth.

From this introductory step, interest in the soybean cultivation expanded rapidly. In 1940 two special Illinois Central trains toured Illinois and Iowa bringing further information about soybean cultivation to farmers in those states to aid them in obtaining maximum yields. As a result, Illinois today is the leading soybean producer in country, followed by Iowa and Indiana.

Illinois Raises Big Third: In Illinois alone, production rose from less than 2½ million bushels in 1927 to almost 50 million bushels in 1941. The high peak came last year when 78½ million bushels flowed like a green-gold river to processing mills.

"Last year national production reached 220 million bushels, Illinois' share was one-third of the total. The four Corn Belt states of Illinois, Iowa, Indiana and Ohio produce the greatest part of the national crop, although there are some commercial plantings in North Carolina and along the Mississippi River where the four states of Missouri, Arkansas, Kentucky and Tennessee meet. Since 1927, the Illinois Central's percentage of carloadings from the national production of soybeans has averaged 15 per cent. One year. in 1939, the railroad hauled 20 per cent, or one-fifth of all soybean carloadings."

A photo (p. 9) shows an aerial view of Decatur, Illinois: "Hungry Mills–Long strings of freight cars, poured millions of bushels of soybeans into the maws of Decatur's processing mills last month as the harvest hit its peak, In the foreground above is the A.E. Staley Manufacturing Company. The Spencer Kellogg and Sons plant is in the background and behind it is the Archer-Daniels-Midland Company. Another soybean processor, the Decatur Soya Products Company, is not in the picture. Photograph by Decatur Newspapers, Inc."

760. Smith, Richard K.; Froehlich, Paul; Battles, Ralph U.; et al. comps. 1949. Agricultural statistics 1948. Washington, DC: U.S. Government Printing Office. 752 p. Index. 24 cm. For soybeans and soy products see p. 146, 149-155, 166, 481, 504, 521, 523, 558, 560.

• ***Summary:*** In this 1948-49 volume, main tables concerning soybeans are on pages 146, 149-155, 166, 481, 504, 521, 523, 558, 560.

"Introduction: Agricultural Statistics brings together each year the more important series of statistics compiled in the Department of Agriculture or in other departments whose work concerns agriculture. Although far more information is available than can be included in a single volume, the tables selected give a wide variety of facts in forms suited to most common uses. Inquiries concerning more detailed data or the statistical methodology used should be addressed directly to the agencies to whom tables in this volume are credited. These agencies can also answer questions about past and prospective revisions in published data.

"Historical series have again been generally limited to data beginning with 1929 or 1930, or to the most recent 10 years. Agricultural Statistics for 1942 is still the most complete reference for earlier data. In building up series from earlier volumes, however, it should be remembered that statistics most recently published supersede those published previously."

"Through 1935, approximately one-half of each Yearbook of Agriculture carried the kind of material that is now published separately in Agricultural Statistics." Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

761. Lehman, Samuel G. 1950. Purple stain of soybean

seeds. *North Carolina Agricultural Experiment Station, Bulletin* No. 369. 11 p. Feb. [5 ref]
• ***Summary:*** "Introduction: The purple stain disease was first reported in 1921 in Korea [by K. Suzuki] where it appeared as a purple discoloration of the seeds. A few years later (2) it was shown that this discoloration is the symptom of a disease caused by growth of a fungus in the seed coats.

"In the United States, the disease was first recognized in Indiana in 1924 (3), and North Carolina in 1927 (4). It has since been found in Illinois, Maryland, Delaware, Virginia, South Carolina and probably occurs to some extent in most other states where soybeans are grown. Other names which are sometimes used for the purple stain disease are 'purple blotch,' 'purple speck,' and 'purple seed stain.'"

"Summary: The purple stain disease of soybeans was first recognized in North Carolina in 1927. Since that time it has become much more prevalent and now occurs in harmful proportions in some parts of the state.

"It is caused by a fungus which survives in infected seeds and spreads from plant to plant by means of wind-blown spores. The disease affects seeds, pods, stems, and leaves but is most easily recognized on seeds where it produces a pink or purple stain of the seed coat.

"In all but a very small proportion of infected seeds the fungus is confined to the seed coat. It is doubtful that the disease reduces the value of soybean seed for milling purposes.

"Infected seeds germinate almost as well as normal seeds, but seedlings from infected seeds are likely to be stunted or killed after emergence from the soil. Diseased seedlings are the primary source of spores which infect leaves, stems, and pods later in the season.

"Soybean seed, whether visibly diseased or not, should be treated with a fungicidal seed protectant before planting. Arasan, or Spergon may be used for this purpose. Apply two ounces of Arasan or Spergon to each bushel of soybean seed. Arasan SL and Spergon SL may be applied as a slurry.

"Some varieties of soybeans are more susceptible to purple stain than others. Ogden usually has a much higher percentage of diseased seeds than Roanoke. Farmers who wish to grow the Ogden variety should plant seed that shows no purple stain." Address: Prof. of Plant Pathology, Raleigh, North Carolina.

762. *Soybean Digest.* 1950. Market Street. Seed directory (Ad). Feb. p. 53.
• ***Summary:*** The main title on this page is "Market street." First come four ads. (1) "For sale–Oil mill equipment. Anderson Expellers, French Screw Presses, all models, as is or rebuilt for specific materials. Pittock and Associates, Glenn Riddle, Pennsylvania."

(2) "For sale–Brand new bagging scale, unused in original crate... Link Bros. & Baird, Marshalltown, Iowa."

(3) "For sale or lease–Soybean plant, with wonderful money making record, 25,000 feet bag storage, and 75,000 bushel overhead bin storage, track scale, sprinkler system, etc. Would also make ideal feed plant. Write Louisville Seed Company, Louisville 2, Kentucky."

(4) "For sale–1,000 bu. Hawkeye seed beans, grown in Mower County, Minnesota, from certified seed. $3 per bu. in 20 bu. lots. Martin Bustad, Austin, Minnesota."

Then comes a bold subheading "Seed directory," under which we read: "A charge of $2 will be made to subscribers for listing in the March and April issues." Quantity for sale and variety are listed. Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Carolina, Ohio, and Canada. For each listing is given the amount and varieties of seed available, and whether certified or uncertified. Many of the entries are for individual farmers.

763. *Soybean Digest.* 1950. Market Street. Seed directory (Ad). March. p. 57.
• ***Summary:*** The main title on this page is "Market street." First come three ads. (1) "For sale–Oil mill equipment. Anderson Expellers, French Screw Presses, all models, as is or rebuilt for specific materials. Pittock and Associates, Glenn Riddle, Pennsylvania."

(2) "For sale or lease–Soybean plant, with wonderful money making record, 25,000 feet bag storage, and 75,000 bushel overhead bin storage, track scale, sprinkler system, etc. Would also make ideal feed plant. Write Louisville Seed Company, Louisville 2, Kentucky."

(3) "For sale–1,000 bu. Hawkeye seed beans, grown in Mower County, Minnesota, from certified seed. $3 per bu. in 20 bu. lots. Martin Bustad, Austin, Minnesota."

Then comes a bold subheading "Seed directory," under which we read: "A charge of $1 will be made to subscribers for listing in the April issue." Quantity for sale and variety are listed. Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Carolina, Ohio. For each listing is given the amount and varieties of seed available, and whether certified or uncertified. Many of the entries are for individual farmers.

764. Thurmond, Gilbert Ivo. Assignor to Algemeene Kunstzijde Unie N.V. (Arnheim, Netherlands). 1950. Verfahren zur Herstellung von kuenstlichen Gebilden, wie Faeden oder Filme, aus Viscose [Process of manufacture of artificial structures, such as threads or films, from viscose]. *German Patent* 954,547. Dec. 25. 3 p. Issued 20 Dec. 1956 (Chem. Abst. 53:9685d). [2 ref. Ger]
• ***Summary:*** These products are made using cationic compounds. Incrustation of the spinning nozzles and

cloudiness of the end-products from viscose are prevented by use of these cationic compounds, especially those known as Ethomene C/25 and S/25, from coconut and soybean oil, respectively.

Note: Soy is mentioned 3 times in this patent, but only in the form "Sojaöl" (soy oil). Address: Asheville, North Carolina.

765. 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.

766. Lehman, Samuel G.; Murakishi, H.; Graham, J.H. 1951. A leaf spot of soybean caused by *Sclerotium rolfsii. Plant Disease Reporter* (*USDA*) 35(3):167-68. March 15.
• ***Summary:*** A photo (by Bernard Ellison) shows lesions of *S. rolfsii* on three soybean leaves taken from the field.

"Sclerotium rolfsii has long been known as a parasite of soybean and numerous other cultivated and wild species of plants. In the experience of the writers, parasitic attack by this fungus has always been limited to the stem at or near the soil level, to roots beneath the soil or to fruits such as cantaloupes, cucumbers, and cotton bolls, lying on the soil. The appearance of *S. rolfsii* in the role of a leaf spotting fungus occurs very infrequently and so far as the writers are aware has not been reported in the literature.

"In late September, 1944, while examining soybeans on the Upper Coastal Plains Test Farm at Rocky Mount, North Carolina, where a high proportion of the plants in a large area were being killed by *S. rolfsii,* a considerable number of leaves were found with spots of diseased tissue differing in appearance from any previously observed on soybean leaves. The lesions were circular in outline and medium brown to light brown or straw color with a narrow band of darker necrotic tissue at the border, this narrow border being more conspicuous on the smaller than on the larger spots. Concentric circular markings were visible on many of the lesions (Figure 1). The diseased areas varied in size up to 1.5 cm., most of them being 1 cm. or less in diameter. At the center of many of the diseased areas a small clump of white mycelium was plainly visible. A small spherical brown sclerotium replaced this clump of mycelium on many of the lesions. In size and color these sclerotia resembled those of *S. rolfsii* occurring on the stems of other diseased plants in the area..." Address: Univ. of North Carolina, Raleigh.

767. *Soybean Blue Book.* 1951. Soybean growers and distributors. p. 143.
• ***Summary:*** This half-page section is divided equally into "Vegetable soybean seed" (11 companies listed alphabetically by company name; after each company name are the names of the vegetable varieties offered) and "Soybean seed–wholesale" (9 companies listed alphabetically by state). The following companies are listed: (1) W. Atlee Burpee Co. (Clinton, Iowa; Bansei). (2) Holmes Seed Co. (Canton, Ohio; Bansei). (3) International Nutrition Laboratory (Mt. Vernon, Ohio; Aoda, Bansei). (4) Lewis Olmer (Carthage, Illinois; Bansei). (5) John A. Salzer Seed Co. (La Crosse, Wisconsin; Bansei). (6) Wm. G. Scarlett & Co. (Baltimore, Maryland; Edible Yellow). (7) Strayer Seed Farms (Hudson, Iowa; Bansei). (8) Raymond Vail (Syracuse, Indiana; Bansei). (9) Vaughan's Seed Store (Chicago, Illinois; Bansei). (10) Buxton White & Co. (Elizabeth City, North Carolina; Bansei). (11) T.W. Wood & Sons (11 S. 14th St., Richmond, Virginia; Early Woods Yellow, Laredo, Mammoth Yellow, Mixed, Ogden, Pocahantas, S-100, Tokio, Virginia Brown, Wilson Black, and Wood's Late Yellow. Note that Wood & Sons offers by far the most varieties of vegetable soybeans).

The list of nine soybean seed wholesalers includes: (1) Robert L. Dortch Seed Farms (Scott, Arkansas): "State registered breeders." Dortch has a half-page ad titled "Soybean breeders" at the bottom of this page. (2) Jacob Hartz Seed Co. (Stuttgart, Arkansas): "Southern grown green and edible varieties for edible purposes." (3) Funk Bros. Seed Co. (Bloomington, Illinois): "Soybean seed." (4) J.A. McCarthy Seed Co. (Evansville, Indiana). (5) Farmer Seed & Nursery Co. (Faribault, Minnesota). (6) Cypress Land Farms Co. (Jaywye, Missouri). See ad p. 142. (7) Cypress Supply Co. (Portageville, Missouri). (8) Valley Farms (Merchants Exchange Bldg., St. Louis, Missouri). See ad p. 142. (9) T.W. Wood & Sons (Richmond, Virginia): "Breed, grow, distribute soybeans for seed and commercial use."

Note: This is the earliest document seen (Aug. 1999) that mentions the soybean variety Virginia Brown.

768. Murakishi, Harry H. 1951. Purple seed stain of soybean. *Phytopathology* 41(4):305-18. April. [31 ref]
• ***Summary:*** The symptoms of this disease, caused by *Colletotrichum kikuchii,* are discussed. Address: Formerly Univ. of North Carolina at Raleigh; Presently Asst. Plant Pathologist, Hawaii Agric. Exp. Station, Honolulu, Hawaii.

769. Feaster, Carl V. 1951. Bacterial pustule disease on soybean: artificial inoculation, varietal response, and inheritance of resistance. *Missouri Agricultural Experiment Station, Research Bulletin* No. 487. 26 p. Nov. [31 ref]
• ***Summary:*** "Condensed from theses submitted to the faculty of the Graduate School of the University of Missouri in partial fulfillment of the requirements for the degrees of

Master of Arts and Doctor of Philosophy."

The bacterial pustule disease: of soybeans, caused by *Xanthomonas phaseoli* var. *sojensis* Hedges, Starr and Burkholder, has been the most prevalent disease affecting soybeans in Missouri. The heaviest infections of the disease were observed in the years 1945 and 1949. Over a period of years, it has occurred more intensely in southeast Missouri than in the remainder of the state.

"The disease was reported first in South Carolina by Smith (28) in 1904. Hedges [1924] (20) observed its occurrence in Texas, Virginia, Arkansas, North Carolina, South Carolina and Louisiana during the early 1920's. Recently, it has been reported in all the soybean producing areas of the corn and cotton belts..." Address: Columbia, Missouri.

770. Calland, J.W. 1951. The present status of soybeans as a crop–The future. *Soybean Digest.* Dec. p. 18-20.
• ***Summary:*** "Recently while visiting with John S. Weskett, president of the New Bern Oil and Fertilizer Co. of New Bern, North Carolina, I was told that during the early twenties, when we were just starting to grow soybeans in the Midwest, he customarily shipped each year from 100 to 150 cars of soybean seed into Illinois and surrounding states. Back then, North Carolina, Virginia, Mississippi, Kentucky and Alabama were the five leading states in soybean acreage.

"In those days less than 5 million bushels of soybean seed were produced annually in the U.S. and they were not for processing. Fifteen percent was used as seed on farms where produced, 25 percent fed to livestock, and the remaining 60 percent sold very largely for seed. Only one-fourth of the total soybean acreage was harvested for beans. The balance went for hay, pasture, or for plowing under for soil improvement. They were called 'the poor man's alfalfa.' It was not until 1941 that one-half of our soybeans were harvested for seed. Now, it is about 80 percent for seed for the entire country and more than 90 percent for the Cornbelt states. Alabama today harvests one-third of her soybean acres for beans. There are yet many areas where soybeans are still 'the poor man's alfalfa.'

"By 1930 one-half of the soybean crop had moved into the Cornbelt. Today 90 percent of the soybeans for processing come from six states–Illinois, Indiana, Iowa, Ohio, Minnesota and Missouri. The acreage grown for all purposes ran up to over 15 million in 1943. It has averaged a little over 13 million for the past six years.

"One thing is sure. Our 1951 production will fall far short of our needs. We never have had enough soybeans. Even last year's 290 million bushels won't be enough. This year is no time to sell the soybean crop short.

"It has been my good fortune to be quite definitely interested in soybean production for the past 17 years. In that time I have seen some mighty poor guesses about what was going to happen to the soybean crop. I still see them. Last fall there was to be the worst glut of soybeans at harvest time that we had ever seen. There was no place to store them and the market couldn't handle them. All three of these assumptions turned out to be exactly wrong. You remember how the acres were going to be reduced by about 50 percent in 1946 and how they were not. It can be pretty well summed up by saying that everyone who has been selling the soybeans short over the past two decades has been wrong consistently.

"Well, while we are on production, let's take a look at the improvements which have come to the soybean since the early twenties. These can be divided into three rather definite periods according to one leading soybean breeder.

"1920-1930. Introductions: Thousands of introductions were tested and compared. The more popular ones were Manchu, Ito San, Peking, Virginia, Wilson, Black Eyebrow, Early Brown, and Midwest.

"1930-1940. Introductions, Re-Selections: The favorite varieties of this period were Illini, Dunfield, Mukden, Mandell, Richland, and 10 or 12 strains of Manchu.

"1940-1950. Hybrids: Plant breeders crossed varieties having desirable qualities in order to combine the good qualities of each into new and superior strains. Their skill has given us Chief, Earlyana, Lincoln, Hawkeye, Adams, Wabash, Monroe, Blackhawk, Ogden, Roanoke, and Volstate.

"Progress Made:

"Oil–Up 4 percent, from 17 to 18 percent up to 21 to 22 percent. A 25 percent increase.

"Yield–Up 100 percent.

"Lodging Resistance–Up 200 percent.

"Shattering–Up from shattering to non-shattering.

"Height–Not changed much.

"Maturity–10 days to two weeks earlier.

"Protein–Decreased slightly as oil content went up.

"Disease–Disease resistant work just started.

"What Can We Expect?

"Standing Ability–Varieties like Hawkeye now have satisfactory standing ability and others will improve.

"Height–Present height appears to be o.k.

"Maturity–Will gain a little in earliness but will hold yielding ability.

"Disease–Disease resistance will be incorporated.

"Here is an example of this progress: From the AK of period I to the Illini of period II to the Adams of period III. The Adams is the highest-oil-content variety we have today–22 percent on a dry basis. The credit for the increase in oil content definitely goes to the plant breeders.

"The contribution of the plant scientists in selecting and breeding improved and better adapted varieties, along with greatly improved technology of production, processing and marketing of soybean products, are doubtless the greatest factors in explaining the amazing increase in soybeans the past two or three decades.

"I think it is interesting to recall that a soybean variety survey conducted in Ohio in 1944, just seven years ago, showed only one-half of the growers using recommended varieties and they were planting more than 50 others. Many of these other varieties were definitely inferior ones while others were too badly mixed to be called a variety. Elevators and seed dealers were selling Manchu-type soybeans to the growers. Manchu type was frequently any mixture of yellow soybeans that happened to be in the bin. Maturity dates might vary as much as two weeks among the varieties making up such a lot of seed.

"Ohio growers have come a long way in soybean varieties since 1944. Today Ohio recommends three varieties–Monroe, Hawkeye, and Lincoln. Probably not more than a dozen varieties are planted in the state.

"A 1951 variety survey, covering 30 states shows only 30 different varieties recommended by state crop specialists, and these range from the early maturing varieties for Minnesota to the late maturity group for Louisiana.

"Processing and Marketing: Again, we must go back to North Carolina for the first processing of American grown soybeans. The Elizabeth City Oil and Fertilizer Co. made a run of 10,000 bushels in Dec. 1915, and W.T. Culpepper, manager of the firm, reported that the operation was successful. The first processing here in the Midwest was by the Chicago Heights Oil Manufacturing Co., of Chicago Heights, Illinois, in 1919. But, according to I.C. Bradley, who was in charge of the operation, they brought the soybeans from North Carolina. The following year they put in two expellers and started to process a few Illinois soybeans. As many of you know, Mr. Bradley has continued to process soybeans for the past 32 years. He is at present manager of the Allied Mills soybean plant at Taylorville, Illinois.

"Cornbelt soybean growers have ample markets for their soybeans. Processing plants already in operation and now being built will have crushing capacity of at least 290 million bushels.

"Now, just a word about this greatly expanded processing capacity. It isn't just bad guessing by the processors. Much of it is simply progress. The industry is in the process of changing over from the screw-press method to the solvent extraction method. Much of the present screw-press capacity eventually may be eliminated. Moreover, considerable potential soybean processing capacity is being used part time, or in some cases, even full time in crushing other oil seeds. In reality, the figure of 290 million bushels is the approximate capacity that could readily be used for soybeans if it were advantageous to do so.

"Nebraska doubled her acreage in 1950, came through with a 24-bushel average yield, and produced more than a million bushels of soybeans. The processing plants within her borders can readily crush all of these, and plenty of markets outside the state are bidding for Nebraska soybeans.

"In 1924, the first year the USDA considered the soybean crop important enough to gather statistics on it, the estimated value of the crop was about 11 million dollars. Consider the 1950 crop worth approximately 1 billion dollars.

"Soybean Oil Meal: The soybean grower is naturally interested in knowing if increased production of soybeans will find a market through soybean oil and soybean oil meal. In my opinion, many important and effective forces are constantly working to increase the demand for soybean oil meal. In the past 15 to 20 years this demand has grown from nothing to 5½ million tons annually." Continued. Address: Managing Director, National Soybean Crop Improvement Council.

771. Smith, Janice M.; Van Duyne, Frances O. 1951. Other soybean products. In: K.S. Markley, ed. 1951. Soybeans and Soybean Products. Vol. II. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 1055-78. [45 ref]
• ***Summary:*** Contents: 1. Vegetable soybeans and their characteristics. 2. Home processing of green soybeans: Harvesting, shelling, preparation for use as a fresh vegetable (nutritive value of cooked green soybeans), preservation of green soybeans (freezing, canning, dehydration). 3. Commercial processing of green soybeans: Harvesting and hulling, canning (selection of varieties, cleaning, blanching, and processing, acceptance of the product), freezing. 4. Home processing of dry soybeans: Harvesting and threshing, cooking, salted soybeans, sprouting soybeans. 5. Commercial processing of dry soybeans: Harvesting and threshing, canning, sprouting, salted soybeans.

"The use of soybeans as a vegetable plays a relatively unimportant role in the American dietary at the present time." only a very small amount is preserved by commercial canning or freezing. "Green soybeans rarely appear in the retail market. A considerable volume of both green and mature soybeans is consumed by families in rural areas of states where production is large and by food fanciers who grow them in their own gardens." "The effectiveness of a shortage of protein in stimulating the use of soybeans was demonstrated during World War II when protein foods were in short supply as a result of rationing and local shortages. Canned soybeans were seen in retail stores and soybeans appeared on the menu in restaurants. Magazines and newspapers frequently carried articles on the nutritional value and possible uses of soybeans in the human diet. With the cessation of rationing, articles featuring soybeans have appeared infrequently."

"The differences between vegetable and field types are not always clear-cut, but vegetable varieties have characteristics that make them superior for table use. In general, the vegetable varieties cook more easily and have a mild nutty flavor. Their pods and seeds are larger, facilitating shelling in the green or immature stage."

Tables show: (170) Characteristics and quality of green and dry, mature soybeans. For each variety is given the following: Maturity group. Green soybeans–Color of pods toward end of edible period. Size of pods and green beans. Weight (gm) of shelled beans from 100 gm of pods. Shelling time for 1 lb. of pods. Dry, mature soybeans–Average acre yields, 1934-1938. Seed color. Hilum color. Average weight of 100 beans, 1934-1938 (gm). Composite quality rating for green and mature beans. Maturity groups–Very early: Giant Green. Early: 80494, Bansei, Fuji. Midseason: Illini, Hokkaido, Jogun, Willomi, Wolverine, 89162, 84979, 87617. Late: Illington, Imperial, 87606, Funk Delicious, Emperor, Higan.

(171) Remarks and recommendations concerning vegetable soybean varieties compiled from publications and a poll of agricultural experiment stations. For each station is given the state name, remarks, and varieties tested. Stations in the following states had remarks and commented on certain varieties: Alabama, California, Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Rhode Island, Tennessee, Washington state, West Virginia, Wisconsin.

(172) Varieties of soybeans adapted to preservation by freezing. (173) Relative ratings of different varieties of cooked dry soybeans.

Figures show: (211) Mung beans and four varieties (Bansei, Illini, Lincoln, Richland) of soybeans in the dry, soaked, and sprouted state. Address: Dep. of Home Economics, Univ. of Illinois, Urbana, IL.

772. Smith, Richard K.; Froehlich, Paul; Battles, Ralph U.; et al. comps. 1951. Agricultural statistics 1951. Washington, DC: U.S. Government Printing Office. 742 p. Index. 24 cm. For soybeans and soy products see p. 136-141, 153-54, 470-71, 474-75, 501, 503, 514, 524, 526, 548.
Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

773. Warren, Lindsay. 1952. Re: Mr. Culpepper to receive a plaque in recognition of his pioneering effort in commercial soybean processing. Letter to Mrs. W.T. Culpepper, Elizabeth City, North Carolina, May 20. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mrs. Culpepper: I see that Billie [Mr. W.T. Culpepper] is to be commemorated when you will receive a plaque in recognition of his pioneering effort in supervising the first domestic. commercial processing of soy beans in the United States in December 1915. I am glad this is being done. You have no idea how often think of Billie. He was one of the dearest friends I have ever had, and his memory will always remain green with me.

"I hope that you are in good health.

"Sincerely,"

Note: No one seems to know what happened to this plaque. Address: Comptroller General of the United States, Washington [DC].

774. Lehman, Samuel G. 1952. Survival of the purple seed stain fungus in soybean seeds (Abstract). *Phytopathology* 42(5):285. May.
• ***Summary:*** Discusses Cercosporina (=Cercospora) kikuchii. Address: North Carolina.

775. Milum, V.G. 1952. Anent soybean honey. *Report of the State Apiarist, Iowa* p. 53-55. For the year ending Dec. 31, 1952. [8 ref]
• ***Summary:*** "Whether soybeans are producers of surplus honey has been a much-debated question, with the non-believers arguing that soybeans, although legumes, do not secrete nectar since the services of the bees are not needed for pollination because soybeans are self-fertile." Milum then reviews the literature on soybean honey production up to 1952. He cites a great deal of evidence that soybeans do produce surplus honey.

"In conclusion, it may be summarized that under certain conditions and in a wide range of localities soybean honey in surplus amounts may be obtained. Apparently the color of the honey varies from white to light amber, but in each case has a peculiar but pleasing flavor. All of the limiting factors on nectar secretion certainly are not known, but there seems to be some evidence that abundant moisture preceding a dry hot blooming period may be one of the controlling factors. That moisture is an important factor is further substantiated by the reports that in North Carolina soybeans do not yield as heavily on uplands as on the black swamp or Pocosin silt, and that the best soybean nectar producing areas of Arkansas are the river bottoms where the soil is deep and fertile. It seems very likely that moisture is the one common factor in all of the cases cited." Address: Entomological Laboratories, Univ. of Illinois, Urbana, Illinois.

776. Hartwig, Edgar E.; Bounds, Elaine. comps. 1953. Results of the Cooperative Uniform Soybean Tests, 1952: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 163. March. 109 p. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/52soybook.pdf
• ***Summary:*** Except for the cover, this document is typewritten.

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: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Uniform test,

Group V. Uniform test, Group VI. Uniform test, Group VII. Uniform test, Group VIII. Weather data.

"Introduction: The program of the U.S. Regional Soybean Laboratory has been directed toward the development of improved strains of soybeans and the obtaining of fundamental information necessary to the efficient breeding of strains to meet specific needs. In the Southern Region, fundamental studies and breeding programs are conducted at the two centers, Stoneville, Mississippi, and Raleigh, North Carolina. After promising new strains are developed at these breeding centers, they are advanced to the uniform regional tests, conducted in cooperation with the 12 southeastern states. This testing program enables the breeder to evaluate new strains under a wide variety of conditions, and permits new strains to be put into production in a minimum amount of time.

"Nine uniform test groups have been established to evaluate the better strains developed in the breeding programs, The Groups 0 through IV are adapted in the northern part of the United States, and the Groups IV through VIII are grown in the southern part. Within their area of adaptation, there is a maturity range of 12 to 18 days within each maturity group. The best standard variety available of each maturity class is used as a check variety with which to compare new strains as to seed yield, chemical composition, maturity, height, lodging, and seed quality. For the groups grown in the southern area, the check varieties are Perry, Dorman, Ogden, Roanoke, and Improved Pelican. At Stoneville, Mississippi, where all maturity classes will mature, the approximate maturity dates of these varieties when planted during the first half of May are: Perry, September 6; Dorman, September 20; Ogden, October 10; Roanoke, October 25; and Improved Pelican, November 8.

"The 1952 cooperative nurseries complete 10 years of regional strain evaluation in the Southern States. Of the 43 strains included in Groups V through VIII, only three, S-100, Ogden, and Acadian, were included in 1943. The results of these tests have shown the advantages of the improved varieties, and as a result, varieties such as Ogden and Roanoke have replaced largely the older varieties such as Arksoy, Ralsoy, Tokyo, Woods Yellow, and Palmetto. However, the good characteristics of some of these strains have been utilized in the breeding program. For example, N47-3479, which has shown promise in Group VII, has Palmetto as one of its parents. Although the variety CNS was shown to have an oil content too low for satisfactory commercial production, its resistance to bacterial pustule has been incorporated into many of the new strains now in test.

"A wide range of soil and climatic conditions exist in the region. As an aid in recognizing regional adaptation, the region has been subdivided into five rather broad areas, which still represent a wide range of soil types. These are: (1) the East Coast, consisting of the Coastal Plain and Tidewater areas of southern Delaware, the Eastern Shore of Maryland, Virginia, North Carolina, and the upper half of South Carolina; (2) the Southeast, consisting primarily of the Coastal Plain soils of the Gulf Coast area, but also including similar soils from South Carolina southward; (3) the Upper and Central South, including the Piedmont and loessal hill soils east of the Mississippi River; (4) the Delta area, composed of the alluvial soils along the Mississippi River from southern Missouri, southward, and (5) the Southwest, comprising Arkansas and Louisiana, outside of the Delta, and Oklahoma and Texas. In the Southwest area, most of the potential soybean-growing areas are on the alluvial river valley soils. A map is included to illustrate the five production areas,

"On nearly all of the Coastal Plain, Piedmont, and loessal soils fertilization is essential for satisfactory soybean production. A table showing soil types and rate of fertilization is included.

"As a further aid in interpreting varietal responses, rainfall data is reported for many of the locations where nurseries were grown. Since much of the summer rainfall is from local showers, rainfall data is included only from locations where records were taken reasonably close to the nurseries. Daily minimum and maximum temperatures are reported for the representative locations for the various production areas.

"The 1952 season was characterized by an extreme summer drouth [drought], especially in the Delta section, and by an early killing frost. The effects of the frost were felt in the Southwest, Delta, and upper East Coast plantings.

"In calculating variety means for seed yield, data from tests with extremely low yields or where the coefficient of variability exceed 25 per cent, are not included in the area means." Address: 1. Agronomist; 2. Clerk-Stenographer [Stoneville, Mississippi].

777. 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.

778. Jeter, F.H. 1953. Dedicate hall to soybean leader [Charles Burgess Williams]. *Soybean Digest.* May. p. 19.
• ***Summary:*** "Had it not been for the enthusiasm, the interest and the patient research work done by Charles Burgess Williams, the soybean oil industry of the South would have been delayed by many years, asserted Dr. R.Y. Winters, Agricultural Research Administration, U.S. Department of Agriculture, in the principal address at the dedication of the new agronomy building on the campus of the North Carolina State College, March 20. Dr. Winters was a long-time assistant and associate agronomist with Dr. Williams. He knew the late crop scientist intimately.

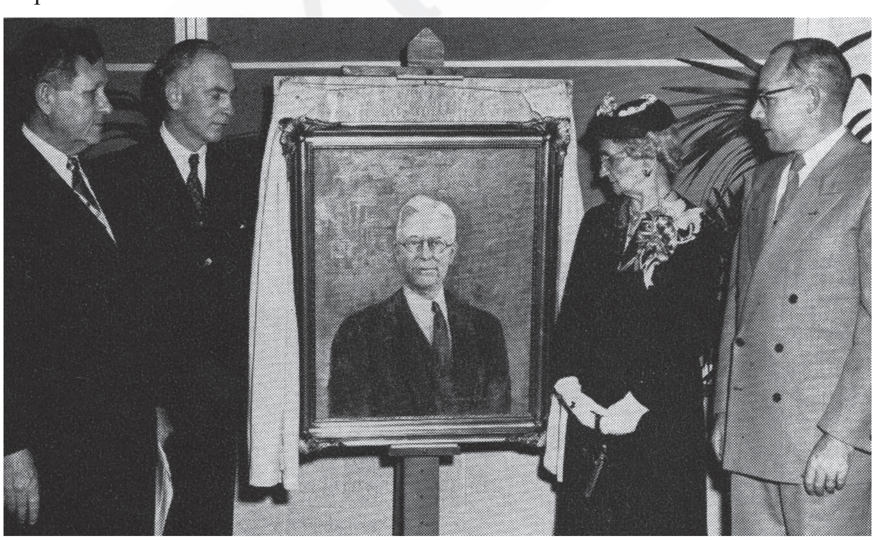
"Winters told of Williams' early interest in promoting soybeans as a legume and as an oil-bearing crop for North Carolina. As early as 1910 the agronomist was at work on the soybean as a forage, hay, soil improving, and cash income crop for eastern Carolina. 'He was tireless in his efforts to get cottonseed oil mills to crush the beans in the face of a rapidly diminishing interest in cotton growing in the state,' Winters said. 'Williams prepared and published a number of valuable folders, circulars and bulletins which paved the way for later research work with soybeans and he was really the father of the crop in the South.'

"More than 200 visiting scientists and friends gathered in the auditorium of Williams Hall to have a part in the dedication ceremonies. Representatives were present from many soil and agronomy societies and organizations. Dr. Richard Bradfield of Cornell University, representing the American Society of Agronomy, brought greetings from his University and the Society.

"The new agronomy building is a part of a 15-million-dollar building program now nearing completion on the campus. It houses the College's agronomy department, including research, teaching and extension, comprising a staff of 120 persons.

"Charles Burgess Williams was born at Shiloh, Camden County, North Carolina, in 1871. He was graduated from State College with highest honors as a member of the first class of 1893. In 1907, he became director of the North Carolina Experiment Station and chief of its department of agronomy. He also served as the first Dean of the School of Agriculture from 1917 to 1923. He was said to have been the outstanding authority in the South on soils and fertilizers."

A large photo shows the unveiling of a portrait painting of Charles W. Williams. The caption states: "Portrait accepted. Left to right, Col. John W. Harrelson, chancellor of North Carolina State College, who presided at the dedication exercises of Williams Hall, the new agronomy building; Gordon Gray, president of the Consolidated University, who responded for the institution; Mrs. C.B. Williams, wife of the late scientist; and Dr. W.E. Colwell, head of the department of agronomy. Portrait was unveiled by Thomas N. and Margaret E. Park, grandchildren of the late Charles B. Williams, for whom the building was named."



779. United States Department of Agriculture, Agricultural Research Service. 1953. Jackson soybean may lower growers' cost in southeast (News release). Washington, DC. 3 p. July 1. 28 cm.
• ***Summary:*** Jackson "is the twelfth in a series of superior varieties for the different producing areas that have been released in the last dozen years. Clark is another new variety announced only June 15 for the northern Corn Belt."

"The seed of Jackson is straw yellow in color, but easily distinguished from seed of Roanoke and Volstate because of its distinctive brown eye or seed scar."

"The Jackson variety traces its parentage to the varieties Volstate and Palmetto. The original cross was made in 1943 by Dr. E.E. Hartwig of the U.S. Regional Soybean Laboratory, working in cooperation with the North Carolina Agricultural Experiment Station. A backcross of the F1 was made to Volstate in 1944. The objective was to produce a variety for the lower southeastern part of the United States that would grow tall like Palmetto and have the good seed holding and chemical qualities of Volstate." Address: Washington, DC.

780. *Chemurgic Digest.* 1953. Williams Hall dedicated. June/July. p. 28.
• ***Summary:*** "Had it not been for the enthusiasm, the interest and the patient research work done by Charles Burgess Williams, the soybean oil industry of the South would have been delayed by many years, asserted Dr. R.Y. Winters, Agricultural Research Administration, U.S. Department of Agriculture, in the principal address at the dedication of the new agronomy building on the campus of the North Carolina State College. Dr. Winters was a long-time assistant and associate agronomist with Dr. Williams.

"Winters told of Williams' early interest in promoting soybeans as a legume and as an oil-bearing crop for North Carolina. As early as 1910 the agronomist was at work on the soybean as a forage, hay, soil improving, and cash income crop for eastern Carolina. 'He was tireless in his efforts to get cottonseed oil mills to crush the beans in the face of a rapidly diminishing interest in cotton growing in the state,' Winters said. 'Williams prepared and published a number of valuable folders, circulars and bulletins which paved the way for later research work with soybeans and he was really the father of the crop in the South.'

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"Charles Burgess Williams was said to have been the outstanding authority in the South on soils and fertilizers."

781. Lehman, Samuel G. 1953. Race 4 of the soybean downy mildew fungus. *Phytopathology* 43(8):460-61. Aug. [2 ref]
• ***Summary:*** The downy mildew disease of soybeans was first reported in America in 1924 by Lehman and Wolf who gave the name *Peronospora sojae* to the causal fungus. Since then the name *Peronospora manshurica* (Naoumoff) Sedow has come into general use for this fungus. It is now believed that *P. manshurica* comprises a number of physiologic races, some of which are present in certain localities and not in others. Address: Plant Pathology, North Carolina State College, Raleigh, NC.

782. Carter, M.W.; Smart, W.W.G., Jr.; Matrone, G. 1953. Estimation of estrogenic activity of genistein obtained from soybean meal. *Proceedings of the Society for Experimental Biology and Medicine* 84(2):506-07. Nov. [10 ref]
• ***Summary:*** The estrogenic activity of commercial defatted soybean meal (extracted using ethyl alcohol), as measured by the uterine weight of immature female mice, was found to be due to the presence of genistin, the glucoside of genistein. Although no information is given on the amount of meal used in the diet, an approximately threefold increase occurred in the uterine weight of the rats. Defatted soybean meal extracted with methanol has no remaining estrogenic activity. Diethylstilbestrol (obtained from Jensen-Salsbery Laboratories, Inc., Kansas City, Missouri) was used as the reference standard estrogen preparation. Address: Dep. of Animal Industry, North Carolina Agric. Exp. Station, Raleigh.

783. Lehman, Samuel G. 1953. Systemic infection of soybean by *Peronospora manshurica* as affected by temperature (Abstract). *J. of the Elisha Mitchell Scientific Society* 69(2):83. Dec.
• ***Summary:*** About the downy mildew disease of soybean. Address: (North Carolina).

784. Charles Burgess Williams Papers: 1895-1953 (Archival collection). 1953. Raleigh, North Carolina. http://www.lib.ncsu.edu/findingaids/mc00016
• ***Summary:*** "Creator: Williams, Charles Burgess, 1871-1947

"Size 0.25 linear feet (1 box)

"Call number MC 00016

"Portions of this collection have been digitized and made available online

"The Charles Burgess Williams Papers, 1895-1953, contain items relating to Williams' time at North Carolina College of Agriculture and Mechanic Arts. During his tenure as a student, researcher, and professor, the institution was renamed North Carolina State College of Agriculture and Engineering (later North Carolina State University). The collection contains personal documents, professional materials documenting his contributions to the study of agriculture, published and unpublished biographical pieces, and materials relating to the history of North Carolina State University.

"Charles Burgess Williams (1871-1947) was a scientist and an educator. He received a B.A. and M.A. in agriculture from the North Carolina College of Agriculture and Mechanic Arts. He spent his career at the College as a

professor, chemist, department head, dean, and leader in the North Carolina Agricultural Experiment Station.

"Biographical/historical note

"Charles Burgess Williams was born on 1871 December 23, in Shiloh, Camden County, North Carolina. He was the son of farmer Robert J. and Susan Burgess Williams. Williams' association with North Carolina State University began when he registered for classes on 1889 October 3, the day the North Carolina College of Agriculture and Mechanic Arts first opened its doors. A member of the College's first class, Williams was captain of the first football team. He graduated in 1893 with highest honors and a Bachelor of Science in agriculture.

"Upon graduation in 1893, Williams was hired as the College's first instructor of chemistry and the assistant chemist of the North Carolina Agricultural Experiment Station. Williams served in the latter capacity until 1896, the same year he obtained a Master of Science in Agriculture from the College. For the academic year 1896-1897, Williams attended the Johns Hopkins University on a fellowship in chemistry. He returned to the College and resumed his position at the Experiment Station, remaining there until 1906. In 1906-1924 and 1926-1940, Williams served as the College's first head of the Department of Agronomy at the North Carolina Experiment Station. He was named Director of the Experiment Station in 1907 and served until 1912. He was Vice-Director from 1913 until 1940. He was the first Dean of the School of Agriculture between 1917 and 1924.

"Williams' research focused on soybeans, soil surveys, and fertilizers. Between 1896 and 1934 he published more than 230 articles, bulletins, and books on these subjects. During his academic career, Williams studied at the National Graduate Summer School of Agriculture at Ohio State University (1902) and researched agriculture in California (1899), Ontario, Canada (1904), and Europe (1928). While at the College, Williams served as the Chairman of the North Carolina state soil survey (1915), Chairman of the Southeastern Tobacco Research Committee (1920-1941), and Chairman of the Southeastern Agronomy Research Committee (1927-1931 and 1936-1942). He was a member of Phi Kappa Phi, the National Grange, and a fellow in the American Association for the Advancement of Science. He was also a charter member of the American Society of Agronomy and its president in 1926. For his contributions to agricultural studies, Williams was listed in Who's Who in America and was honored in 1941 by the Association of Southern Agricultural Workers.

"Williams retired from administrative duties in 1940, but remained an active College faculty member until his death on 1947 June 25. Williams had served the institution for more than fifty-three years, longer than almost any other man until that time. He was survived by his wife Margaret Williams Moring Williams, one son, and two daughters. Margaret, a native of Raleigh, North Carolina, was born on 1879 October 4, and was a graduate of Peace College in Raleigh and the Southern Conservatory of Music in Durham, North Carolina. The couple married on 1900 July 5.

"Arrangement: The collection is organized into three series. (1) The Personal Materials series contains documents relating to Williams' family, community activities, and death. (2) The Professional Materials series is divided into three subseries, namely Professional Organizations, Research and Writings, and Biographical Materials. (3) The North Carolina State University series contains photographs as well as materials relating to agriculture, the university's fiftieth anniversary, university archives, and dedication of Williams Hall.

"Source of acquisition: Gift of Mrs. T.N. Park, 1970 September 9 (Accession 1970-0001).

"Processing information: Processed by Caitlin Donnelly, 2005 October."

785. Johnson, Howard W.; Chamberlain, D.W.; Lehman, S.G. 1954. Diseases of soybeans and methods of control. *USDA Circular* No. 931. 40 p. Jan. Superseded by USDA Agriculture Handbook No. 302. [84 ref]

• ***Summary:*** Contents: Leaf, stem, pod, and seed diseases: Bacterial blight, bacterial pustule, wildfire, brown stem rot, pod and stem blight, stem canker, frog-eye, brown

spot, anthracnose, target spot, phyllosticta leaf spot, downy mildew, powdery mildew, black patch, alternaria leaf spot, arsenical injury, soybean mosaic, yellow mosaic, bud blight, mineral deficiencies, purple seed stain, yeast spot.

Root and crown diseases: Charcoal rot, sclerotial blight, stem rot, fusarium blight, or wilt, phythium root rot, seed decay, and damping-off, rhizoctonia root rot, phymatotrichum root rot, root knot, lightning injury.

Control measures: Disease-resistant varieties, crop rotation, fall plowing, disease-free seed, seed treatment, dusting, exclusion of foreign diseases. Literature cited.

Superseded by USDA Agriculture Handbook 302.

"Root knot: The root knot disease occurs on soybeans growing in soil infested by parasitic nematodes of the genus *Meloidogyne."* This genus name "was established in 1949 as the correct name for the root-know nematodes formerly grouped under the name *Heterodera marioni* (Cornu) Goodey" (p. 29).

"Seed treatment: Soybean seed treatment tests have been conducted at various locations in the United States since 1925 (Johnson and Koehler 1943). More extensive tests have been made since 1940, and these have shown that the emergence of soybean seedlings in some districts can be increased 10 to 15 percent by treating the seed with a suitable chemical disinfectant before planting (Sherwin et al. 1948). However soybean seed treatments are not recommended as a general practice in the major Corn Belt states. "In the southern producing districts, on the other hand, the combination of poorer quality seed and cold, wet weather after planting sometimes results in the loss of 20 to 25 percent of the potential stand, if the soybean seed is not treated, Under such conditions, yield increases from seed treatment can be demonstrated, and the practice has been recommended in the South (Johnson 1951) (p. 34-35).

"A somewhat similar situation exists apparently in the northern limits of soybean cultivation (Kernkamp 1948).

"Of the numerous seed-treating chemicals tested on soybeans, Arasan and Spergon dusts at the rate of 2 ounces per bushel have consistently given good results."

Photos show: (1) Bacterial blight on the upper and lower surfaces of soybean leaves. (2) Bacterial pustule on the upper and lower surfaces of soybean leaves. (3) Wildfire, another bacterial disease of soybeans, is characterized by broad, yellow halos around the dead areas on the leaflets. (4) Soybean stems split open to show (A) the dark-brown internal discoloration characteristic of brown stem rot and (B) the white center of a normal stem. (5) Brown stem rot symptoms appear on the soybean leaflets in late August or early September as a sudden blighting. (6) Stem canker lesion girdling a soybean stem at base of branch on the right. (7) Frog-eye lesions on the lower surface (A) of a soybean leaflet and on the upper surface (B). (8) Brown spot lesions on the primary leaves of young soybeans. (9) The dark fruiting structures (acervuli) of an anthracnose fungus on a soybean stem. (10) Target spot lesions on soybean leaflets, showing zonation within the lesions and a narrow chlorotic halo around them. (11) Phyllosticta lesions on the primary leaves of young soybeans. The small, black dots on the lesions are the fruiting structures (pycnidia) of the fungus. (12) Downy mildew lesions on upper surface of soybean leaflets, showing (A) early stage and (B) later stage of the disease. (13) Soybean seeds encrusted with oöspores of the downy mildew fungus. (14) The powdery mildew fungus causes a powdery, flourlike coating on soybean leaflets. (15) Alternaria leaf spot, showing zonation of the spots and the dead areas that develop when spots coalesce. (16) Soybean leaflets, showing (A) mosaic symptoms (B) a normal leaflet, and (C) 2, 4-D injury. (17) Yellow mosaic mottling on soybean leaflets. (18) Recurved stem tip of a young soybean plant infected with 'bud blight,' a virus disease. (19) Soybean seeds, showing (A) purple stain and (B) normal seeds. (20) A, Soybean stem base and root with bark peeled off to show the small, black sclerotia of the charcoal rot fungus; B, soybean stem showing white, immature and dark-brown, mature sclerotia of the sclerotial blight fungus. (21) Lesions on soybean leaflets caused by the sclerotial blight fungus. (22) Rhizoctonia root rot of young soybeans, showing destruction of the secondary roots. (23) Rhizoctonia aerial blight, showing (A) large, discolored areas on the leaf blades and (B) sclerotia of the fungus on a leaf petiole. (24) Nematode galls (root knot) on soybean roots. (25) Beneficial root nodules on soybean roots.

Note: This is the earliest document seen (Jan. 2005) that mentions the USDA's Agricultural Research Service– which was established on 2 Nov. 1953. Address: 1. Senior pathologist; 2. Assoc. pathologist; 3. Collaborator. All: Div. of Foreign Crops and Diseases, Agricultural Research Service [USDA].

786. Collins, E.R.; Scott, H.E.; Wells, J.C.; Westmoreland, W.G. 1954. Soybean production in North Carolina. *North Carolina State College of Agriculture, Extension Circular* No. 381. 8 p. March.

• ***Summary:*** Contents: Introduction. Lime requirements. Fertilization. Planting. Weed control. Harvesting. Pest control: Table of pests that attack soybeans. Control measures [for pests; apply DDT]. Plant an adapted variety: Coastal Plain and Piedmont, Mountains and early bean for Coastal Plain, Upper Coastal Plain and Piedmont, varieties for hay. Address: 1. In charge, agronomy section; 2. Extension entomologist; 3. Extension pathologist; 4. Extension weed control specialist. All: North Carolina.

787. Hartwig, Edward E.; Bounds, Elaine. comp. 1954. Results of the Cooperative Uniform Soybean Tests, 1953: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 171. March. 126 p. Not for publication. https://www.ars.usda.gov/

ARSUserFiles/60661000/UniformSoybeanTests/53soybook.pdf
• ***Summary:*** Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Field Crops Research Branch, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel (gives person's name, city, and state). Introduction. Location of cooperative nurseries [on outline map of south-eastern USA]. Methods. Uniform test, Group IV. Uniform test, Group V. Uniform test, Group VI. Preliminary test, Group VI. Uniform test, Group VII. Preliminary test, Group VII. Uniform test, Group VIII.

"Introduction: The program of the U.S. Regional Soybean Laboratory has been directed toward the development of improved strains of soybeans and the obtaining of fundamental information necessary to the efficient breeding of strains to meet specific needs. In the Southern Region, fundamental studies and breeding programs are conducted at the two centers, Stoneville, Mississippi, and Raleigh, North Carolina. After promising new strains are developed at these breeding centers, they are advanced to the uniform regional tests, conducted in cooperation with the 12 southeastern states. This testing program enables the breeder to evaluate new strains under a wide variety of conditions, and permits new strains to be put into production in a minimum amount of time.

"Nine uniform tests groups have been established to evaluate the better strains developed in the breeding programs. The Groups 0 through IV are adapted in the northern part of the United States, and the Groups IV through VIII are grown in the southern part. Within their area of adaptation, there is a maturity range of 12 to 16 days within each maturity class. The best standard variety available of each maturity class is used as a check variety with which to compare new strains as to seed yield, chemical composition, maturity, height, lodging, and seed quality. For the groups grown in the southern area, the check varieties are Perry, Dorman, Ogden, Jackson, and Improved Pelican. At Stoneville, Mississippi, where all maturity classes will mature, the approximate maturity dates of these varieties when planted during the first half of May are: Perry, September 6; Dorman, September 20; Ogden, October 10; Jackson, October 25; and Improved Pelican, November 8.

"A wide range of soil and climatic conditions exist in the region. As an aid in recognizing regional adaptation, the region has been subdivided into five rather broad areas which still represent a wide range of soil types. These are: (1) the East Coast, consisting of the Coastal Plain and Tidewater areas of the Eastern Shore of Maryland, Virginia; North Carolina; and the upper half of South Carolina; (2) the Southeast, consisting primarily of the Coastal Plain soils of the Gulf Coast area, but also including similar soils from South Carolina southward; (3) the Upper and Central South, including the Piedmont and loessal hill soils east of the Mississippi River; (14) the Delta area, composed of the alluvial soils along the Mississippi River from southern Missouri, southward, and (5) the Southwest, comprising Arkansas and Louisiana, outside of the Delta, and Oklahoma and Texas. In the Southwest area, most of the potential soybean-growing areas are on the alluvial river valley soils. A map is included to illustrate the five production areas.

"On nearly all of the Coastal Plain, Piedmont, and loessal soils, fertilization is essential for satisfactory soybean production. A table showing soil types and rate of fertilization is included.

"As a further aid in interpreting varietal responses, rainfall data is reported for many of the locations where nurseries were grown. Since much of the summer rainfall is from local showers, rainfall data is included only from locations where records were taken reasonably close to the nurseries. Daily minimum and maximum temperatures are reported for the representative locations for the various production areas.

"The 1953 season was characterized by extremes in moisture. Through much of the central south, May was extremely wet and planting was delayed until late May and early June. The wet period followed by a long drouth [drought] period contributed to poor seed bed preparation which resulted in poor stands. For this reason, accuracy of several of the yield comparisons were [sic, was] seriously reduced. Late summer drouth reduced yield in much of the area. However, on the heavy clay soil at Stoneville, soybeans again demonstrated their ability to get a high percentage of their moisture requirements from the soil water." Address: 1. Agronomist; 2. Clerk-Stenographer. Both: Stoneville, Mississippi.

788. *Soybean Digest.* 1954. Seed directory (Ad). March. p. 40.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Minnesota, Missouri, North Carolina, North Dakota, Virginia, Wisconsin, and Ontario (Canada). For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

789. Evans, Harold J. 1954. Diphosphopyridine nucleotide-nitrate reductase from soybean nodules. *Plant Physiology* 29(3):298-301. May. [10 ref]
• ***Summary:*** The soybean is the main legume species discussed. Nitrate reductase can be obtained from soybean leaves. "Summary: Cell free extracts of soybean nodules have been prepared which catalyze the reduction of nitrates to nitrites in presence of reduced diphosphopyridine nucleotide. The enzyme activity is strongly inhibited by sodium azide and cupric sulfate and weakly inhibited by

potassium cyanide. Initial purification procedures have resulted in a five-fold increase in specific activity. It was shown that nitrate reductase is present in all of the eleven samples of nodules tested, from four different legume species. Results are discussed from the standpoint of the requirement of molybdenum for both nitrate reduction and nitrogen fixation, and it is concluded that there is ample indirect evidence to consider the possibility of a role of nitrate reductase in nitrogen fixation.” Address: North Carolina State College, Raleigh, North Carolina.

790. Matrone, Gennard; Smith, F.H.; Weldon, V.B.; Woodhouse, W.W., Jr.; Peterson, W.J.; Beeson, Kenneth C. 1954. Effects of phosphate fertilization on the nutritive value of soybean forage for sheep and rabbits. *USDA Technical Bulletin* No. 1086. 95 p. May. [59 ref]

• ***Summary:*** “An investigation concerned with the effect of phosphate fertilization on the nutritive value of soybean forage was carried on over a period of 5 years (1945-49). At extremely low levels of soil phosphorus, phosphate fertilization brought about numerous changes in the chemical composition of the soybean plant, with noticeable increases in the phosphorus, calcium, and protein concentration. Phosphate fertilization increased the yield of soybean hay by twofold or threefold. Phosphate fertilization increased the nutritive value of soybean hay as indicated by the growth of lambs and the growth and bone formation in rabbits fed phosphate-treated soybean hay.

“The cause of the increased growth in sheep fed the phosphate-treated soybean hay appears to be the extra phosphorus in the phosphate-fertilized hay. In the 1947 crops, the protein and phosphorus factors were eliminated in the case of the rabbits, but differences in the nutritive value in favor of the forage grown on the phosphate-fertilized plots remained unexplained. No evidence was obtained that either the availability of the phosphorus or the quality of the protein of the soybean hays for either rabbits or lambs was altered by phosphate fertilization. Methods were illustrated and developed for an integrated attack on fertilization problems from the soil to the animals.” Address: North Carolina Agric. Exp. Station.

791. *Agricultural Research* (*USDA*). 1954. Soybean disease builds up. 2(12):12-13. June.

• ***Summary:*** “New [soybean] variety Lee, the first soybean aimed chiefly at disease control, gives South (shaded area) high resistance to bacterial pustule and wildfire, moderate resistance to target spot, and more tolerance than most

species to root-knot nematode. All are important in the South and among the top 10 soybean diseases. Lee also has high resistance to frogeye and purple seed stain. Bacterial pustule lesions provide an easy entry for wildfire bacteria, as well. The North lacks a variety with multiple resistance. Lee originated from a cross made at Raleigh, North Carolina, 10 years ago by E.E. Hartwig, of ARS, working in cooperation with southern experiment station scientists. Several generations following the cross–a series of pollinations, tests, and selections of individuals–the F-6 descendants of a single plant became the foundation of the variety. Neither parent, S-100 or CNS, was outstanding, but jointly they gave Lee the desired superior characteristics.

“The new soybean Lee, released to seed growers June 1, promises the South resistance to 4 of the Nation’s top 10 soybean diseases. But the situation with the other 6 is far from encouraging.

“Some 30 diseases–but chiefly the top 10–cost more than 12 percent of the crop. No adequate control is in sight for 3–brown stem rot and stem canker (which cause half the loss) and sclerotial blight–for a fourth, rhizoctonia root rot, no immediate control is in prospect.

“This disease loss fulfills a prophecy of history: as a minor, trouble-free crop gets big, diseases build up. Paced by the rising vegetable-oils industry, soybeans expanded 9-fold in acreage and 12-fold in bean production in just two decades. They’re now our fifth-ranking cash crop at $3/4 billion a year.

“The 10 big diseases rose from relative obscurity in a few years. Four were unknown a dozen years ago. Though it’s 10 now and $100-million-a-year damage, it may soon be the big 20–even some unknowns–and far more loss.

“As we get more dependent on soybeans and the disease threat deepens, teams of pathologists and agronomists

in ARS and State experiment stations fight to get ahead of the diseases. Emphasis is on breeding for resistance. Several thousand distinct kinds of soybeans (genotypes) are tested yearly in search of resistance to the big 10 and other diseases, any of which may flare up.

"Aside from Lee, several other varieties have adequate resistance for appreciable control of some diseases: *South*–Ogden, for pustule, wildfire, frogeye, and target spot; Dorman, for frogeye and downy mildew; Jackson, for frogeye, target spot, purple seed stain, and root knot; Roanoke, for frogeye and purple seed stain; and Acadian for downy mildew. *North Central States*–Flambeau and Hawkeye, for bacterial blight; Harosoy, for stem canker (but inadequate); Adams, Clark, Lincoln, and Wabash, for frogeye; and Chief and Dunfield, for downy mildew.

"The important job is to get resistance for the 2 serious unchecked diseases (brown stem rot and sclerotial blight), improve resistance to the others (especially stem canker and rhizoctonia root rot), and develop for each area varieties resistant to all its major diseases.

"We need to know more about the destructiveness of each disease–the true value of resistance to it. This would help growers decide whether to change to a resistant variety. It would also help scientists judge which diseases to give priority in their work–they have only estimates now. But ARS and experiment station plant breeders and pathologists are using a technique that will give a precise measure of loss, disease by disease:

"A resistant soybean crossed with a susceptible one generally gives rise to plants of three kinds–some having only genes for resistance, some having only genes for susceptibility, and some (heterozygous ones) having genes for both. Heterozygous plants will give progeny of all three kinds. About eight generations following the cross the progeny of plants selected for the heterozygous condition for disease reaction will be essentially identical for all characters except disease reaction.

"If the resistant and susceptible F-3 progeny are exposed to a disease, the difference in their bean and oil yield will accurately measure these effects of the disease. The scientists hope to study all major soybean diseases in this way as sources of resistance are found.

"What can farmers do about soybean disease? They can use resistant varieties where available and adapted. They can turn under plant residues–sources of infection for future crops–and, if diseases are prevalent, rotate crops to prevent carryover of disease. And they can avoid planting diseased seed. In these ways they can take advantage of what science has already done for them."

A photo caption reads: "Top 10 diseases of soybeans–7 of which are shown here–cause heavy damage yearly. Some, unnoticed a few years ago, are serious today. Most occur in a single region or part of it, but 2 occur in both. The top 10 are: North Central States–brown stem rot (found 1944), stem canker (identified 1948), frogeye, bacterial blight, bacterial pustule, wildfire (found 1943), and rhizoctonia root rot. Diseases of the South–bacterial pustule, wildfire, target spot (found 1945), sclerotial blight, and root-knot nematode."

792. Brim, Charles A. 1954. New Lee soybean: from 100 plants to 20,000 acres. *Research and Farming* (*Agric. Exp. Station, North Carolina State College, Raleigh*). Summer & Autumn. p. 12-13.

• ***Summary:*** "Its to the Tar Heel farmer's advantage to switch to the new Lee soybean. The new variety is the most shatter-resistant variety so far developed, it's resistant to several major soybean diseases, and it has the yellow seedcoat color preferred by soybean importers in foreign countries. (About 80 per cent of the soybeans produced in North Carolina go into export channels.)

"There should be a plentiful seed supply for the 1956 crop. More than 20,000 bushels, enough to plant 20,000 acres, of Lee seed were produced by certified seed growers in North Carolina in 1954.

"If the season is good, these 20,000 bushels should produce around a half million bushels of seed in 1955. This is enough to fulfill the 1956 demand.

"Will Replace Ogden: Lee is expected to replace the Ogden variety over much of the area where this variety is now grown. Although Ogden usually produces high yields, shattering losses often occur with this variety. Shattering is especially bad where the harvest period is longer than two weeks. Lee has shown very little shattering eight to 10 weeks after maturity. It is the first soybean variety developed in which disease control was a major objective, and is resistant to bacterial pustule, wildfire, and frogeye. Lee is moderately resistant to purple seed stain. Where Ogden will have 80 per cent purple mottling, Lee will have 8-10 per cent.

"Lee is also more tolerant to the root knot nematode than the Ogden variety.

"Agronomists in the U.S. Department of Agriculture and the several state experiment stations who developed and tested the new variety believe it will help stabilize yields in the mid-southern area for which it was developed.

"The North Carolina station had a big hand in the development of the new soybean. Dr. Edgar E. Hartwig of the U.S. Regional Soybean Laboratory, working in cooperation with the North Carolina Agricultural Experiment Station, made the first cross at Raleigh in 1944. Lee is a selection from this cross (S-100 x CNS).

"An advanced F_3 line from this cross, N46-2566, was widely tested in North Carolina and appeared to be one of the better lines which combined good agronomic qualities with resistance to the bacterial pustule disease–a disease often found in soybean fields in the southeastern United States.

"100 Plants in 1948: In the fall of 1948, approximately 100 plants were harvested individually from N46-2566. These new lines were evaluated jointly by Dr. Herbert W.

Johnson in North Carolina and Dr. Hartwig at the Delta Branch of the Mississippi Agricultural Experiment Station.

"The variety now designated as Lee proved outstanding in performance in the North Carolina and Mississippi plantings. In 1951 it was entered in the cooperative regional trials conducted by the U.S. Regional Soybean Laboratory in cooperation with research workers in the 12 Southeastern states. These tests were carried out for three years, with tests at 35-40 locations each year. In North Carolina the new soybean was tested at McCullers, Plymouth, Willard, Statesville, Rocky Mount, and Weeksville. Lee is especially adapted to the eastern two-thirds of North Carolina, the southeast corner of Virginia, and parts of several other southern states, as far west as Texas. Because of its later maturity (average of 5 days), Lee is not suitable for planting as far north as Ogden is now grown.

"In comparison with Ogden, Lee produces higher yields, has slightly higher oil content, and sounder seed coats. Lee seed averaged 29.3 bushels per acres to Ogden's 27.5 bushels per acre in three years of testing.

"Oil content of the seed averaged 21.5 per cent on a dry weight basis for Lee and 21.3 per cent for Ogden. Lee gave an outstanding performance in the tests under a wide variety of weather conditions."

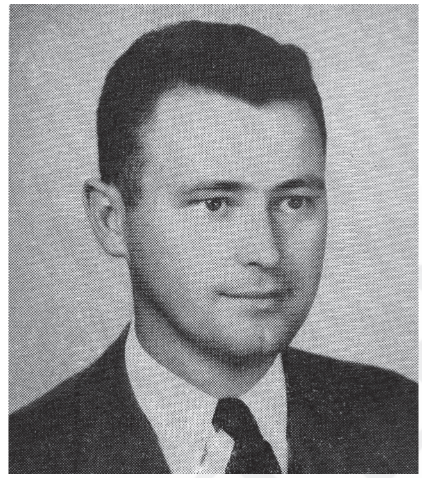
"Lee is the third in a series of new, superior varieties adapted for production in the Southern states. Dorman was introduced in 1951, Jackson in 1952."

A map shows that Lee is adapted to the eastern half of North Carolina. Address: North Carolina State College.

793. Hartwig, Edgar E. 1954. The new varieties for the southern states. *Soybean Digest.* Oct. p. 8-9.
• ***Summary:*** Varieties discussed include Ogden (introduced in about 1943 in Tennessee, it soon became the most popular soybean in the South), Roanoke (1946, from North Carolina), Dorman (1952, the first of 3 varieties released from the hybridization and selection program of the U.S. Regional Soybean Laboratory), Dortchsoy, Jackson (1953, RSL), Lee (1954, RSL), and Improved Pelican. "Better varieties and improved cultural practices will strengthen the competitive position of soybeans in the South."

794. Johnson, Herbert W. 1954. Expanded program of varietal development work in soybeans. *Soybean Digest.* Oct. p. 6-7.
• ***Summary:*** Presented before the convention of the American Soybean Association at Memphis, Tennessee.

"The underlying objective of agricultural research has been to increase production efficiency. The success of this tax-supported and private research is demonstrated by the fact that in 1940 each individual employed on the farm produced enough food and fiber for himself and 11 others; whereas today each farming individual produces enough for himself and 17 others.



"Although research workers have found the ways and means of increasing the returns from each unit of land, labor, and capital invested, they cannot claim full credit for the increased production efficiency. Vigorous extension workers have carried the results of research to the farmers and demonstrated how they could be put into practice. Farmers have learned to rely on the recommendations of their experiment stations, and today the findings of research are put into practice quicker than they have ever been before.

"The net result is that the backlog of research information that has been accepted by farmers is diminishing steadily. In many cases this situation has resulted in a critical evaluation of our approach to research, which in turn has resulted in greater emphasis on fundamental or basic research in–an attempt to insure that we will continue to add to this backlog of research information.

"The present intensified program of soybean research began in the U.S. Department of Agriculture in 1936, when the acreage of soybeans harvested for beans in the United States was 2,359,000. Production has increased steadily since that date and in recent years the acreage harvested for beans has been about six times what it was in 1936. This rapid expansion in soybean production created new problems with diseases and insects, cultural and fertilization practices, and varieties, and our research effort has not kept pace with the increase in production problems. However, increased funds appropriated this year will enable us to expand the research program.

"From the beginning of the soybean research program in the Department of Agriculture, the work has been cooperative with state experiment stations and this cooperation has been excellent from the start. Federal funds for extensive cooperative work in all states where soybeans are important have not been available and the major portion of what has been available has been concentrated in a few research centers. Currently these research centers are located in Iowa, Illinois, Indiana, Missouri, Maryland, North Carolina, Mississippi, and California, and at most of these centers an agronomist and pathologist are working as a

team on the development of improved varieties and cultural practices.

"State Contributions: The state stations where research centers are located contribute heavily to the cost of the program, but the information and new varieties from the program are made available to all states in the region. In addition to the research centers, small cooperative programs are under way in 18 other states. Work on major lines of research in the northern states is coordinated by Mr. J.L. Cartter, and Dr. E.E. Hartwig is the coordinator for the southern states.

"Although research initiative and originality is encouraged in each individual program, coordination of the work in all the programs insures against excessive duplication of effort and permits an almost immediate exchange of important information and material.

"The research team at the U.S. Regional Soybean Laboratory headquarters at Urbana, Illinois, is composed of a physiologist and two chemists, as well as an agronomist and pathologist. In addition to doing research on oil and protein, the two chemists operate the analytical section of the laboratory, which provides analyses for the compositional characters oil, protein, and iodine number for all the cooperative soybean research in the United States.

"These compositional characters are important in soybean breeding programs, and the lack of facilities sufficient for analyzing large numbers of varieties and strains has been a bottleneck in breeding progress. The results of breeding experiments indicate that the accurate evaluation of a group of selections or varieties with respect to yield must involve much more extensive testing than the evaluation for compositional characters. Thus, in early generations following a cross, when the small amount of seed precludes extensive testing, it is possible to identify and eliminate inferior selections with respect to compositional characters.

"Such elimination would mean that in later generations more intensive selection for yield could be practiced without the difficulties involved in selecting rigorously for yield and compositional characters at the same time. This would enable breeders to evaluate a larger number of selections for yield, thereby increasing the chances of obtaining a selection superior to present varieties. In the past, many high-yielding selections have been carried into advanced stages of testing only to be discarded because they were deficient in some compositional character.

"The increased funds will enable us to expand research in three general areas, and the first of these is an expansion of the facilities and capacity of the analytical section. This enlarged capacity will enable the agronomists to follow a more efficient breeding system and increase the productiveness of the entire research program.

"The second area of expansion is in fundamental genetics and breeding. Increased emphasis on this type of research is necessary if breeders are to continue to be as productive in the future as they have been in the past. The general level of performance of present day varieties is considerably higher than it was only a decade ago, and the development of new varieties that are superior to existing ones is becoming increasingly difficult. Therefore, it behooves us to accumulate basic information that will enable us to do a better job of breeding in the future.

"In this research we expect to accumulate information on such problems as: What are the characteristics that indicate two varieties will yield superior progeny if crossed? What easily-measured characters tend to be associated with important characters which are difficult and expensive to measure? What procedure of crossing, selection, and recrossing is most efficient? How is resistance to important diseases inherited and what economic losses result from a given level of infection of each disease alone and in various combinations? What are the difficulties involved and what breeding materials and procedures should be used should economic conditions indicate an important shift in the relative emphasis placed on oil and protein in our breeding programs? And many other similar problems.

"The third area of expanded research is in the evaluation of genotypes in our germ plasm collection for disease resistance and other important characters. The need for this expanded work is clearly demonstrated by the fact that we have no good source of resistance to two of the most important diseases, stem canker and brown stem rot. Also, preliminary evaluations of this collection indicate that it contains an extremely wide range of types with respect to compositional characters, seed size and quality, height, lodging, shattering, etc. Detailed and accurate information on the selections in this collection may prove to be of immeasurable value to the breeding programs of the future.

"In this expanded program, a research center will be established in the northern fringe of the soybean-producing states and one in the southern fringe; the existing centers will be strengthened, chiefly through the addition of subprofessional assistants to work with the agronomists and pathologists; and the work in two of the eighteen cooperating states will be increased.

"Although the expanded program will enable us to do a thorough job of evaluating selections in the germ plasm collection with respect to compositional characters considered in our breeding programs, it will not be possible to evaluate them for special properties with respect to oil or protein quality or other chemical characteristics. However, if soybeans that have unusual or specialized chemical characteristics are sought in any of the research laboratories of industry, we will be happy to furnish laboratory samples from selections in the germ plasm collection for evaluation in these laboratories."

A portrait photo shows Herbert W. Johnson. Address: Research Agronomist, Field Crops Research Branch, Agricultural Research Service, U.S. Dep. of Agriculture.

795. Winstead, N.N.; Skotland, C.B.; Sasser, J.N. 1955. Soybean cyst nematode in North Carolina. *Plant Disease Reporter* (*USDA*) 39(1):9-11. Jan. 15. [2 ref]

• ***Summary:*** "A cyst-forming nematode of the genus *Heterodera* has been found parasitizing soybean (*Glycine max* (L.) Merrill) in Southeastern North Carolina. Examination of soybean roots from small areas where the plants were severely stunted and chlorotic (Fig. 2), revealed the presence of numerous lemon-shaped female nematodes attached to the roots (Fig. 1). Soil samples from infested areas were found to contain several thousand cysts per pint of soil. Males were also very numerous.

"This nematode has been tentatively identified as the soybean cyst nematode, *Heterodera glycines* Ichinohe, 1952. Two other *Heterodera* species are known to attack legumes–the pea cyst nematode, *H. gottingiana* Liebscher, 1892, and the clover cyst nematode, *H. schachtii trifolii* Goffart, 1932. Mature cysts of the soybean cyst nematode can be distinguished from those of the pea cyst nematode by the presence of dark bodies (brown knobs) at the posterior end. These are absent in the pea cyst nematode. The clover cyst nematode apparently does not attack soybeans."

Photos show: (1) "Soybean root showing attached female nematodes. Note egg masses (arrows) attached to the females. Approx. 37.5 x." Address: 1. Vegetable Research Lab., Castle Hayne, North Carolina; 2. Field Crops Research Branch, USDA ARS; 3. North Carolina State College, Raleigh.

796. Bisson, F.C. 1955. Soybeans–Agricultural miracle. *Board of Trade News* (*Chicago Board of Trade*). Jan. p. 3-4.

• ***Summary:*** This is the second of two articles with this title. A table shows soybean production (in 1,000 bushels) in the ten leading states in 1930, 1940, and 1950. The ranking has changed over the years. In 1930, the top 3 states were Illinois, North Carolina, and Indiana, in that order. In 1954 the top 3 states were Illinois, Iowa, and Indiana. The states that produce the most corn also tend to produce the most soybeans.

Discusses improvements in soybean crushing technology, from the "hydraulic" method, to the "expeller" process, to the "solvent extraction" method.

"In connection with the soybean and soybean processing industries, it is interesting to note that the Chicago Board of Trade is the only commodity exchange which has facilities for futures trading, and through it, hedging, in not only the raw but also the processed commodities made from it. In other words, this exchange has trading facilities for soybeans, crude soybean oil and soybean meal futures."

A table shows the percentage of futures trading each month during 1954 that took place in soybeans, crude soybean oil, and soybean meal at the CBOT compared with all other exchanges. Every month, CBOT had more than 98% of the trading in soybean futures, more than 90% of the trading in crude soybean oil futures, and usually more than 60% of the trading in soybean meal futures. Address: Director of Market Research.

797. Schaub, I.O. 1955. North Carolina Agricultural Experiment Station: The first 60 years, 1877-1937. *North Carolina Agricultural Experiment Station, Bulletin* No. 390. 120 p. Jan. [20 ref]

• ***Summary:*** The station was established in 1877. Past directors were Dr. Albert R. Ledoux (1877-1880), Dr. Charles W. Dabney, Jr. (1880-1887), Dr. H.B. Battle (1887-1897), Dr. W.A. Withers (Acting) (1897-1899), Dr. George T. Winston (1899-1901), Dr. B.W. Kilgore (1901-1907), Mr. C.B. Williams (1907-1912), Dr. B.W. Kilgore (1913-1925), Dr. R.Y. Winters (1925-1937). A photo taken on the station's 50th anniversary, 17 April 1927, shows Winters, Dabney, Kilgore, and Williams.

Pages 21-30 contain an excellent biography of Dr. Charles W. Dabney, Jr., with a portrait. Dr. Dabney resigned from the station on 1 Sept. 1887. "His last report was dated March 15, 1887 and covered the work for 1886 and up to March. Dr. Dabney left North Carolina to become President of the University of Tennessee, an Assistant Secretary of Agriculture, and later President of the University of Cincinnati. He engaged in many other activities and was author of a number of books." Address: Agric. Exp. Station, North Carolina St. College, Raleigh, North Carolina.

798. Johnson, Howard W.; Chamberlain, D.W.; Lehman, S.G. 1955. Soybean diseases. *Farmers' Bulletin* (*USDA*) No. 2077. 16 p. March. Supersedes Farmers' Bulletin No. 1937.

• ***Summary:*** Contents: Bacterial diseases: Bacterial blight, bacterial pustule, wildfire. Fungus diseases: Brown stem rot, stem canker, pod and stem blight, frogeye, brown spot, target spot, downy mildew, purple seed stain, sclerotial blight, rhizoctonia disease. Virus diseases: Mosaic, yellow mosaic, bud blight. Root knot. Adaptation of available resistant varieties.

"Root knot: Soybeans are attacked by several different kinds of nematodes (microscopic eelworms). The most common of these cause knotlike swellings, or galls, on the roots. This abnormal condition is called root knot. The tiny root-knot nematodes enter young soybean roots and feed there, stimulating the root cells to greatly increased growth, thus forming the characteristic swelling or galls." Photos show most of these diseases on soybean plants. Address: 1. Senior pathologist; 2. Assoc. Pathologist; 3. Collaborator. All: Field Crops Research Branch, Agricultural Research Service.

799. *Soybean Digest.* 1955. Seed directory (Ad). March. p. 36.

• ***Summary:*** Soybean seedsmen and seed companies

are listed alphabetically by state (and within each state alphabetically by city) in the following states: Alabama, Arkansas, Illinois, Indiana, Iowa, Minnesota, Missouri, North Carolina, Ohio, Virginia, and Ontario (Canada). For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

800. Carter, M.W.; Matrone, G.; Smart, W.W.G., Jr. 1955. Effect of genistin on reproduction of the mouse. *J. of Nutrition* 55(4):639-45. April. [15 ref]
• ***Summary:*** In a control diet containing 0.2% added genistin, the authors found little effect on reproduction in mice, although soybeans were found to elicit an estrogenic response in mice. An estrogen is a substance capable of stimulating the growth of female reproductive organs and the development of female secondary characteristics in animals. "Reproductive disturbances have been reported to occur in sheep and in rabbits fed the soybean plant as a large part of the diet by Hunt (1935), Kendall et al. (1950), and Matrone (1952). That these reproductive disturbances might have been caused in part by the presence of an estrogenic-like substance can be inferred from data in the literature... Both commercial soybean oil meal and isolated genistin [an isoflavone] significantly lowered the age at which the vaginas of immature mice opened.

"The principal effect on reproduction of 0.2% genistin in the diet was a decrease in the number of litters born, whereas litter size was not affected. The effect of commercial soybean oil meal (80% of the diet [which would provide a dietary level of 0.12% genistin]) on the number of litters born was not statistically significant but the number of litters obtained was less than that from the group of females on the control diet." Address: Animal Nutrition Section, Dep. of Animal Industry, North Carolina Agric. Exp. Station, Raleigh.

801. *Soybean Digest.* 1955. New nematode in Carolina. June. p. 6.
• ***Summary:*** "A cyst-forming nematode has been found infesting soybeans in the Castle Hayne area, New Hanover County, N.C., according to North Carolina Experiment Station and U.S. Department of Agriculture workers in the area. Six or more farms have been found to be infested with this nematode, or a total area of 200 to 300 acres. So far it has not been found elsewhere.

"The Experiment Station and USDA are studying the problem and conducting a survey to learn if the nematode is widespread in North Carolina. Examination of soybean roots from small areas where the plants were severely stunted and chlorotic revealed the presence of numerous lemon-shaped female nematodes attached to the roots. Soil samples from infested areas were found to contain several thousand cysts per pint of soil.

"The nematode has been tentatively identified as the soybean cyst nematode, *Heteroda glycines* (Ichinohe). The known distribution of this species has been only Japan and China.

"'We do not know yet how the nematode got into this country, but we do know that some shipments of Japanese lilies were brought into the area several years ago,' states J. N. Sasser, assistant professor of plant pathology, North Carolina State College, Raleigh. Soybeans in the area are interplanted with bulbs as a cover crop. There is speculation that the nematode may have been introduced with a shipment of lilies. Sasser, N.N. Winstead and C.B. Skotland published an article on the nematode infestation in the Jan. 15 issue of *Plant Disease Reporter*.

"So far host tests have revealed that the nematode attacks only soybeans and snap beans. Studies are also being conducted on soil fumigation, the longevity of the nematode in the soil in the absence of a suitable host, etc.

"The Golden Nematode Control Project, with Joseph F. Spears in charge, at Hicksville, Long Island. New York, is working on the problem.

"Says Spears: 'It appears that the soybean cyst nematode could be a threat to the industry if established in commercial growing areas of this country. Based on what is known about the seriousness of nematodes in general when they attack our important crops and their difficulty of control, it is felt that agricultural workers in all areas should be alerted to this pest.'"

Note: This is the earliest article seen on nematodes published in *Soybean Digest.*

802. Johnson, Herbert W.; Robinson, H.F.; Comstock, R.E. 1955. Estimates of genetic and environmental variability in soybeans. *Agronomy Journal* 47(7):314-18. July. [7 ref]
• ***Summary:*** "The purpose of the present investigation was to estimate for two segregating populations of soybeans (1) genetic variance among F3 lines in the F4 and F5 generations, (2) variance due to genotype-environment interactions, and (3) progress to be expected from selection." Address: 1. Research Agronomist, Field Crops Research Branch, A.R.S., USDA, Beltsville, Maryland; 2-3. Profs. of Experimental Statistics, North Carolina State College.

803. National Soybean Processors Association. 1955. Year book, 1955-1956 (Association year). Chicago, Illinois. 48 p.
• ***Summary:*** On the cover (but not the title page) is written: "Year Book and Trading Rules, 1955-1956." Contents: Constitution and by-laws and code of ethics. Officers, directors and committees for 1955-56. Membership of the National Soybean Processors Association. Trading rules on soybean oil meal. Appendix to trading rules on soybean oil meal: Official methods of analysis (moisture, protein, oil, crude fiber {only method numbers listed}, sampling of soybean oil meal). Trading rules on soybean oil: Tentative refined oil specifications. Appendix to trading rules on

soybean oil: Uniform sales contract, standard specifications for crude soybean oil for technical uses, grading soybean oil for color (N.S.P.A. tentative method), methods of analysis (A.O.C.S. official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses; soap stock, acidulated soap stock and tank bottoms (only method numbers listed).

The section titled "Officers, directors, and committees" (p. 12-15) states: President: R.G. Houghtlin. V.P., Chairman Executive Committee: Dwight L. Dannen. Secretary: E.A. Cayce. Treasurer: H.A. Abbott. Executive Committee: Dwight L. Dannen, Chairman, D.O. Andreas, H.A. Abbott, R.G. Golseth (term ending Sept. 1956). E.A. Cayce, A.C. Hoehne, R.G. Houghtlin, W.E. Huge (term ending Sept. 1957).

Board of Directors (Term expiring Sept. 1956): E.A. Cayce, Jasper Giovanna, Willard C. Lighter, M.D. McVay, Ralph S. Moore, Clark Yager. Term expiring Sept. 1957: D.O. Andreas, Earl J. Brubaker, Dwight L. Dannen, R.B. Jude, W.H. Knap, Glenn Pogeler. Term expiring Sept. 1958: S.D. Andrews, Jr., S.E. Cramer, A.C. Hoehne, W.E. Huge, Donald C. Ogg, J.J. Quinlan.

Standing committees: For each committee, the names of all members (with the chairman designated), with the company and company address of each are given–Traffic and transportation. Technical. Soybean grades and contracts. Oil trading rules. Meal trading rules. Crop improvement council. Soybean research council. Uniform rules and standards for soybean oil meal. Safety and insurance. Lecithin. Regional: Ohio and East; Illinois, Indiana, Kentucky, Wisconsin and Northwestern Missouri; Iowa, Minnesota, Nebraska, South Dakota; Kansas, and Western Missouri; Southeastern Missouri and the Mississippi River Delta Sections.

The following organizations, and individuals are members of NSPA: Albers Milling Co., Los Angeles, California (W.P. Kyle). Allied Mills, Inc., Board of Trade Bldg., Chicago, Illinois; Peoria, Illinois; Taylorville, Illinois; Omaha, Nebraska. Archer-Daniels-Midland Co., Box 839, Minneapolis 2, Minnesota; Mankato, Minnesota; Decatur, Illinois; Baldwin Oil Mill, Inc., Foley, Alabama (W.H. Sessions). Belzoni Oil Works, Belzoni, Mississippi (Irby Turner). Big 4 Co-op. Processing Assn., Sheldon, Iowa (Chas. W. Hanson). Boone Valley Co-op. Processing Assn., Eagle Grove, Iowa (Edward Olson). Borden's Soy Processing Co., New York 17, New York (E.J. Brubaker); Waterloo, Iowa; Chicago 4, Illinois (James R. Pentis); Kankakee, Illinois. Buckeye Cotton Oil Co. (The), Cincinnati 1, Ohio (W.H. Knapp, R.B. Williams); Little Rock, Arkansas; Wilson, Arkansas; Louisville, Kentucky; Greenwood, Mississippi; New Madrid, Missouri; Raleigh, North Carolina; Memphis, Tennessee. Cargill, Inc., Minneapolis 15, Minnesota (M.D. McVay, Jay Haymaker); Chicago 3, Illinois (W.B. Saunders); Cedar Rapids, Iowa (C.W. Bohlander); Fort Dodge, Iowa (W.J. Wheeler); Washington, Iowa (Hugo Lensch); Philadelphia, Pennsylvania (R.F. Hubbard). Central Iowa Bean Mill, Gladbrook, Iowa (Paul H. Klinefelter). Central Soya Co., Inc., Fort Wayne 2, Indiana (W.E. Huge); Gibson City, Illinois (Newell Wright); Decatur, Indiana (T.H. Alwein); Marion, Ohio (W.E. Mann); Chattanooga, Tennessee (R.W. Fay). Checkerboard Soybean Co., Decatur 30, Illinois (R.E. Baer). Colchester Processing Co., E. St. Louis, Illinois (E.L. McKee). Consumer's Soybean Mills, Inc., Minneapolis 15, Minnesota (Riley W. Lewis). Dannen Grain and Milling Co., St. Joseph 1, Missouri (Dwight L. Dannen). Delphos Grain and Soya Products Co., Delphos, Ohio (Floyd E. Hiegel). Delta Cotton Oil and Fertilizer Co., Jackson, Mississippi (Alfred Jenkins). Drackett Co. (The), Cincinnati 32, Ohio (Roger Drackett). Farmers Cooperative Assn., Ralston, Iowa (Karl Nolin). Farmers Cooperative Co., Dike, Iowa (C.M. Gregory). Fremont Cake and Meal Co., Fremont, Nebraska (Harry E. Wiysel). Funk Bros. Seed Co., Bloomington, Illinois (H.A. Abbott). Galesburg Soy Products Co., Galesburg, Illinois (Max Albert). General Mills, Inc., Chem. Div., Minneapolis 1, Minnesota (Sewal D. Andrews, Jr.); Belmond, Iowa (Walter B. Hotvet); Rossford, Ohio (Glenn W. Martin). Glidden Co. (The), Chicago 39, Illinois (Willard C. Lighter). Gooch Milling & Elevator Co., Lincoln 1, Nebraska (M.R. Eighmy). Haynes Milling Co., Inc., Portland, Indiana (Clarence E. Peters). Holland Pioneer Mills, Ohio City, Ohio (G.A. Holland). Honeymead Products Co., Mankato, Minnesota (D.O. Andreas, L.W. Andreas); Huegely Elevator Co., Nashville, Illinois (J.W. Huegely). Illinois Soy Products, Springfield, Illinois (Jasper Giovanna, Eric Nadel). Iowa Milling Co., Cedar Rapids, Iowa (Joe Sinaiko, Bob Scroggs). Iowa Soy Co., Redfield, Iowa (Donald C. Ogg). Ipava Farmers Processing Co., Ipava, Illinois (Phil. Snedeker). Kansas Soya Products Co. (The), Emporia, Kansas (Elmer L. Buster). Lauhoff Soya Co., Danville, Illinois (R.G. Golseth). Marshall Mills Inc., Marshalltown, Iowa (J.I. Johnson). McKee Feed & Grain Co., Muscatine, Iowa (L.R. McKee). Mid-States Fats and Oils Corp., Peru, Indiana (Oren P. Cochran); Indianapolis, Indiana (Paul J. Sicanoff). Minnesota Linseed Oil Co., Minneapolis 21, Minnesota (R.J. Lindquist, Jr.). Mississippi Cottonseed Prod. Co., Jackson, Mississippi (H.E. Covington). Muscatine Processing Corp., Muscatine, Iowa (G.A. Kent). North Iowa Cooperative Processing Association, Mason City, Iowa (Glenn Pogeler). Ohio Valley Soybean Co-op, Henderson, Kentucky (A.I. Reisz). Owensboro Grain Co., Owensboro, Kentucky (William M. O'Bryan). Pacific Vegetable Oil Corp., San Francisco 7, California (B.T. Rocca, Jr.). Pillsbury Mills, Inc., Clinton, Iowa (Clark Yager, D.B. Long, E.A. Blasing). Planters Manufacturing Co., Clarksdale, Mississippi (A.K. Shaifer). Quaker Oats Co. (The), Chicago 54, Illinois (K.N. Tilden). Quincy Soybean Products Co., Quincy, Illinois (Irving Rosen, Norman Rosen). Ralston Purina Co., St. Louis 2, Missouri (Donald B. Walker); Kansas City, Missouri (F.G.

Franze); Bloomington, Illinois (D.D. Rowland); Lafayette, Indiana (Ralph Guenther); Iowa Falls, Iowa (H.N. Johnson). Riverside Oil Mill, Marks, Mississippi (William King Self). Sisketon Cotton Oil Mill, Inc., Sisketon, Missouri (P.B. Bartmess). Sioux Soya Mills, Div. of Sioux Industries, Inc., Sioux City 2, Iowa (John W. Zipoy). Southern Cotton Oil Co. (The), Goldsboro, North Carolina (W.V. Westmoreland); Tarboro, North Carolina (W.A. Moore). Southland Cotton Oil Co., Div. of Anderson Clayton Co., Paris, Texas (James R. Gill). Soy-Rich Products, Inc., Wichita, Kansas (Ralph S. Moore). Spencer Kellogg and Sons, Inc., Buffalo 5, New York (Robert B. Jude); Chicago, Illinois; Decatur, Illinois; Des Moines 6, Iowa; Bellevue, Ohio; El Centro, California. Swift & Co., Union Stock Yards, Chicago 9, Illinois (S.E. Cramer). Tri-County Co-op Soybean Assn., Dawson, Minnesota (J.C. Givens). Wells (Ralph) & Co., Monmouth, Illinois (Ralph Wells). West Bend Elevator Co., West Bend, Iowa (R.W. Jurgens). West Tennessee Soya Mill, Inc., Tiptonville, Tennessee (Peter Frederickson).

Associate Members: American Feed Stores Home Organization (The), Minneapolis, Minnesota. Armour & Co., Chicago 9, Illinois (John H. Noble). Best Foods, Inc. (The), New York 17, NY. Capital City Products Co., Columbus 16, Ohio. Clinton Foods Inc., Clinton, Iowa. Cooperative Mills Inc., Baltimore 30, Maryland. Cox (Chas. M.) Co., Boston, Massachusetts. Humco Co. (The), Memphis 1, Tennessee. Kraft Foods Co., Chicago, Illinois. Lever Bros Co., New York 22, New York. Procter & Gamble Co., Cincinnati 1, Ohio. Spartan Grain & Mill Co., Inc., Spartanburgh, South Carolina. Tuckers (Mrs.) Products, Div. of Anderson Clayton Co., Sherman, Texas. Wilson & Co., Inc., Chicago, Illinois. Address: 3818 Board of Trade Building, Chicago 4, Illinois.

804. Johnson, Herbert W.; Robinson, H.F.; Comstock, R.E. 1955. Genotypic and phenotypic correlations in soybeans and their implications in selection. *Agronomy Journal* 47(10):477-83. Oct. [5 ref]
• ***Summary:*** The authors observed positive genotypic correlations of high yield with high seed weight and lateness in maturity. Address: 1. Research Agronomist, Field Crops Research Branch, A.R.S., USDA, Beltsville, Maryland; 2-3. Profs. of Experimental Statistics, North Carolina State College.

805. Yearbook: Pasquotank Historical Society. Vol. 1. 1954-1955. 1955. Elizabeth City, Pasquotank County, North Carolina.
• ***Summary:*** On page 162 is a full-page entry (with portrait photo) for "William Thomas Culpepper." It reads: "Merchant, theatre owner, public official. Born in Pasquotank County, June 19, 1884. Parents: LeRoy and Martha (Davis) Culpepper. Md. [Married] Alice, daughter of James M. and Rebecca (Carter) Butler, Oct. 9, 1909. Children: Louise (Mrs. S. B. Smith); William Thomas, Jr.;

Levin Butler. Attended local schools (and Atlantic Collegiate Institute). Promoter and mgr. Elizabeth City Cotton Oil & Fertilizer Co.; pres. Carolina Amusement Co.; pres. Culpepper Hardware Co. and Culpepper Motor Co.; secy-treas. Carolina-Virginia Amusement Corp.; member General Assembly (1933); state senator (1945); postmaster, Elizabeth City (1934-43); chairman. county finance, Pasquotank, in W.W. II. Member: First Baptist Church; Kiwanis; State Assn. of Postmasters (pres. 1938); B.P.O.E.; Mason (York and Scottish); Shriner. Died June 11, 1945; buried in Hollywood Cemetery" [later called Old Hollywood Cemetery].

Note: Also buried in the Hollywood Cemetery is William B. Culpepper, born 16 Dec. 1910; died (as an infant) 29 May 1912. Inscription on gravestone: Son of W.T. & Alice B. Culpepper. Address: North Carolina.

806. Skotland, C.B. 1956. Life history and host range of the soybean cyst nematode (Abstract). *Phytopathology* 46(1):27. Jan.
• ***Summary:*** The results of this experiment suggest that five generations of soybean cyst nematode can be produced on a soybean crop in one season in North Carolina. Address: North Carolina Agric. Exp. Station, Raleigh, North Carolina.

807. *Agricultural Research* (*USDA*). 1956. Widespread search is underway for the threatening soybean cyst nematode,... 4(8):16. Feb.
• ***Summary:*** "... which was first found in this country in 1951.

"So far as we know, it's still confined to its original area of about 900 acres near Castle Hayne, New Hanover County,

North Carolina. However, regulatory officials of USDA and the North Carolina Department of Agriculture aren't taking chances. They're resurveying the Castle Hayne area to see whether the pest has spread. They're spot-checking up to 50 miles from there–in fact, wherever they think the pest might have been moved by the transfer of plant material, soil, or machinery.

"Regulatory personnel, agronomists, and plant pathologists in soybean areas everywhere have been alerted to report for careful investigation any unexplained damage to soybeans. Regulatory problems raised by the nematode's presence in this country are also being investigated.

"The soybean cyst nematode yellows and dwarfs soybean plants. It's one of the microscopic organisms often called 'eelworms' or 'thread-worms.' We're especially concerned because cyst-forming types are usually very persistent–extremely hard to kill. The mother nematode changes her body into a heavy-walled egg case or cyst that keeps eggs alive for years and ready to emerge at the proper signal.

"The golden nematode of tomatoes and potatoes, for example, can survive over 9 years this way. The sugar-beet nematode, also a cyst-forming type, can be starved out by a proper 3- or 4-year rotation.

"Survivability and other characteristics of this pest are being studied by ARS and North Carolina experiment station researchers. They hope to find some weakness in the pest that will enable us to control it."

808. *Agricultural Research* (*USDA*). 1956. Double cropping... Why and how: Work in two southern states has brought some practical advances. 4(10):6-7. April.
• ***Summary:*** Six years of trials with soybeans and small grain in the North Carolina Coastal Plain and Mississippi Delta regions have demonstrated the feasibility of double cropping.

809. *Soybean News* (*NSCIC*). 1956. Best adapted varieties (Map). 7(4):4. April.
• ***Summary:*** See next page. A large outline map of the eastern United States, east of about the 104th meridian west (approximately east of the western boundaries of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas), is divided into three horizontal zones. From north to south they are Zone A, Zone B, and Zone C. On this map are listed the names of many soybean varieties, showing where (in which states and in which zone) they are best adapted.

Other states shown on the map (in which soybean varieties are listed) are Minnesota, Iowa, Missouri, Arkansas, Louisiana, Michigan, Illinois, Tennessee, Mississippi, Alabama, Georgia, Michigan, Wisconsin, Illinois, Kentucky, Indiana, Ohio, New York, Pennsylvania, West Virginia, Maryland, Delaware, Virginia, North Carolina, South Carolina, and Florida.

The varieties adapted to the farthest north (Minnesota and eastern North Dakota) are Acme, Flambeau, Norchief, Mandarin (Ottawa), Grant, and Capital.

Note: This is the earliest such map seen in *Soybean News.*

810. Matrone, G.; Smart, W.W.G., Jr.; Carter, M.W.; Smart, V.W.; Garren, H.W. 1956. Effect of genistin on growth and development of the male mouse. *J. of Nutrition* 59(2):235-241. June. [7 ref]
• ***Summary:*** The authors found that genistin and genistein (isolated from commercial, toasted defatted soybean oil meal) when fed to rats at high levels (0.5% of the diet) inhibited growth, increased the iron content of the liver and spleen, showed antiperotic properties [helped prevent porous bones], elevated the zinc content of the bones and liver, and increased deposition of calcium, phosphorus, and manganese. No significant adverse effects were noted in rats fed 0.1% genistein (equivalent to 0.16% genistin) in a 19% casein diet for 4 weeks. Diethylstilbestrol was used for comparative study.

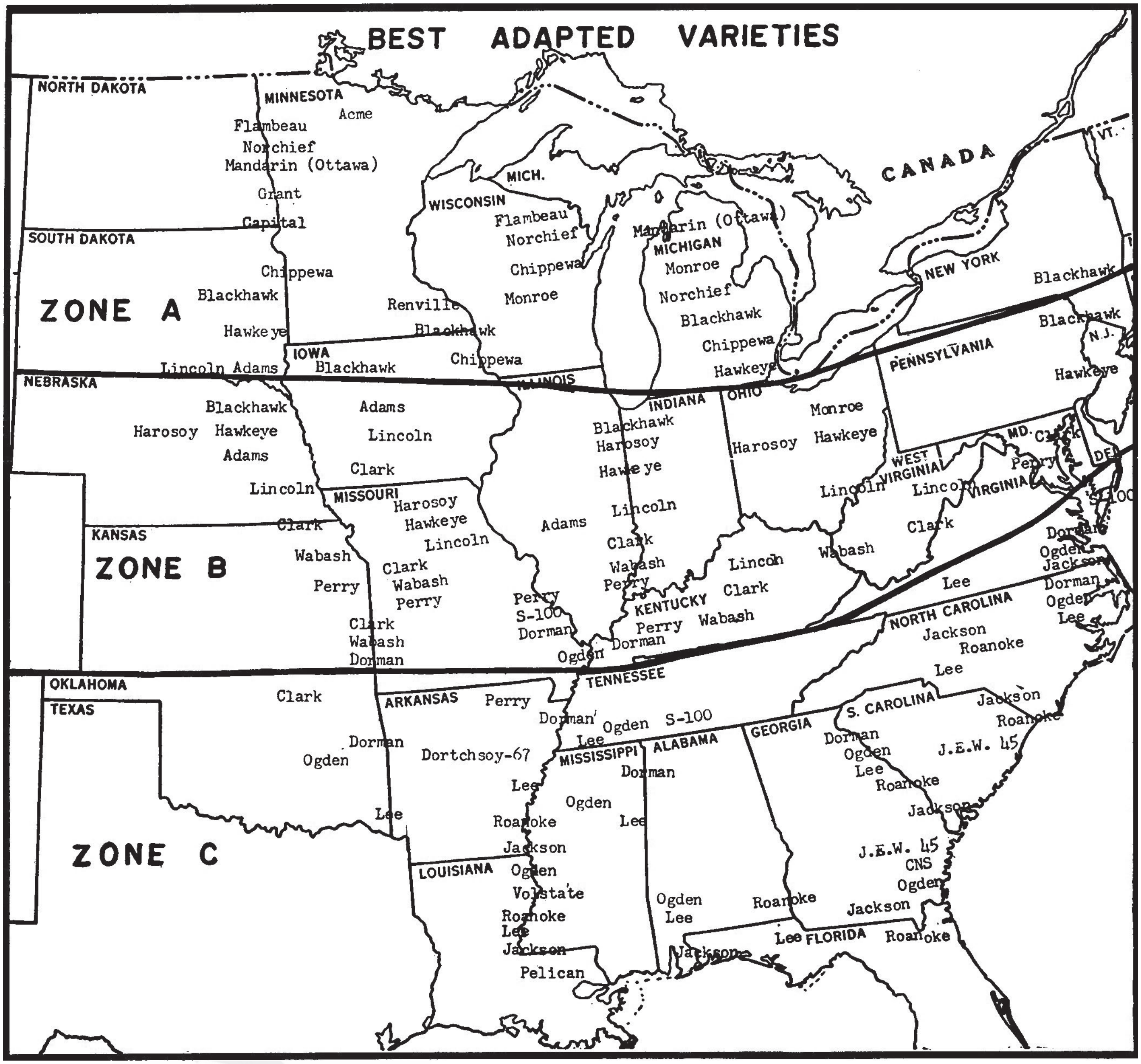
Note: This is the earliest document see (Dec. 2001) concerning soy and prevention of osteoporosis. Specifically, it is the earliest document seen indicating that soy isoflavones (genistin, genistein) are beneficial for bone health and help prevent osteoporosis. Address: 1-4. Animal Nutrition Section of Dep. of Animal Industry; 5. Poultry Science Dep., North Carolina Agric. Exp. Station, Raleigh.

811. Moore, R.P. 1956. Harvest with care. *Research and Farming* (*Agric. Exp. Station, North Carolina State College, Raleigh*). Summer. p. 3.
• ***Summary:*** In both peanuts and soybeans, seed injury resulted in a weakening of seed vigor and reduced seed stands. A common type of injury is breaks in the seed coats. Address: North Carolina State College.

812. *Soybean Digest.* 1956. Nematode quarantine in N.C. [North Carolina]. July. p. 18.
• ***Summary:*** "A quarantine of the soybean cyst nematode in southeastern North Carolina was promulgated by the North Carolina State Department of Agriculture following a public hearing at Raleigh in March.

"The nematode was first found severely damaging soybeans at Castle Hayne, New Hanover County, N.C., in 1954. It has been identified as *Heterodera glycines* Inchinohe.

"To date the pest has been found on 68 farms in Hanover and Pender Counties, involving 1,202 acres, with Castle Hayne as the center of infection. So far as is known, this pest is confined to that area, but uncontrolled it could pose a serious threat to the nation's soybean industry. The importance of making known any new outbreaks so they may be dealt with promptly and effectively is pointed out by Joseph F. Spears, in charge of the golden nematode project



for the U.S. Department of Agriculture at Hicksville, L.I. [Long Island], New York.

"It is possible for up to five generations of this nematode to mature in one crop of soybeans. Yields were so low on several infested fields last year that some owners did not attempt to harvest the crop. The only other known occurrences of this pest are in Japan, Korea, and China-Manchuria.

"The quarantine in North Carolina requires that farm machinery, implements and other equipment used on infested fields must be thoroughly washed to remove all soil before moving to noninfected fields.

"The N.C. Department of Agriculture also recommends to growers in the infested area that they do not grow susceptible crops such as snap beans, annual lespedeza or common vetch as well as soybeans on land infested with the nematode.

"The Castle Hayne area is also a flower growing center producing narcissus, daffodils and gladioli. There has been considerable concern about shipping bulbs from known infested fields as a possible means of spreading the nematode. The bulbs are not hosts of the nematode, but they may be carriers of the cysts. The quarantine regulations prohibit true bulbs, corms or rhizomes from being moved out of the quarantined area until at least 60 days after digging and after they have been thoroughly cleaned of soil.

"Growers and agricultural workers are urged to watch for any unexplained damage to soybean plantings. Diseased areas may range from small spots to entire fields. Plants severely attacked are usually stunted and the foliage becomes

prematurely yellow.

"Roots of infected plants have numerous lemon-shaped female nematodes and cysts attached to them. These are small, but they can be seen with the naked eye. They range in color from white to yellow to brown, depending on the age of the nematode. The brown nematodes are dead females transformed into tough, durable cysts filled with eggs. The cyst protects the eggs throughout the winter months.

"Since other diseases may cause stunting and yellowing of the soybean plant, positive identification rests on finding nematodes living on the plant roots.

"For further information see, The Soybean Cyst Nematode, Extension Folder No. 126, North Carolina Agricultural Extension Service, State College Station, Raleigh, N.C., or write U.S. Department of Agriculture, Plant Pest Control Branch, Washington, D.C."

Photos show: (1) Close-up view of soybean plants growing in an infested area. (2) Circular photomicrograph of soybean root with nematode cysts attached. Cyst at lower right has egg masses attached. These are difficult to see with the naked eye.

813. Cheniae, G.M.; Evans, H.J. 1956. Studies on nodule nitrate reductase. *Plant Physiology* 31(Proceedings supplement):x.
• ***Summary:*** Found that soybean nodule bacteria possessed nitrate reductase, whereas the bacteria grown in culture did not unless they were grown in the presence of nitrate. Address: Univ. of North Carolina, Raleigh, NC.

814. Pierce, Walter H.; Pugh, Charles R. 1956. Cost of producing farm products in North Carolina. *A.E. Information Series* (*Dep. of Agricultural Economics, North Carolina State College, Raleigh, NC*). No. 52. v + 108 p. Dec.
• ***Summary:*** One section, titled "Soybeans" (p. 47-48) begins: The average labor inputs for soybeans for beans are shown in Table 33. These data are based primarily upon conditions in the Northern Tidewater area of the State. Since most of the operations in commercial soybean production are mechanized, the estimated costs and returns have been computed only on this basis (Table 34). It has been assumed that soybeans would be harvested with a combine. Most workstock farms would hire this operation which would increase the direct cash expenses by the amount of the custom charges.

"An average yield of 22 bushels per acre could be expected normally with the use of recommended practices. In the case of late planting following another crop such as small grain, a slightly lower yield may be expected. On most soils, an application of 400 pounds of 0-10-20 or 150 pounds of muriate of potash and 200 pounds of 20 per cent superphosphate would be adequate. Lime also is important. However, since applications of two tons would be sufficient every five to seven years, and other crops in the rotation would share in the benefits, the cost may be prorated on an annual basis as indicated.

Tables: (33). "Average labor inputs per acre for soybeans for beans." (34) "Estimated costs and returns per acre for soybeans for beans."

Soybeans are also mentioned on pages iii, v, 2-3, 5 and 107.

The total number of man hours per acre to produce soybeans (8.5) is much less than all of North Carolina's other major cash crops: flue-cured tobacco (389.0), burley tobacco (378.3), cotton (117.5), and peanuts (45.0). Address: 1. Assoc. Prof. of Agricultural Economics; 2. Extension Farm Management Specialist.

815. Epps, J.M. 1957. Soybean cyst nematode found in Tennessee. *Plant Disease Reporter* (*USDA*) 41(1):33. Jan. 15.
• ***Summary:*** "The soybean cyst nematode, *Heterodera glycines* Ichinohe, has been found in soybean fields in Lake County, in Western Tennessee. In the course of a survey, soil and roots of soybean plants were collected from a field believed to be infested with the root-knot nematode. Examination of the soil revealed the presence of many lemon-shaped female nematodes attached to the roots and in the soil. Larvae were present in the soil.

"The extent of the infestation has not been determined. Numerous soil and root samples collected later, in the north part of Lake County, have not revealed the presence of this nematode. It now appears that the present known infestation constitutes a considerable acreage. The general area is devoted to growing soybeans, cotton, alfalfa, and corn. The soil varies from very sandy to heavy.

"Soil samples sent to Dr. J.N. Sasser, Department of Plant Pathology, North Carolina State College, Raleigh for confirmation were found to contain viable cyst nematodes which attacked soybeans. Reproduction occurred readily and numerous males were found in the material. Positive identification of the cyst nematode was made.

"Investigations as to extent of damage and areas of damage are being continued." Address: Plant Pathology Dep., Tennessee Agric. Exp. Station, Jackson, Tennessee.

816. Moore, R.P. 1957. Rough harvesting methods kill soybean seeds. *Soybean Digest.* Feb. p. 14-16.
• ***Summary:*** When harvesting soybeans with a combine, split or cracked beans are the result of (1) too high a cylinder speed; (2) insufficient clearance between cylinder and concave bars; and/or (3) too many bars in cylinder or concave. Excessive cylinder speed is damaging to seed viability. Address: Professor, Research, Crop Stands, North Carolina State College, Raleigh, NC.

817. *Soybean Digest.* 1957. May quarantine soybean nematode. Feb. p. 22.

• ***Summary:*** "A public hearing on a U.S. Department of Agriculture proposal to quarantine the states of Missouri, North Carolina and Tennessee for the soybean cyst nematode or 'yellow dwarf' disease was held by USDA in Washington Jan. 31.

"The Department announced the hearing on Jan. 14 and interested people were given a chance to appear and express their views on the proposal.

"The quarantine, if established will restrict or prohibit the movement of: soil, nursery stock, bulbs and tubers, soybeans and soybean hay, farm implements, construction and maintenance equipment, used boxes, bags and other containers, trucks, wagons, railway cars and boats and other articles that might spread the soybean cyst nematode from the infected areas.

"The soybean cyst nematode is taken seriously as a threat to the soybean crop, since it is capable of causing complete destruction to the crop in an area.

"The disease caused by the nematode was first called 'yellow dwarf' disease in Japan, Korea, and Manchuria, where it has its only known habitat outside of the United States.

"In this country, the pest has been found in Pemiscot County, Missouri, New Hanover and Pender Counties, North Carolina, and Lake County, Tennessee.

"Seen as Serious Missouri Threat: The soybean cyst nematode, discovered in southeast Missouri late in 1956, may prove to be a most serious threat to soybean production, say University of Missouri extension and survey entomologists Stirling Kyd and George Thomas.

"Undiscovered in this country until 1954 when it was found in North Carolina, the soybean nematode was noticed late last year in Lake County, Tennessee, just across the Mississippi River from Pemiscot County. Missouri surveys were started immediately and the nematode was easily found in the southeast part of the state.

"Surveys are continuing and it looks as though the infestation may be fairly general throughout southeastern Missouri, the two entomologists say. The State Department of Agriculture and the United States Department of Agriculture are conducting the surveys in southeast Missouri. The soybean cyst nematode has been a pest in the bean-producing areas of Japan, Korea, and Manchuria for 40 years or more. It's one of the numerous, tiny, almost transparent eelworms that infest soil, plants, and animals all over the world.

"Soybeans are the principal host plant and most attention has been given to the nematode's attack on that legume. However, North Carolina studies show the nematode willingly attacks annual lespedeza also.

"Consequently, the soybean cyst nematode must also be considered a potential serious threat to Missouri's 10 million acres of lespedeza. Common vetch and garden beans also succumb to the nematode's attack.

"Since the nematode is unable to move under its own power, infestations occur via moving soil. Farm machinery is probably the most common means of spread–custom machinery can spread the nematode over wide areas. The nematode can also be spread by normal surface drainage, blowing soil, flood, man and animals carrying infested soil on their feet, cars driving through fields, and through any other soil movement.

"To counter this dark picture, Kyd and Thomas point out that the nematode discovery doesn't mean it's new. They say the nematode has probably been active in Missouri for 15 to 25 years.

"As for methods of holding the pest in check, chemical control is completely out of the question at the present time. Costs are prohibitive from a crop protection standpoint and treatment isn't effective enough to be used in an attempt to do away with the nematode.

"For the 1957 growing season, Kyd and Thomas suggest that bean producers in southeastern Missouri plant soybeans on land that hasn't been used for beans, lespedeza, or vetch during the past 3 or 4 years. Although there hasn't been time to complete research, they believe that a 3 or 4-year rotation may significantly reduce the nematodes' ability to damage a soybean crop.

"And, the two entomologists point out that, under no conditions, should soil samples be taken from fields suspected to be infested with the nematode. Any such samples taken would only make the situation worse by having a flood of potentially infested samples being sent over the state."

818. Hartwig, Edgar E. 1957. Row width and rates of planting in the southern states: No yield advantage for narrow rows. *Soybean Digest.* March. p. 13-14, 16.

• ***Summary:*** "Rate of planting and row width studies have been conducted in all of the major soybean producing areas of the South. Results of most of these studies are in fairly close agreement and indicate that the optimum rate within the row is 10-12 viable seed per foot and that there is no yield advantage for planting in rows narrower than 36 to 40 inches.

"Plantings of less than 10-12 seeds per foot of row will frequently yield as well as thicker planting, but the seedling growth is at a slower rate and more difficulty is encountered in weed control. Planting at rates heavier than 10 to 12 seeds per foot of row gives better early season weed control, but a greater amount of lodging usually results.

"Thirty-six or 38-inch rows have an advantage over 40-inch rows in that four rows can be handled with greater ease with a 12-foot combine.

"In 1944, the three varieties Ogden, Volstate, and Woods Yellow were grown at four rates in the row–2, 3, 6, and 12 plants per foot of row at two locations in eastern North Carolina. For the varieties Ogden and Volstate, this would

mean planting rates of approximately 10, 15, 30, and 60 pounds per acre, and for Woods Yellow the planting rates would have been approximately 13, 20, 40, and 80 pounds. Row width was 40 inches. Plantings were made in early May. All plantings were made at a heavy rate and thinned to the desired spacing after emergence. Yields in these plantings are reported in Table 1.

"In these plantings harvest loss from combining the two and three plants per foot rate would have been greater than from the two thicker rates, because pods were borne much closer to the ground.

"In 1947, 1948, and 1949, a rate of planting study was conducted on a Norfolk Sandy Loam soil at Rocky Mount, North Carolina. The Roanoke variety was planted in early May at the rates of 4, 6, 9, and 12 seeds per foot in 42-inch rows. Seeds having a laboratory germination of 90 to 95% were used. Seedling emergence ranged from 80 to 85% each year. Planting rate had no influence on percentage emergence in any year. A higher percentage of the plants survived to maturity in the thinner plantings. Seed yields were low in each of the first 2 years, and very good the third year. Yield was not influenced by planting rate. The results for the 3 years are reported in Table 2.

"There was a greater amount of lodging in the planting of 12 seeds per foot than where 9 seeds per foot were planted. On the basis of these studies and observations at other locations, a planting rate of 9 seeds per foot was recommended for Roanoke in North Carolina.

"In order to study the interrelations of row width and planting within the row, studies were made at Plymouth, N.C., using four row widths, 24, 30, 36, and 42 inches, and three rates within the row, 4, 6, and 12 plants per foot. All plantings were made at a thicker rate and thinned to the required spacing. Plantings were made in early May. Results for the Ogden variety are reported in Table 3.

"These studies showed no advantage for planting in rows closer than the conventional 36- to 42-inch rows. Thicker plantings in the row had an advantage from the standpoint of early weed control, regardless of row width. Lodging increased appreciably as row width was reduced.

"The plant population of 12 plants per foot appeared to be slightly excessive. A planting rate of 10-12 viable seeds per foot in 36- to 42-inch rows was concluded to be near the optimum for seed yield, early weed control, and a minimum amount of lodging.

"H.M. Camper and Dr. T.J. Smith conducted studies at Warsaw, Virginia, for the years 1952, 1953 and 1954 in which they used 12, 24, and 36-inch rows and planted at the rates of 3, 5, and 7 pecks per acre. Average planting dates were May 10, May 24, June 8, June 23, and July 9. Narrow rows had no yield advantage over the 36-inch row for the Ogden variety in any of the first four planting dates. Narrow rows gave higher yields than the 36-inch row in the July 9 plantings, but Ogden yielded appreciably less when planted in narrow rows on July 9 than when planted in 36-inch rows on June 26 or earlier. Seven pecks per acre reduced yield of Ogden in the May and June plantings.

"In 1949, Ogden soybeans were planted in late May at Stoneville, Mississippi, in four row widths–24, 30, 36, and 42 inches–at the rate of 10 viable seeds per foot of row. The mean yield for all plantings was 39.5 bushels per acre with no difference for row width.

"In 1950, Dorman, Ogden, and Roanoke varieties were planted in early May in 28, 32, 36, and 40-inch rows on a sandy loam soil at Stoneville. All plantings were made at the rate of 10 seeds per foot of row. In these plantings the row middles in the 28-inch rows were shaded in 37 days as compared with 44 days for the 36-inch row. This difference might mean one less cultivation for the narrow rows. A greater amount of lodging resulted from planting in the narrow rows. Seed yields are reported in Table 4.

"Planting rates in 36-inch rows were tested at Stoneville on a sandy loam soil for the years 1952, 1953, and 1954. The three varieties Dorman, Ogden, and Lee were planted at the rates of 6, 9, 12, 18, and 21 seeds per foot. Percentage emergence was not influenced by planting rate in any of these plantings. Seed yield was influenced very little by planting rate. The mean yields for the three varieties in 1954 for the 6, 9, 12, 18, and 21 seeds per foot planting rates were 36.9, 35.4, 37.5, 36.8, 38.5, and 35.8 bushels per acre. The six-seed-per-foot planting required a longer time to give complete ground shading. Lodging was considerably greater in the 18 and 21 seeds per foot planting rates. For the Dorman and Lee varieties, the approximate planting rates would be 27, 40, 54, 80, and 94 pounds per acre, while for Ogden the rates would be approximately 30, 45, 60, 90, and 105 pounds per acre. The 9-to-12-seeds-per-foot rates gave excellent early growth with a minimum amount of lodging.

"In 1955, Dorman and Lee were planted at three planting dates on a heavy clay soil at Stoneville, Miss. Three planting rates–6, 12, and 18 seeds per foot–were used in 36-inch rows. Percentage emergence was slightly higher for the thinner planting rates. Seed yields for the May 10 and May 31 plantings are reported in Table 5.

"These plantings were made with an old style double disk opener which did not place the seed uniformly at the bottom of the furrow opening. As a result the percentage emergence was somewhat lower than has been obtained from the use of newer style double disk openers on the heavy clay soils. Therefore, the apparent advantage for thicker planting in late May or early June is not typical.

"During the years 1950, 1951, 1952, and 1953 plantings of Ogden beans were made by Ralph Smith in west Florida at the rates of 30 to 120 pounds per acre. These plantings were made in 36-inch rows in early June. Results are reported in Table 6.

"In 1952, Ogden soybeans were grown in six row widths in West Florida. When each row received a comparable

amount of fertilizer and approximately one seed per inch in the row, the yields for the different row widths were as follows: 12-inch, 35.2 bushels; 18-inch, 31.9 bushels; 24-inch, 32.3 bushels; 30-inch, 32.9 bushels; 36-inch, 34.2 bushels; and 42-inch, 30.6 bushels.

"Studies conducted by the Arkansas Agricultural Experiment Station at Stuttgart in 1950 and 1951, at Clarkedale in 1950, and at Marianna in 1951 showed a distinct yield advantage for planting in narrow rows. Results obtained for the Ogden variety are reported in Table 7. In these studies the 10-inch and 20-inch rows were hand hoed to control weeds and the 40-inch rows were cultivated.

"Plant growth in the Arkansas tests was less than was produced in the other studies reported from other states. The reduced plant growth probably explains the greater differences in seed yield among the different row widths.

"Perhaps growers in the North Central area will wonder why experimental plantings in their area show a yield advantage for narrow rows while most results in the South show no advantage for narrow rows. Much of the difference can be explained by the fact that adapted Southern varieties have much heavier foliage and will normally completely fill the row middles in 36- to 40-inch rows (fig. 1). Crowding these heavy foliage types into narrow rows results in increased lodging.

"In this discussion, increased lodging from thick plantings or narrow rows has been emphasized. Readers may feel that the data presented does not show too much yield reduction from the heavy planting rates. However, severe lodging increases problems in maintaining proper combine adjustment, particularly height of cutter bar and reel, and will frequently result in greater harvesting losses.

"Growers frequently say that they like to plant extra seed because they believe it will improve their chances of obtaining a stand. Excess seed is no substitute for a good seedbed. Two bushels per acre in a dry cloddy seedbed will fail just as surely as 10 viable seeds per foot in 36- to 40-inch rows. Rate of planting studies with different varieties and strains of soybeans have shown little difference in the optimum planting rate in the row. Soybean varieties do differ, however, in the number of seeds in a bushel. A large seeded variety having only 2,000 seeds per pound will require 87 pounds of seed per acre to give the same planting rate as will be obtained by planting 50 pounds of a variety having 3,500 seeds per pound. The most positive method of checking planting rate is to put seed in one hopper, drive at regular planting speed on firm ground, and count seed dropped in several 36-inch sections of row. With seed having a germination of 90% or better, one seed per inch will usually be an adequate amount of seed. Seed of any variety will differ slightly in size from year to year. Therefore, it is desirable to check planting rate every year ahead of planting time." Address: Research Agronomist, Mississippi Agric. Exp. Station, Stoneville, MS, and coordinator of the U.S. Regional Soybean Lab. research program.

819. Hartwig, Edgar E.; Jamison, Kathryn W.; Edwards, C.J., Jr. comps. 1957. Results of the Cooperative Uniform Soybean Tests, 1956: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 189. March. 146 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/56soybook.pdf
• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Crops Research Division, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII.

"Introduction: The program of the U.S. Regional Soybean Laboratory has been directed toward the development of improved strains of soybeans and the obtaining of fundamental information necessary to the efficient breeding of strains to meet specific needs. In the Southern Region, fundamental studies and breeding programs are conducted at the two centers, Stoneville, Mississippi, and Raleigh, North Carolina. After promising new strains are developed at these breeding centers, they are advanced to the uniform regional tests, conducted in cooperation with the 12 southeastern states. This testing program enables the breeder to evaluate new strains under a wide variety of conditions, and permits new strains to be put into production in a minimum amount of time.

"Nine uniform test groups have been established to evaluate the better strains developed in the breeding programs, The Groups 0 through IV are adapted in the northern part of the United States, and the Groups IV through VIII are grown in the southern part. Within their area of adaptation, there is a maturity range of 12 to 18 days within each maturity group. The best standard variety available of each maturity class is used as a check variety with which to compare new strains as to seed yield, chemical composition, maturity, height, lodging, and seed quality. For the groups grown in the southern area, the check varieties are Perry, Dorman, Ogden, Roanoke, and Improved Pelican. At Stoneville, Mississippi, where all maturity classes will mature, the approximate maturity dates of these varieties when planted during the first half of May are: Perry, September 6; Dorman, September 20; Ogden, October 10; Roanoke, October 25; and Improved Pelican, November 8.

"The 1952 cooperative nurseries complete 10 years of regional strain evaluation in the Southern States. Of the

43 strains included in Groups V through VIII, only three, S-100, Ogden, and Acadian, were included in 1943. The results of these tests have shown the advantages of the improved varieties, and as a result, varieties such as Ogden and Roanoke have replaced largely the older varieties such as Arksoy, Ralsoy, Tokyo, Woods Yellow, and Palmetto. However, the good characteristics of some of these strains have been utilized in the breeding program. For example, N47-3479, which has shown promise in Group VII, has Palmetto as one of its parents. Although the variety CNS was shown to have an oil content too low for satisfactory commercial production, its resistance to bacterial pustule has been incorporated into many of the new strains now in test.

"A wide range of soil and climatic conditions exist in the region. As an aid in recognizing regional adaptation, the region has been subdivided into five rather broad areas, which still represent a wide range of soil types. These are: (1) the East Coast, consisting of the Coastal Plain and Tidewater areas of southern Delaware, the Eastern Shore of Maryland, Virginia, North Carolina, and the upper half of South Carolina; (2) the Southeast, consisting primarily of the Coastal Plain soils of the Gulf Coast area, but also including similar soils from South Carolina southward; (3) the Upper and Central South, including the Piedmont and loessal hill soils east of the Mississippi River; (4) the Delta area, composed of the alluvial soils along the Mississippi River from southern Missouri, southward, and (5) the Southwest, comprising Arkansas and Louisiana, outside of the Delta, and Oklahoma and Texas. In the Southwest area, most of the potential soybean-growing areas are on the alluvial river valley soils. A map is included to illustrate the five production areas,

"On nearly all of the Coastal Plain, Piedmont, and loessal soils fertilization is essential for satisfactory soybean production. A table showing soil types and rate of fertilization is included.

"As a further aid in interpreting varietal responses, rainfall data is reported for many of the locations where nurseries were grown. Since much of the summer rainfall is from local showers, rainfall data is included only from locations where records were taken reasonably close to the nurseries. Daily minimum and maximum temperatures are reported for the representative locations for the various production areas.

"The 1952 season was characterized by an extreme summer drouth [drought], especially in the Delta section, and by an early killing frost. The effects of the frost were felt in the Southwest, Delta, and upper East Coast plantings.

"In calculating variety means for seed yield, data from tests with extremely low yields or where the coefficient of variability exceed 25 per cent, are not included in the area means." Address: 1. Agronomist; 2. Clerk-Stenographer; 3. Agricultural Aid [Stoneville, Mississippi].

820. *Soybean Digest.* 1957. Market street and seed directory (Ad). Feb. p. 35.

• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Minnesota, Mississippi, Missouri, North Carolina, North Dakota, Ohio, South Carolina, South Dakota, Virginia, and Ontario (Canada). For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers. Companies include: Jacob Hartz Seed Co. (Stuttgart, Arkansas, selling Lee, Jackson, Ogden, Dorman, JEW 45, Volstate, Mamloxi). L.B. Wannamaker Seed Co. (Box 194, St. Matthews, South Carolina, selling Lee, Jackson, CNS 24, JEW 45). T.W. Wood & Sons (Richmond, Virginia, selling Ogden, Early Wood's Yellow, Jackson, Lee).

Note 1. This the earliest listing in this directory for Wannamaker in South Carolina.

Note 2. This directory also appeared in the March 1957 issue (p. 38) of this magazine.

821. Johnson, Herbert W. 1957. Soybean breeding research: Recent developments, future objectives. Soybean diseases are increasing in importance and more attention is paid to disease resistance by soybean breeding programs. *Soybean Digest.* Sept. p. 60, 62.

• ***Summary:*** Contents: Introduction. Phytophthora root rot. The soybean cyst nematode. A virus disease of soybeans (was observed in several states last year). Bacterial induced chlorosis. Bacteria can prevent. New varieties. Future objectives.

This article begins: "The research on the development of new soybean varieties in the United States is cooperative between state agricultural experiment stations and the U.S. Department of Agriculture. The specific items to be mentioned are a result of this cooperative undertaking and no attempt will be made to identify a specific research organization with each item mentioned.

"Variety developmental research is a continuing process and sometimes a slow, if not discouraging, process. It can be likened in many respects to a field of soybeans. The growth of the plants and the yield produced in the field is a continuous process from planting to harvest, and although you can identify certain periods during the life of the plants when growth was unusually rapid or unusually slow, the harvested yield from the field was nevertheless a process that took place throughout the growing season. So it is in the development of a new soybean variety. The process is continuing over several years but sometimes there are some unusually good or bad periods which one can single out for discussion. This is becoming increasingly true as the emphasis on the development of disease resistant varieties increases.

"Soybeans are no longer considered a crop free of diseases as they once were. The importance of diseases in decreasing yields is becoming increasingly apparent, and our emphasis on the development of disease resistant varieties is likewise increasing. I should like to mention four situations that have been either new in occurrence or unusual in occurrence in the last few years and indicate what we have done and are doing about them.

"Phytophthora root rot was first reported in the United States in 1951 and it has only been within the last 3 or 4 years that the disease has been of major concern to growers. The disease has been most serious in northwestern Ohio and those of you who have seen the disease in that area know well the destructiveness of it. As soon as the seriousness of this disease was recognized, numerous selections were evaluated for resistance to it. Several resistant selections were found, including some released varieties such as Monroe, Blackhawk, Illini, and Mukden. The inheritance of the resistance has been determined and we are well along in a crossing program designed to transfer this resistance to varieties best adapted to the area, and to develop new varieties. The discovery that some of the improved varieties were resistant was a fortunate development. Although the varieties are not the best ones for the area in the absence of the disease, they can be used satisfactorily during the time required to develop resistant varieties better adapted to the area.

"Frequently disease resistance when found is in one of the several thousand selections maintained in our germplasm collection which is of little use from a production standpoint. Such resistance must be transferred to adapted varieties before it is of practical use to growers.

"The soybean cyst nematode was discovered for the first time in this country in North Carolina in 1954..." Address: Research Agronomist, Crops Research Div., ARS, USDA.

822. Skotland, C.B. 1957. Biological studies of the soybean cyst nematode. *Phytopathology* 47(10):623-25. Oct. [16 ref]
• ***Summary:*** The results of this experiment suggest that four or five generations of soybean cyst nematode (*Heterodera glycines*) can be produced on a soybean crop in one season in North Carolina. "Viability of eggs and of larvae in cysts of the soybean nematode was drastically reduced by desiccation" [drying]. Address: Plant Pathology, North Carolina Agric. Exp. Station, Raleigh, North Carolina.

823. Ross, J.P.; Brim, C.A. 1957. Resistance of soybeans to the soybean cyst nematode as determined by a double-row method. *Plant Disease Reporter* (*USDA*) 41(11):923-24. Nov. 15. [1 ref]
• ***Summary:*** "The soybean cyst nematode (*Heterodera glycines* Ichinohe) has been found in North Carolina, Tennessee, Missouri, Arkansas, Kentucky and Mississippi. Since this pathogen threatens soybean production in infested areas, resistance to it would be of great value to growers.

"During the spring of 1957 approximately 2800 selections and varieties of soybean (*Glycine max*) were evaluated for resistance by means of a double-row planting method.

"One of the greatest difficulties with field evaluations of resistance is the lack of uniformity in nematode population throughout the planting area. This handicap was overcome by planting two-row plots consisting of a standard susceptible line and an entry being evaluated. The infested field was 120 by 450 feet. Seed of each test entry were planted in 5 feet of row with a 1-foot space between entries. After the entire field had been planted with the test lines in rows 32 inches apart, seed from a glabrous line of soybean (2) previously found to be highly susceptible to the soybean cyst nematode were planted in rows approximately 6 inches to one side of each row of the test lines.

"White cyst (3) indices for each entry were recorded 1 month after planting when the white cysts attached to the roots were visible. At least six plants from each entry were dug and the roots washed, and each root system was given a rating on the basis of the number of cysts present. If a test strain contained less than 10 cysts per root system, roots of the adjacent susceptible check plants were similarly examined for cysts. The check plants provided a good indication of the nematode population in the proximity of the test strain. The glabrous character of the susceptible check readily distinguished it from the test strains. If an entry received a lower score than the check, resistance was indicated. Many lines were observed to have low ratings, but when the roots of the adjacent susceptible check plants were examined it was evident that the nematode population in that particular area was very low.

"Eight of the entries tested in this manner appeared to have high resistance. These eight entries were evaluated again in the field, by the same method. Results of both evaluations, including the susceptible check ratings, are presented in Table 1. It is apparent from these results that in those cases where the check rating was low, indicating a low nematode population, the rating obtained for the test entry was erroneously low (viz. P.I. 189920 and 189969). However, in the cases where the check rating was high, indicating a high nematode population, the rating given the test entry was substantiated in the second evaluation.

"The double-row method used in these evaluations could also be used for evaluating other crops for nematode resistance. The method might also find application in screening plants for resistance to other diseases caused by soil-inhabiting pathogens, such as root rots, wilts and foot rots.

"The results indicate that resistance to the soybean cyst nematode is available within our present soybean germ plasm. Ichinohe and Asai (4) report that two resistant soybean varieties, 'Daiichi-hienuki' and 'Nanguntake-

date', show almost no symptoms of the disease and allow fewer larvae to mature than susceptible varieties. These two varieties were included in our evaluations and both favored the development of large numbers of female nematodes. The existence of biological races within *Heterodera glycines* might explain this discrepancy.

"Roots of the resistant lines listed in Table 1 are invaded by second-stage larvae, but the number of larvae reaching maturity was found to be very small, and in most cases larvae do not mature. Further investigations on the host-parasite relationships of the resistant lines are in progress."

Footnotes: (2) Supplied by E.E. Hartwig, Delta Branch Experiment Station, Stoneville, Mississippi. (3) "White cyst" as used in this paper is understood to mean the living adult female of the soybean cyst nematode. It does not include the true cyst which is formed from the body of the dead female. (4) Ichinohe, M. and K. Asai. 1956. Studies on the resistance of soybean plants to the nematode, Heterodera glycines. I. *Hokkaido National Agricultural Experiment Station Research Bulletin.* Sept. 71: 67-79.

Table 1, titled "White cyst indices for eight entries of soybeans evaluated for resistance to the soybean cyst nematode, *Heterodera glycines* in double-row plots," has 6 columns: (1) Entry [soybean varietal name or P.I. number]. (2) Maturity Group. (3-4) First evaluation: Entry & Check. (5-6) Second evaluation: Entry & Check.

The Entries are Ilsoy, Peking and six P.I. numbers. All are from Maturity Group III except one from Maturity Group IV. The rating system is: 1-no cysts; 2-1 to 10 cysts; 3-11 to 25 cysts; 4-26 or more cysts. Each number represents a single plant rating. Address: 1. Plant Pathologist; 2. Research Agronomist. Both: Crops Research Div., USDA ARS & North Carolina Agric. Exp. Station.

824. Moore, R.P. 1957. Are your seed dead or alive. *Research and Farming* (*Agric. Exp. Station, North Carolina State College, Raleigh*). 15(3):8-9. Winter.

• ***Summary:*** Long subtitle: "Or how strong are they? The TZ test reveals hidden reasons for germination troubles. Add it up and you have more answers in less time."

This article is about the "TZ" or tetrazolium test. Soybeans are used as an example.

"Needs Demand New Methods: Let's take the case of a farmer who's considering buying a certain lot of soybeans. The standard germination test, made three months earlier, showed a total germination of 83 per cent. That's good. However, the seed he bought last year tested about the same and looked like these. Yet they didn't perform too well. The stand was only 'fair,' and many plants were weak and grew off slowly.

"How can he get a better idea of what the soybean seed are likely to do come spring?

"TZ Test Hunts Hidden Answers: Perhaps what he would like to know most of all at this point is the internal physical condition and strength or vigor of the seed. Equally important would he the question of whether this vigor can be expected to last until planting time.

"The TZ test gives us helpful information. First, he'll be advised as to *total germination.* This is comparable to results of a standard germination test and estimates the highest number of seeds he can expect to germinate under ideal conditions.

"Then he'll be informed of the *germination energy,* or vigor, of the soybean seed. This is an estimate of the number of seeds capable of developing into strong, normal seedlings. Seeds in this group have not been fractured, bruised or otherwise weakened.

"Seeds of high planting quality will show a high percentage figure for both total germination and vigor. Differences between the two values would estimate the extent of weakening.

"Thus, the TZ test enables us to separate the 'really good' seeds from weak ones.

"'Magic' Chemical Used: Chemicals have been used to a limited extent to detect life or death of plant tissues for many years. However, it wasn't until World War II that a German scientist developed practical means for chemical seed testing using tetrazolium."

825. *Agricultural Research* (*USDA*). 1958. Nematode resistance found. 6(8):15. Feb.

• ***Summary:*** "Sorting through approximately 3,000 selections and varieties of USDA's world soybean collection has turned up 4 genotypes that show resistance to soybean cyst nematode.

"Field tests were conducted last summer in cooperation with the North Carolina Agricultural Experiment Station. These 4 genotypes showed their resistance to the cyst nematode by the pest's limited amount of reproduction and population buildup. ARS researchers found also that second-stage larvae that invaded the roots of the resistant lines failed to develop to maturity.

"These experiments mark some of the first steps in development of nematode-resistant soybean varieties from germ plasm that's already available to us, the scientists point out. Although heavy infestations of this threadlike eelworm can destroy soybean plantings in some areas, the cyst nematode does not pose an immediate nationwide threat, ARS plant disease specialists say. If and when infestations become more widespread, however, the researchers hope to have several high-yielding, nematode-resistant varieties available for distribution to the growers in nematode areas.

"In past trials, scientists have found it difficult to evaluate varieties for nematode resistance because of the uneven distribution of nematode population in the planting area. This handicap was overcome by planting easily identified susceptible line beside each test variety. The susceptible plants serve as checks in determining the

presence of nematodes and extent of damage they cause.

"Double-row tests show promise in evaluating other crops' resistance to nematodes, other soil-borne diseases."

826. Lehman, Samuel G. 1958. Physiologic races of the downy mildew fungus on soybeans in North Carolina. *Phytopathology* 48(2):83-86. Feb. [2 ref]

• ***Summary:*** Four new races of *Peronospora manshurica* (Naum.) Syd. we gathered from collections of infected soybean seed in North Carolina. The reaction of 37 soybean varieties was determined. Table 1 gives the names of these soybean varieties and their reactions. The varieties are: Mukden, Richland, Illini, Roanoke, Acadian, C.N.S., Ogden, Palmetto, Woods Yellow 1, S-100, Wabash, Laredo, Arksoy, Armredo, Biloxi, Cherokee, Chief, Dorman, Dunfield, Improved Pelican, Lincoln, Mammoth Yellow, Mamotan 6680, Manchu, Otootan, Ralsoy, Rokusun, Rose Non Pop, Tar Heel Black, Tokio, Virginia Brown, Volstate, Jackson, Perry, N49-2560 (Lee), N48-1867, P.I. 157-463A. Address: Plant Pathology, North Carolina State College, Raleigh.

827. Hartwig, Edgar E.; Jamison, Kathryn W.; Edwards, C.J., Jr. comps. 1958. Results of the Cooperative Uniform Soybean Tests, 1957: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 192. March. 124 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/57soybook.pdf

• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Crops Research Division, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII.

"Introduction: The program of the U.S. Regional Soybean Laboratory has been directed toward the development of improved strains of soybeans and the obtaining of fundamental information necessary to the efficient breeding of strains to meet specific needs. In the Southern Region, fundamental studies and breeding programs are conducted at the two centers, Stoneville, Mississippi, and Raleigh, North Carolina. After promising new strains are developed at these breeding centers, they are advanced to the uniform regional tests, conducted in cooperation with the 12 southeastern states. This testing program enables the breeder to evaluate new strains under a wide variety of conditions, and permits new strains to be put into production in a minimum amount of time.

"Nine uniform test groups have been established to evaluate the better strains developed in the breeding programs, The Groups 0 through IV are adapted in the northern part of the United States, and the Groups IV through VIII are grown in the southern part. Within their area of adaptation, there is a maturity range of 12 to 18 days within each maturity group. The best standard variety available of each maturity class is used as a check variety with which to compare new strains as to seed yield, chemical composition, maturity, height, lodging, and seed quality. For the groups grown in the southern area, the check varieties are Perry, Dorman, Ogden, Roanoke, and Improved Pelican. At Stoneville, Mississippi, where all maturity classes will mature, the approximate maturity dates of these varieties when planted during the first half of May are: Perry, September 6; Dorman, September 20; Ogden, October 10; Roanoke, October 25; and Improved Pelican, November 8.

"The 1952 cooperative nurseries complete 10 years of regional strain evaluation in the Southern States. Of the 43 strains included in Groups V through VIII, only three, S-100, Ogden, and Acadian, were included in 1943. The results of these tests have shown the advantages of the improved varieties, and as a result, varieties such as Ogden and Roanoke have replaced largely the older varieties such as Arksoy, Ralsoy, Tokyo, Woods Yellow, and Palmetto. However, the good characteristics of some of these strains have been utilized in the breeding program. For example, N47-3479, which has shown promise in Group VII, has Palmetto as one of its parents. Although the variety CNS was shown to have an oil content too low for satisfactory commercial production, its resistance to bacterial pustule has been incorporated into many of the new strains now in test.

"A wide range of soil and climatic conditions exist in the region. As an aid in recognizing regional adaptation, the region has been subdivided into five rather broad areas, which still represent a wide range of soil types. These are: (1) the East Coast, consisting of the Coastal Plain and Tidewater areas of southern Delaware, the Eastern Shore of Maryland, Virginia, North Carolina, and the upper half of South Carolina; (2) the Southeast, consisting primarily of the Coastal Plain soils of the Gulf Coast area, but also including similar soils from South Carolina southward; (3) the Upper and Central South, including the Piedmont and loessal hill soils east of the Mississippi River; (4) the Delta area, composed of the alluvial soils along the Mississippi River from southern Missouri, southward, and (5) the Southwest, comprising Arkansas and Louisiana, outside of the Delta, and Oklahoma and Texas. In the Southwest area, most of the potential soybean-growing areas are on the alluvial river valley soils. A map is included to illustrate the five production areas,

"On nearly all of the Coastal Plain, Piedmont, and loessal soils fertilization is essential for satisfactory soybean production. A table showing soil types and rate of

fertilization is included.

"As a further aid in interpreting varietal responses, rainfall data is reported for many of the locations where nurseries were grown. Since much of the summer rainfall is from local showers, rainfall data is included only from locations where records were taken reasonably close to the nurseries. Daily minimum and maximum temperatures are reported for the representative locations for the various production areas.

"The 1952 season was characterized by an extreme summer drouth [drought], especially in the Delta section, and by an early killing frost. The effects of the frost were felt in the Southwest, Delta, and upper East Coast plantings.

"In calculating variety means for seed yield, data from tests with extremely low yields or where the coefficient of variability exceed 25 per cent, are not included in the area means." Address: 1. Agronomist; 2. Clerk-Stenographer; 3. Agricultural Aid [Stoneville, Mississippi].

828. *Soybean Digest.* 1958. 3/4 million acres surveyed in 23 states in 1957 for cyst nematode. March. p. 16-17.

• ***Summary:*** "About three quarters of a million acres in 25 eastern and central states were surveyed during 1957 in a search for the soybean cyst nematode, the U.S. Department of Agriculture reports. This new pest of soybeans has now been found on 15,626 acres in six states–Arkansas, Kentucky, Mississippi, Missouri, North Carolina, and Tennessee.

"USDA pest-control workers declare it fortunate that this root-feeding nematode has not yet been found in the chief soybean-producing areas of the United States. The surveys show that the nematode is established in three main areas. The largest is a narrow 11-county strip straddling the Mississippi River and extending from southwestern Kentucky to northwestern Mississippi. Counties included in the area are: Crittenden and Mississippi in Arkansas; Fulton in Kentucky; De Soto in Mississippi; Pemiscot, New Madrid, and Stoddard in Missouri; and Dyer, Lake, Lauderdale, and Obion in Tennessee.

"The other two main infested areas are in North Carolina. One includes New Hanover and Pender Counties along the southeastern coastline. The other is more than 200 miles northeastward, in Camden County on the state's northern border.

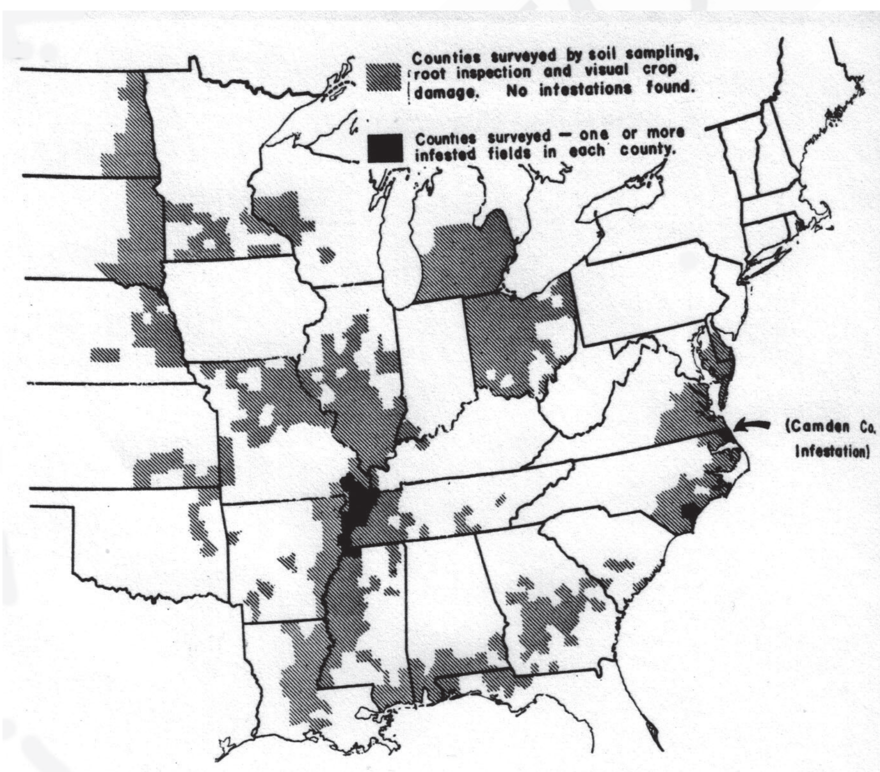
"State agriculturists in cooperation with workers in USDA's Agricultural Research Service made the 1957 nematode survey. It covered parts of 25 states–Alabama, Arkansas, Delaware, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska. North Carolina, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Virginia and Wisconsin.

"Various methods were used in inspecting the approximately 750,000 acres surveyed–examining soil for the underground pest, pulling plants to check roots for clinging female nematodes, and visually inspecting sample fields for anemic-looking plants and yellowed spots that might reveal feeding of the tiny eelworm. Additional acres were observed visually from rural roads to check on the condition of the crop.

"USDA scientists consider this broad survey a long step forward in eventual control of the nematode which was first found in this country in 1954. They point out, however, that the search must be continued and intensified. Last year's survey bore down hardest in older soybean-producing areas where crop rotation is not practiced and in areas exposed to infestation through movement of farm machinery or by other carriers.

"Searching for the almost microscopic pest on more than 22 million acres of soybeans grown in this country is a tremendous undertaking. Federal and state personnel in all major soybean-producing areas will continue their efforts this spring to learn the exact whereabouts of the nematode. Some scientists believe that a more intensive survey might double or triple the area found infested.

"Scanning soybean fields for unhealthy-looking plants is the quickest



but least certain survey method used for nematodes. The healthiest-appearing fields can nourish heavy nematode colonies a year or more before damage appears above ground.

"Although soil fumigation reduces nematode numbers, it does not give complete control and is costly. Until research now in progress finds a practical chemical, cultural, or biological control for this pest, scientists are advocating a three-point program to prevent spread of the soybean cyst nematode to new areas and to keep its populations low. It involves (1) strict adherence to the federal and state quarantine regulations now in effect in the infested areas, (2) keeping soybeans or other host crops off infested fields during long crop rotations, and (3) continuing surveys in all soybean-producing areas to define limits of infestation."

A map of the major U.S. soybean growing states shows: (1) in gray–"Counties surveyed by soil sampling, root inspection and visual crop damage. No infestations found." (2) in black–"Counties surveyed–one of more infested fields in each county."

829. Slack, D.A. 1958. Soybean cyst nematode. *Arkansas Farm Research* 7(3):2. May/June.
• ***Summary:*** "Before 1954, the soybean cyst nematode (*Heterodera glycines* Ichinohe) was known to occur only in the Orient. In 1954, soybean cyst nematode was discovered in North Carolina, and more recently in certain areas of Tennessee, Missouri, Arkansas, Kentucky, and Mississippi. At present, the known infested area in Arkansas is confined to a part of Mississippi and Crittenden counties.

"The soybean cyst nematode must enter, feed and reproduce on the roots of soybeans, vetch, lespedeza, and a few other plants in order to persist. Recently, workers in Tennessee reported the ability of the nematode to reproduce on roots of two common weeds, henbit and coffee-bean. Although crop damage has not been determined for any host other than soybeans, these additional hosts–whether crops or weeds–could maintain the nematode in infested fields." Address: Assoc. plant pathologist.

830. Roberts, R.A. 1958. The soybean cyst nematode quarantine. *Soybean Digest.* Sept. p. 77-80.
• ***Summary:*** Contents: Introduction. Damage to soybeans. Survey: soil sampling, plant root examination, survey for areas showing damage symptoms. Federal and state quarantines. Commercial soybeans. Small grains. Cotton. Used farm tools, implements and harvesting equipment and used construction and maintenance equipment. Other regulated articles. Dealer-carrier agreements. Research.

This long article begins: "The soybean cyst nematode, *Heterodera Glycines* Ichinohe, a serious pest of soybeans in Asia, was first found in the United States in New Hanover County, North Carolina, in 1954. The North Carolina infested area was placed under state regulation immediately.

"The nematode is a small eel-like worm which enters the root of the soybean plant. The female worm completes it growth and protrudes from the root as a white body no larger than the head of a pin, which enlarges, changes to a yellow color and eventually is transformed to a dark brown, lemon-shaped cyst.

"The female, after maturity and fertilization, produces several hundred eggs, some of which are extruded directly but the majority of which remain protected in the hard chitinous cyst. The eggs may hatch in a short time or they may remain alive for several years, protected within the cyst. When the eggs hatch, the worms or larvae attack and enter the rootlets of the plant and begin another generation.

"Three to four generations may occur each year. When high populations of the nematode develop, literally thousands of nematodes attack each plant. The plant denied of its nutrition wilts, yellows and becomes stunted. Bean yields are thus seriously reduced.

"Damage to Soybeans: The nematode has been reported from Japan, Korea and Manchuria. In Japan the relationship of soybean damage to the nematode was observed as early as 1915. The disease there is known as 'yellow dwarf' because of the stunting and yellowing of the infested soybean plants.

"Scientific studies have been made in Japan showing the decreased height and weight of infested plants as well as the reduction in the number of pods produced per plant. Reduction in bean yields has been determined and it appears in the case of spotted infestation reduction in yield may be as high as 70%, and where the entire field is heavily infested the loss of the crop may be complete.

"Ichinohe of the Agricultural Experiment Station in Hokkaido, Japan, states that the disease begins in Japan 'toward the middle of July, about 2 months after sowing,' and 'in the fields the disease occurs in more or less circular patches, while in serious cases the whole field is affected.'

"In the United States the soybean cyst nematode was found in North Carolina in 1954; in Tennessee and Missouri in 1956; and in Arkansas, Kentucky and Mississippi in 1957.

"Damage to soybean plantings was evident in North Carolina at the time the pest was discovered there, stunted and chlorotic plants appearing in the 'more or less circular patches' described by Ichinohe. Losses in yields from these fields were considerable and in the heavily infested spots, losses were complete. Damage has persisted where growers continued to plant soybeans on these infested fields without due regard to crop rotation."

A portrait photo shows R.A. Roberts. Address: Plant Pest Control Div., Agricultural Research Service, USDA, Washington, DC.

831. Skotland, C.B. 1958. Bean pod mottle virus of soybeans. *Plant Disease Reporter* (*USDA*) 42(10):1155-56. Oct. 15. [1 ref]
• ***Summary:*** "Abstract: Pod mottle virus was found in

naturally infected soybeans in North Carolina and Virginia. All soybean varieties included in inoculation tests were susceptible. The virus produced local lesions or mottling on various bean varieties. Some varieties of cowpeas were resistant and others were susceptible to infection. Annual and perennial lespedezas, velvet bean and crimson clover are reported as hosts for the first time. Lima bean, pea, red clover, sweet clover, crotalaria, broadbean, peanut, alfalfa, ladino clover, tobacco, cucumber, pepper, tomato and petunia were resistant. The virus was not transmitted by soybean seeds."

"Disease surveys were made on soybean (*Glycine max* (L.) Merr.) in 1955 in eastern North Carolina and southeastern Virginia. Four samples of a soybean virus disease were collected from North Carolina and one from Virginia. In one field 75 percent of the plants were infected with the virus. A similarly diseased field of soybeans was also observed near Plymouth, North Carolina in 1954. Several varieties of soybean, bean (*Phaseolus vulgaris* L.) and other plant species were inoculated with these virus collections. These inoculations were made in the greenhouse at temperatures ranging from 75º to 85ºF. Beans were inoculated by conventional mechanical methods when the primary leaves were almost expanded. Other hosts were inoculated in the 4- to 6-leaf stage. At least 15 plants of all species and varieties were inoculated. Plants which showed no visible symptoms were checked for the presence of the virus by inoculation to Idaho Refugee bean, a local lesion host for the pod mottle virus.

"Plants inoculated with each of these four viruses had identical host ranges and symptoms which resembled the pod mottle virus described by Zaumeyer and Thomas (2). The unidentified viruses and the pod mottle virus obtained from Dr. W.J. Zaumeyer of the United States Department of Agriculture, Beltsville, Maryland reacted identically on several hosts; however, the reaction of stringless Black Valentine snapbean (3) and Greenseeded Henderson Bush lima bean was not the same as that reported by Zaumeyer and Thomas for pod mottle virus. According to the original report, stringless Black Valentine was susceptible to local lesion infection only and in these tests it was systemically infected. Greenseeded Henderson Bush was reported to be a local lesion host but in these tests it was resistant to infection. A second isolate of the pod mottle virus was obtained from Zaumeyer and extreme caution was used to avoid contamination. This isolate also caused the same reaction on these bean varieties as those collected from soybeans. It was concluded that these soybean viruses were the pod mottle virus.

"All soybean varieties tested were susceptible. These included S 100, Jackson, Ogden, Roanoke, Lee, Acadian, Palmetto, Laredo, Ralsoy, Illini, Richland, CNS, F.C. 33123, Mukden and Biloxi."

Note: This is one of the two first papers to report the discovery Bean pod mottle virus in soybeans. Address: North Carolina Agric. Exp. Station, Raleigh, North Carolina.

832. *State Times* (*Jackson, Mississippi*). 1958. Buckeye plant to close here. Cotton declines. Nov. 4. p. 5-A.

• ***Summary:*** "The Buckeye Cellulose Corp. will close its plants here and in Macon, Georgia, at the end of the current crushing season, the firm announced Tuesday. President Walter L. Lingle, Jr. said in Cincinnati, Ohio, headquarters of the firm, that the permanent closing of operations of the two plants is due to continuing decline of cotton crops in this part of the South."

"Simultaneous with announcement of the closing here, Buckeye announced plans to sell four soybean crushing mills to Ralston Purina Co., St. Louis, manufacturer of animal feeds. In making this announcement, Lingle said: 'Buckeye entered the soybean crushing business primarily to supply Procter and Gamble with soybean oil for food products. Recently, however, the increasing importance of soybean meal for animal feed has made it desirable for soybean crushers to enter the mixed animal feed business. That's just not Buckeye's or Procter and Gamble's kind of business, so it became sound business policy for us to buy soybean oil on the open market and to dispose of the facilities for crushing soybean seed. Purchase of the mills is logical for Ralston Purina...' The mills are located in New Madrid, Missouri; Louisville, Kentucky; Raleigh, North Carolina; and Memphis (Binghampton), Tennessee."

Note: This is the earliest document seen (Oct. 2005) that mentions "Buckeye Cellulose Corp." in connection with soybean processing. The name "Buckeye Cotton Oil Co." had previously been used.

833. *Johnstonian-Sun* (*Selma, North Carolina*). 1958. Selma Soybean Corporation begins operations this week. Nov. 6. p. 1.

• ***Summary:*** What began as idle conversation early in 1957 became a reality this week as the Selma Soybean Corporation began processing soybeans by the only process of its kind in North Carolina,–solvent extraction. The corporation's assets are now valued at $125,000 with the majority of the capital owned by the four officers: R.G. Gurley (president of the Gurley Milling Co.), Floyd C. Price, Jr., A.L. Perry, and A.Z. Thompson, Jr.

"Gurley learned that a soybean plant in California was going out of business so he went to look at it. The plant was purchased from the Glidden Co. of Chicago [Illinois] and arrangements were made with Steel Erectors of Charlotte [North Carolina] to dismantle the equipment and ship it to Selma."

Photos show: (1) Aerial view of the plant taken from atop the new storage grain elevator. (2) Four officials of the corporation inspecting the completed plant.

834. Brim, Charles A. 1958. Hood: new southern soybean. *Research and Farming* (*Agric. Exp. Station, North Carolina State College, Raleigh*). 17(2):14. Autumn.
• ***Summary:*** "Hood is a new soybean being released for production in North Carolina. The new variety matures about 2 days earlier than Ogden and 9 days ahead of Lee. It looks very much like Ogden, but is ahead in seed yield, seed holding and seed quality. It does not, however, hold its seed as well as Lee. Hood is resistant to bacterial pustule, wildfire, frogeye and target spot.

"Will Be Valuable Where Lee Is Late: With these characteristics, Hood should prove to be a popular variety in many areas of the state. It is especially suited to areas where the Lee variety matures too late. It will be particularly welcome in northeastern counties where late fall rains often hamper harvesting operations with Lee.

"Result of Regional Efforts: Hood was developed and tested by research workers of the U.S. Regional Soybean Laboratory and co-operating southern experiment stations. The original cross. Ogden x CNS, from which the new variety was developed, was made in 1943 at the North Carolina Agricultural Experiment Station. An F-8 line from this cross, similar to Ogden in maturity and type but having yellow seed coat and resistance to bacterial pustule, was crossed to Roanoke to get good seed holding capacity and high oil content. A selection from this cross, N48-1831, performed well in North Carolina and the Mississippi Delta, and later in regional trials.

"D51-4888 was selected from N48-1831 at the Delta Experiment Station, Stoneville, Mississippi, and was entered in cooperative regional trials in 1953. This line became the new variety.

"Outyields Ogden in This Area: Hood has performed consistently well in these tests at 35 to 40 locations throughout the South. It has looked especially promising in the northern area where Ogden is grown. Seed yields averaged 6% higher than Ogden from 1953 through 1957 in the east coast area.

"Hood has slightly more oil than Ogden, while its protein content is a bit lower. Two other desirable features of Hood are its yellow seed coat and almost colorless to medium brown hilum color. The new variety should result in less difficulty with 'hilum bleeding,' which produces sooty colored seed coats in Lee under certain growing conditions.

"Hood grows 30 to 36 inches tall and has moderate size stems, heavy foliage and purple flowers. Sometimes leaves of Hood look rough or puckered. Hairs on the pods and stems are gray.

"About 1,500 acres of the new variety were planted for seed increase in 8 states in 1958. The resulting production will be available for further increase in 1959. There should be ample seed stocks for extensive plantings in adapted areas in 1960.

"Seed producers who are interested in obtaining seed for increase in 1959 should contact the North Carolina Foundation Seed Producers, Inc., Raleigh.

Circular photos show the Hood, Ogden, and Lee soybean varieties.

A table compares the seed yield and chemical composition of Hood, Ogden, and Lee (1953-1957). Address: Field crops asst. prof., NCSU.

835. **Product Name:** Soybean Oil, and Soybean Meal.
Manufacturer's Name: Ralston Purina Co.
Manufacturer's Address: Raleigh, North Carolina.
Date of Introduction: 1958 December.
Ingredients: Soybeans.
New Product–Documentation: *State Times* (Jackson, Mississippi). 1958. "Buckeye plant to close here. Cotton declines." Nov. 4. p. 5-A. "Simultaneous with announcement of the closing here, Buckeye [Cellulose Corp.] announced plans to sell four soybean crushing mills to Ralston Purina Co., St. Louis [Missouri], manufacturer of animal feeds." One of the 4 mills is located at Raleigh, North Carolina.

Gantt, B.J. 1959. "Buckeye manufacturing history." [Memphis, Tennessee]. 21 p. Unpublished typescript. Courtesy Procter & Gamble Co. archives. In the fall of 1958, Buckeye decided to sell four of its soybean processing mills to the Ralston-Purina Corporation." A P&G news release describing the sale is quoted at length. These mills are at New Madrid, Missouri; Louisville, Kentucky; Raleigh, North Carolina; and the Binghampton mill at Memphis, Tennessee. They must be delivered to Ralston-Purina in the middle of an operating season–December 1, 1958.

Ad in *Soybean Digest.* 1959. "Welcome to St. Louis and Checkerboard Square." Aug. p. 5. Ralston Purina Co. has nine soybean processing plants, including one at Raleigh, North Carolina.

836. **Product Name:** Selsoy (Soy Flour).
Manufacturer's Name: Selma Soybean Corp. (Renamed Gurley's Inc. by 1971).
Manufacturer's Address: P.O. Box 488, Selma, North Carolina.
Date of Introduction: 1958.
New Product–Documentation: Soybean Blue Book. 1958. p. 88. *Soybean Digest Blue Book.* 1971. p. 115. Gurley's, P.O. Box 388, Selma, North Carolina 27576. Still makes Selsoy.

837. *Soybean Digest.* 1959. Soybean varieties: The leading varieties acreagewise in soybean growing states as reported by state statisticians, crop improvement associations, and agronomists. Jan. p. 20, 22-23.
• ***Summary:*** A large map shows the soybean varieties best adapted to each soybean growing state. Hawkeye continues as the leading variety in several of the northern states, with Harosoy coming up fast. The approximate percentage of total

soybean acreage in various states is a follows:

Illinois: Harosoy 39%, Harosoy 25%, Adams 14%, Clark 10%, Lincoln 6%, Blackhawk 2%. Iowa: Hawkeye 58%, Blackhawk 18%. Indiana: Hawkeye 43%, Harosoy 31%, Lincoln 10%. Minnesota: Capital. South Dakota: Blackhawk 27%, Hawkeye 27%, Capital 11%, Chippewa 10%. Arkansas: Lee 50+%, Ogden 12-15%, Dorman 10-12%. Nebraska: Hawkeye, Harosoy. Tennessee: Ogden 80+%, Lee 15-20%. South Carolina: Jackson, Lee. North Carolina: Lee 60%, Ogden 20%, Jackson 10%. Kentucky: Clark 50%, Wabash 12-15%, Perry 10%. Georgia: CNS 4, Jackson, CNS 24, JEW 45. Alabama: Ogden 45%, Jackson 30%, Lee 15%. New Jersey: Clark, Lincoln, Hawkeye. Ohio: Harosoy 40%, Hawkeye 25%, Lincoln 20%, Monroe 3%. Wisconsin: Chippewa 35%, Blackhawk 20%, Norchief 15%. North Dakota: Capital 20%, Grant 20%, Norchief 20%, Comet 10%. Oklahoma: Dorman 30%, Ogden 30%, Lee 15%. Kansas: Clark. Virginia: Ogden, Lee, Dorman.

838. *Soybean Digest.* 1959. Seed directory (Ad). March. p. 38.

• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio. For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers. Companies include: Robert L. Dortch Seed Farms (Scott, Arkansas, selling Dortchsoy 67A, Dortchsoy 2A, Dortchsoy 31, Lee, and Jackson). Jacob Hartz Seed Co. (Stuttgart, Arkansas, selling Jackson, Lee, Ogden, Dorman).

839. *Soybean Digest.* 1959. Cargill makes start on new Norfolk plant. April. p. 19.

• ***Summary:*** At South Norfolk, Virginia, Cargill, Inc. began construction of a solvent extraction plant to produce soybean oil and meal; it will boost soybean crushing capacity by 50-60% in the five-state production area of Virginia, Maryland, Delaware, North Carolina, and South Carolina. The estimated total crushing capacity of in those 5 states is about 12 million bushels.

At the ground-breaking ceremony, Cargill announced details of the processing plant and plans to expand its Norfolk grain export elevator from a present capacity of 2.25 million bushels to more than 4.5 million bushels. “The soybean installation–a multipurpose extraction, storage, domestic merchandising and exporting center–is being built adjacent to the elevator.

“Fred M. Seed, vice-president in charge of Cargill’s vegetable oil division, said the new plant will be completed in time to handle this fall’s soybean harvest.” The Rotocel solvent extractor will have a capacity of 7 million bushels/year of soybeans. The storage expansion will include two 1-million bushel steel tanks and 13 smaller tanks totaling 325,000 bushels. South Norfolk city officials and Virginia and Carolina state agricultural officials were present at the ceremony.

An aerial-view illustration shows an artist’s sketch of Cargill’s planned plant in South Norfolk.

840. *Soybean News* (*NSCIC*). 1959. Recommended varieties (Map). 10(1):6. April.

• ***Summary:*** See next page. A large outline map of the eastern United States, east of about the 103rd meridian west (approximately east of the western boundaries of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas), is divided into three horizontal zones. From north to south they are Zone A, Zone B, and Zone C. On this map are listed the names of many soybean varieties, showing where (in which states and in which zone) they are best adapted.

Other states shown on the map (in which soybean varieties are listed) are Minnesota, Iowa, Missouri, Arkansas, Louisiana, Michigan, Illinois, Tennessee, Mississippi, Alabama, Georgia, Michigan, Wisconsin, Illinois, Kentucky, Indiana, Ohio, New York, Pennsylvania, West Virginia, Maryland, Delaware, Virginia, North Carolina, South Carolina, and Florida.

Even southern Ontario province in Canada is listed. It is on the about the same latitude as Michigan, Wisconsin, and Minnesota. The soybean varieties listed as suitable for southern Ontario (from north to south) are: Acme, Flambeau, Comet, Capitol, Hardome, Mandarin, Chippewa, Blackhawk, Harosoy, Hawkeye, and Lincoln.

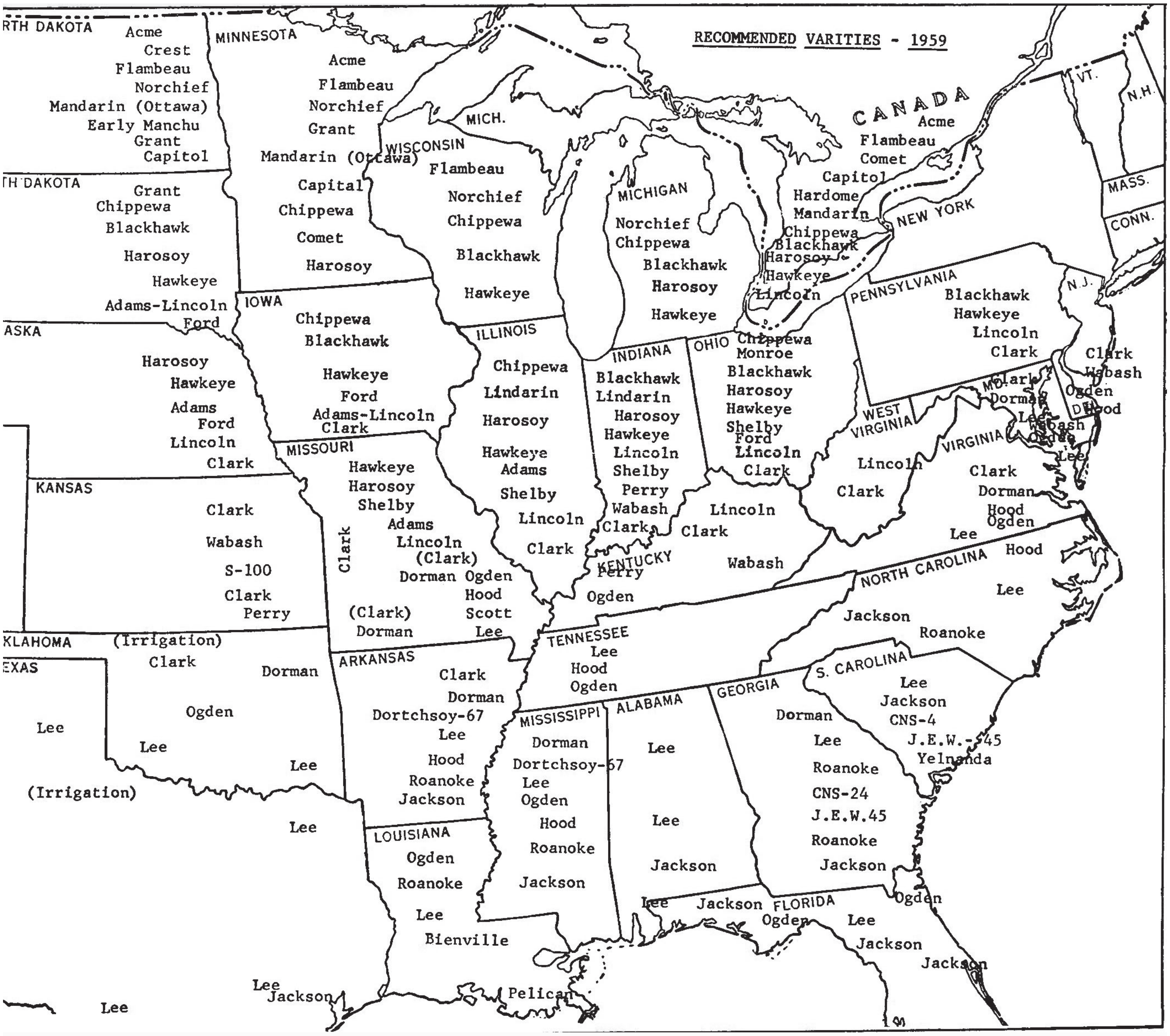
In the far south, varieties listed as suitable for Florida (from north to south) are: Lee, Jackson, and Ogden.

841. Hamblen, M.L.; Slack, D.A. 1959. Factors influencing the emergence of larvae from cysts of *Heterodera glycines* Ichinohe. Cyst development, condition and variability. *Phytopathology* 49(5):317. May.

• ***Summary:*** This abstract begins: “In greenhouse and laboratory studies, development of cysts and emergence of larvae from cysts were influenced by the moisture condition of soil in which soybean plants were growing prior to collection of cysts. A higher percentage of brown cysts and significantly greater emergence of larvae from brown cysts was correlated with moisture stress on soybean plants during a 2-week period preceding the recovery of cysts from soil.” Address: North Carolina Agric. Exp. Station, Raleigh, North Carolina.

842. Brim, Charles A.; Mason, David D. 1959. Estimates of optimum plot size for soybean yield trials. *Agronomy Journal* 51(6):331-34. June. [5 ref]

• ***Summary:*** Summary: “Size was estimated from an index of soil heterogeneity (Smith’s b) and cost estimates in



man-hours. An average value for b of 0.529 was obtained. For guarded plots the optimum plot size was estimated as 3.6 times the basic unit (3 by 8 feet). Plots of 2 basic units were for all practical purposes as efficient as the estimated optimum from the standpoint of relative cost per unit of information for cost estimates obtained." Address: North Carolina Agric. Exp. Station, Raleigh.

843. Gantt, B.J. 1959. Buckeye manufacturing history. [Memphis, Tennessee]. 21 p. Unpublished manuscript. Corrected by the author in Aug. 1959. 28 cm.
• ***Summary:*** The story began when Procter & Gamble Co. created/established Buckeye. "The Buckeye Cotton Oil Company had its beginning in the year 1901 when its parent company, The Procter & Gamble Company, leased a cotton oil mill at West Point, Mississippi, for one year in order to experiment with getting a steady supply of oil for P&G products. The experiment proved to be a wise one. The Buckeye Cotton Oil Company was incorporated in 1901. William Cooper Procter actively sponsored the business from the beginning. In 1902, The Buckeye Cotton Oil Company bought two six-press mills at Birmingham, Alabama, and Greenwood, Mississippi. With the purchase of these two mills, the first Buckeye General Manager was appointed.

"In 1903, mills were constructed at Augusta and Macon, Georgia; Jackson, Mississippi; Little Rock, Arkansas; and Selma, Alabama. The following year the Greenwood mill was practically rebuilt. The old mill at West Point later burned. In 1910, the press capacity of all the mills, with the exception of Charlotte, was increased to 12. Also during this year, the first mill laboratory was installed in the Birmingham mill. It was later made a division laboratory

and moved to Atlanta." In 1929 the company bought the Hollywood Mill in Memphis, Tennessee, and mills in Louisville, Kentucky, and Chattanooga, Tennessee.

"In the fall of 1958, the company decided to sell four of its soybean processing mills to the Ralston-Purina Corporation." A P&G news release describing the sale is quoted at length. "The mills involved in the transaction are at New Madrid, Missouri; Louisville, Kentucky; Raleigh, North Carolina; and the Binghampton mill at Memphis, Tennessee.

"The sale of these mills, which virtually takes the company out of the soybean crushing business in this country, has resulted from changes which have taken place in marketing the end products from the soybean crushing operation.

"Buckeye's principal reason for crushing soybeans has been to supply soybean oil for Procter & Gamble food products... The company will continue to operate its seven crushing mills at Augusta, Georgia; Ft. Worth, Texas, Corinth, Mississippi; Montgomery, Alabama; Little Rock, Arkansas; Memphis, Tennessee (Hollywood Mill) and Toronto, Canada.

"This drastic reduction in the number of operating mills brought about several major problems. First, how to deliver to the Ralston organization the four soybean mills in the middle of an operating season–December 1, 1958."

Note: This news release was reprinted 4 Nov. 1958 issue of the *State Times* (Jackson, Mississippi).

"New Methods of Unloading: Around 1940, truck dumpers were being improved and the first installation was made at one of the mills whereby a load of from 15 to 18 tons could be unloaded within a few minutes... In the rapid increase to soybean usage, a much larger percentage of those were still received at the Louisville Mill by rail. Because of this problem, in 1957 a car vibrator-type unloader was installed at Louisville. This was the latest development for unloading soybeans from rail cars and will unload a 50-ton car in three or four minutes.

"Solvent Extraction Process–First for Soybeans: The solvent extraction process was invented by the Germans to use gasoline, or hexane, to get the oil out of the cottonseed and soybeans. It was the first process to replace the traditional hydraulic pressure in extracting oil. The machine for solvent extraction was patented. This patented unit, bought by Proctor & Gamble from Hans-Muhle was on the docks at Hamburg, Germany, awaiting shipment when the war broke out in 1939. Because of the blockade, it never left Germany. The only way to make-do was to go to the French Oil Mill Machinery Company in Piqua, Ohio, and try to have a similar unit built. As this was designed and built to Buckeye's specifications all of the other features on the solvent extraction tower were worked out by Buckeye including the 'basket on a ferris wheel' for holding the meats. A year's experimental work was done at the Louisville Mill and we finally began processing soybeans by solvent extraction at Louisville in 1941. The experience gained in Louisville permitted us to develop sufficient confidence to proceed with installations of solvent extraction units for cottonseed."

"Many improvements have been made to both equipment and solvent extraction processes for seed and soybeans and in 1958, 95% of all soybeans in Buckeye were processed by the solvent extraction method and 68% of the cottonseed also is processed on this type of equipment.

"Soybean Crushing: Buckeye crushed the first soybeans on expellers at the Louisville Mill in 1931-32. In 1935-36, Binghamton at Memphis also processed a sizable quantity of 28,000 tons of soybeans. Louisville, that same year (1936) crushed about 15,000 tons. Since the 1937-38 season, Binghamton was changed to process soybeans only, with all cottonseed being diverted to the Hollywood Mill in Memphis. The next year, 1938-39, Raleigh started crushing soybeans. Since that time, practically all mills have processed some beans and in 1958 the division of bean and seed crushing is about as follows: Crushing Soybeans Only: Louisville Mill (solvent extraction), Binghamton Mill (solvent), New Madrid, Missouri Mill (solvent). Crushing Soybeans and Cottonseed: Augusta, Georgia Mill (solvent), Little Rock, Arkansas Mill (solvent), Hollywood Mill (solvent), Raleigh, North Carolina Mill (started solvent–4/1/59)... With the advent of soybeans, 1931-32, the per cent of the total crush in soybeans has been increasing every year. In the fiscal year which ended on 30 June 1958, Buckeye processed 240,000 tons cottonseed (this does not include Traders Oil Mill, Ft. Worth, Texas, which crushed about 44,000 tons of cottonseed). In the same fiscal year, Buckeye processed 522,000 tons of soybeans.

"Soybean Protein: In the fall of 1946, Proctor & Gamble needed a raw material to use in the new formula of Spic and Span. It was found that a protein product that could be made from soybeans at Louisville would supply this demand. As a result, a protein unit [for making industrial-grade isolated soy protein] was erected at the Louisville Mill and adequately took care of the Proctor & Gamble needs.

"After a few years, the Spic and Span formula was changed again so there was less need for this protein product and it was necessary to develop outside markets where it was used largely as a substitute for casein in the paper trade.

"One of the most interesting developments in the processing of soybeans recently has been the advent of 50% protein low-fiber soybean meal. This is a premium product usually selling from $7 to $8 a ton over the regular soybean meal market, and is in great demand by the poultry trade. Buckeye started producing 50% soybean meal at Louisville and Binghamton Mills in 1956-57."

Talk with Ed Rider, corporate archivist, Procter & Gamble Co. (who located and sent this valuable document). 1993. July 15. When B.J. Gantt wrote this history he was probably residing and working in Memphis,

Tennessee, which is where P&G's Buckeye subsidiary was headquartered. Address: Vice President and Superintendent of Manufacture, Buckeye [Memphis, Tennessee].

844. Hartwig, E.E. 1959. Hill, a new early maturing soybean for the South. *Soybean Digest.* Aug. p. 20-21.
• ***Summary:*** Hill is a new high-yielding, shatter resistant, and disease resistant soybean variety slightly earlier than Dorman. It will be available for seed producers in 1960 and should be generally available for planting in 1961. Photos show: Hill soybeans prior to maturity showing pod development. Mature plants. A map shows the areas to which Hill is best adapted in New Mexico, Texas, Arkansas, Missouri, Kentucky, Tennessee, Mississippi, Delaware, Maryland, Virginia, and North Carolina. Address: Delta Branch Exp. Station, Stoneville, Mississippi.

845. Ralston Purina Co. 1959. Welcome to St. Louis and Checkerboard Square (Ad). *Soybean Digest.* Aug. p. 5.
• ***Summary:*** "Home of the Ralston Purina Company, one of the country's largest users of soybeans and soybean meal for the manufacture of Purina Chows for poultry and livestock.

"With soybean processing plants at Bloomington, Illinois; Decatur, Illinois; Iowa Falls, Iowa; Kansas City, Missouri; Lafayette, Indiana; Louisville, Kentucky; Memphis, Tennessee; New Madrid, Missouri; Raleigh, North Carolina."

This ad welcomes members of the American Soybean Association and the National Soybean Processors Association, who are apparently meeting in St. Louis. Address: General Offices: St. Louis 2, Missouri.

846. Van Wyk, Judson J.; Arnold, M.B.; Wynn, J.; Pepper, F. 1959. The effects of a soybean product on thyroid function in humans. *Pediatrics* 24(5):752-60. Nov. [17 ref]
• ***Summary:*** A 10-month old infant reared from birth on Mull-Soy, a soy-based infant formula, developed a goiter and hypothyroidism, which was cured by the administration of 4 drops of Lugol's solution and the replacement of the soybean product by whole cow's milk.

Studies in normal adults showed that this soybean product did not interfere with the absorption of iodine, iodine uptake by the thyroid, oxidation of iodide to iodine, or the release of PBI-131 in most subjects. However two subjects who had a high plasma level of PBI-131 while receiving whole cow's milk, had a significant suppression in the PBI-131 while receiving this soybean product.

"These studies suggest that a goitrogenic agent was present in this particular soybean product, which interfered with thyroid hormone synthesis in susceptible individuals, and which raised the daily requirement for iodine."

Footnote: This work was supported in part by a grant from the Borden Company [makers of Mull-Soy].

Messina states (2016, *Nutrients,* p. 18, #399): "Although several cases of goiter were attributed to the use of soy infant formula, this problem was eliminated in the mid-1960s with the advent of iodine fortification of the formula." Address: 1. M.D., Dep. of Pediatrics and Radiology, Univ. of North Carolina School of Medicine, Chapel Hill, NC; and Depts. of Medicine, Veterans Administration Hospital; and Duke Medical Center, Durham, NC.

847. Ingram, William Prentiss, Jr. 1959. The physiochemical and nutritional properties of riboflavin-active substances in soybean-oil meal. PhD thesis in Animal Husbandry, North Carolina State University–Raleigh. ix + 106 p. Page 2529 in volume 20/07 of Dissertation Abstracts International. [56 ref]
• ***Summary:*** Contents: Biography. Acknowledgments. List of tables. List of appendix tables. Introduction. Review of the literature: A. Observed differences in estimates of riboflavin in soybean-oil meal. B. Evaluation of the principal methods used in riboflavin assays: 1. The fluorimetric and the microbiological assay methods The rat-growth assay method. a. Development of basic procedure. b. Composition and adequacy of reference diets. used in rat-growth assays. c. Equivalence of standard reference diets and test diets with respect to accepted nutrients. (1) Quantitative equivalence. (2) Availability of accepted nutrients. d. Other factors that may be involved in the stimulation of growth by the test diets. C. Summary of the literature. Experimental.

Part I. Riboflavin-active substances in extracts of soybean-oil meal.

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B. Fluorimetric assays of soybean-oil meal fractions for riboflavin.

C. Procedures used in and results from rat-growth assay of residues and of photolyzed extracts from soybean-oil meal.

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2. Second rat-growth assay. a. Preparation of test material. b. Preparation of diets. C. Design of assay. d. Results of assay.

3. Third rat-growth assay. a. Preparation of test material. b. Preparation of diets. c. Design of assay. d. Results of assay.

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2. Detection, by microbiological assays, of non-fluorescent growth-promoting substances in extracts. a. Procedure. b. Results.

3. Detection, by rat-growth assays, of riboflavin-active substances in extracts and in residues. a. Rat-growth assay IIA.

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General Summary.

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7. Fluorimetric assays of riboflavin-enriched soybean-oil meal samples.

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Note: William P. Ingram, Jr. was born in 1914. Address: North Carolina State Univ., Raleigh.

848. Kropotkin, Alexandra. 1960. Lose 5 lbs. in 6 days with "No hunger" rice diet. *Coronet* 47(3):74-78. Jan.

• ***Summary:*** Cites the health and reducing values of rice and soy sauce. Dr. Walter Kempner, of Duke Univ. [Durham, North Carolina], believes in the health value of rice, since it "contains no cholesterol–which many doctors believe dangerous to the heart, kidneys and blood circulation." Note: All plant foods are free of cholesterol.

The writer prefers long grain brown rice, with long grain polished as a 2nd choice. She enjoys "a bowl of room-temperature rice with nothing but soy sauce, cold spinach and a small helping of 'pickled' vegetables"–in short a Japanese peasant diet. She seasons 3/4 cup cooked rice with 1 teaspoonful soy sauce: total 100 calories. She also uses 1 teaspoon soy sauce in her "geisha girl" salad dressing. Address: Princess.

849. *Soybean Digest.* 1960. Cargill opens new plant at

Norfolk. Jan. p. 12.
• ***Summary:*** Cargill's soybean solvent extraction plant at South Norfolk, Virginia, exported its first shipment of soybean meal on 1 Dec. 1959–3,000 tons destined for Denmark. State and local officials attended an opening day plant tour. The solvent extractor is a percolator-like Blaw-Knox Rotocel.

"Benjamin S. Jaffray, Cargill's southeastern regional manager, said the soybean plant's location on main rail, truck and water routes will make it 'highly competitive' in distribution of soybean meal to feed manufacturers serving both commercial livestock raisers and the South's expanding poultry industry."

"Tom C. Veblen, in charge of soybean purchases and sales of oil and meal, said soybean production in the surrounding five states [Virginia, Maryland, Delaware, North Carolina, and South Carolina] had increased 400% in 10 years to an estimated 30.2 million bushels last year."

Elsewhere in the U.S., Cargill operates 9 vegetable oil plants processing soybeans, flax and copra, and some 45 terminal and 50 country grain elevators.

An aerial photo show's the new soybean processing plant, with water in the background. Soybean storage appears to be mostly in round steel tanks.

850. Howell, R.W.; Wargel, C.J.; Brim, C.A.; et al. 1960. Response of soybeans to seed-treatment with gibberellin under simulated commercial conditions. *Agronomy Journal* 52(3):144-46. March. [14 ref]
• ***Summary:*** An extensive literature has developed during the past few years attesting to the responsiveness of many plant species to gibberellin, which promotes the growth of intact plants. However in this experiment, plant maturity and oil and protein content of the seed were not affected consistently by treatment of soybean seeds with gibberellin. Address: 1. Plant Physiologist; 2-3. Research Agronomists. All three: Crops Research Div., ARS, USDA.

851. Ahmed, Shaukat; Evans, Harold J. 1960. Cobalt: A micronutrient element for the growth of soybean plants under symbiotic conditions. *Soil Science* 90(3):205-10. Sept. [7 ref]
• ***Summary:*** Conclusion: The results of experiments summarized in this paper provide strong evidence that cobalt is an essential element for the growth of soybean plants under symbiotic conditions with nitrogen-fixing bacteria. Address: North Carolina Agric. Exp. Station.

852. *Soybean Digest.* 1960. Honorary life members [American Soybean Assoc.]: Dr. E.E. Hartwig and Dr. Frederick Dimmock. Sept. p. 8.
• ***Summary:*** See next page. Dr. Edgar E. Hartwig, who has played a leading role in the rapid growth of soybean production in the southern United States, was born in 1913 at Wheaton, Minnesota. He received his bachelor of science degree from the Univ. of Minnesota and his PhD degree from the Univ. of Illinois. In 1943 he joined the southern soybean improvement program in cooperation with the North Carolina Agric. Exp. Station.

"In January 1949 he became coordinator of the southern soybean improvement program at the Delta Branch Experiment Station, Stoneville, Mississippi, which position he still holds. Dr. Hartwig has had a major part in the development and release of the following soybean varieties: Roanoke, Jackson, Dorman, Lee, Hood and Hill. In recent years more than 90% of the soybean acreage in the Midsouth has been planted to these varieties."

Note: Edgar E. Hartwig died on 11 May 1996 in Mississippi at age 82. He had been residing in Leland, Washington Co., Mississippi.

Dr. Dimmock was born at Edgware, Middlesex County, England in 1896, and came to Canada at the age of 15. "He received his BSA degree at McGill University in 1923, his MSA degree in 1925, and his PhD at the University of Nebraska in 1947. Dr. Dimmock served as assistant agrostologist at the Agricultural Experiment Station, Harrow, Ontario, from 1923 to 1928, and was transferred to the forage crops division, Experimental Farms Service, Canada Department of Agriculture at Ottawa, Ontario, in 1928. He has been in charge of the soybean and corn breeding programs at Ottawa since 1928... He has had charge of the program of soybean investigations for the Canada Department of Agriculture since it was initiated in 1924. During the 6 years he was at Harrow he developed and distributed A.K. (Harrow), and later Harman, the selection of which he began at Ottawa.

"The program of soybean research which he initiated at Ottawa has resulted in the development and distribution of the following early-maturing varieties of soybeans, most of them from hybridization: Mandarin (Ottawa), Capital, Kabott, Pagoda, Comet, Acme, and Merit. These varieties have contributed greatly to the development of a successful soybean industry in Canada, and have been of great importance in the northern United States."

Photos show Dr. E.E. Hartwig (with Jake Hartz, Jr., who introduced him at ASA's 40th convention in Memphis, Tennessee) and Dr. Frederick Dimmock (with ASA vice president Charles V. Simpson presenting the award, and K.A. Standing of Chatham, Ontario, who introduced Mr. Dimmock).

853. Caldwell, B.E.; Brim, C.A.; Ross, J.P. 1960. Inheritance of resistance of soybeans to the cyst nematode, *Heterodera glycines. Agronomy Journal* 52(11):635-38. Nov. [6 ref] Address: North Carolina State College.

854. Shaukat-Ahmed; Evans, Harold J. 1961. The essentiality of cobalt for soybean plants grown under symbiotic conditions. *Proceedings of the National Academy*

of Sciences, USA 47(1):24-36. Jan. 15. [30 ref]
• ***Summary:*** The biological importance of the element cobalt was first recognized in 1935 with the discovery. reported in three different papers, that small amounts would cure certain deficiency symptoms in sheep and cattle. Underwood (1956) has given a good review of the sequence of events leading to these findings.

From culture-solution experiments it is concluded that cobalt is essential for the growth of soybean plants under conditions which force them to depend upon symbiotic relationship with *Rhizobium japonicum* for nitrogen.
Address: Dep. of Botany and Bacteriology, North Carolina Agric. Exp. Station, Raleigh, NC.

855. *Soybean Digest.* 1961. John MacMillan dies; was Cargill chairman. Jan. p. 15.
• ***Summary:*** John H. MacMillan, Jr., chairman of the board and chief operating officer of Cargill, Inc. died on 23 Dec. 1960 at Durham, North Carolina, where he had been flown for treatment.

Born in 1895 in Fort Worth, Texas, he had been a resident of the Minneapolis area since 1904. He began his business career in 1919 as a grain buyer and trader for the Cargill Elevator Co. at Duluth, Minnesota, and in 1926 he was elected a director of the firm.

In 1932, when Cargill Elevator Co. became Cargill, Inc., Mr. MacMillan became vice president and general manager, succeeding his father, John H. MacMillan, Sr. He was named board chairman in 1937.

"Mr. MacMillan was well known for designing large elevators for efficient storage and handling of grain, and he was responsible for two developments–accurate temperature measurements inside huge storage bins and development of equipment for rapid loading and unloading of the bins–that were revolutionary in the grain industry. He also pioneered in the development of the integrated barge-and-towboat unit now widely used in the inland waterways.

"During his 20 years as president, Cargill more than tripled in size. Its annual sales volume is now well over $1 billion, making it the nation's largest grain handling firm. During his tenure, the company also became significant in production of vegetable oils.

"A brother, Cargill MacMillan, was president of Cargill until July of last year, when he was granted a leave of absence to recover from illness." A small portrait photo shows John MacMillan.

856. *Soybean Digest.* 1961. Agronomists recommend, state by state: The best varieties. Feb. p. 14-17.
• ***Summary:*** This article has information about the seed varieties in the following states: Arkansas: Lee, Hood, Hill, Jackson (Outdated: Dortchsoy 67, Ogden). Delaware: Wabash, Clark, Kent, Bethel, Hill, Hood. Georgia: Lee, Hill, Jackson, Bienville. Kansas: Clark, S-100, Wabash, Perry. Maryland: Clark, Wabash, Kent, Hill, Dorman, Hood, Ogden, Lee. Nebraska: Blackhawk, Harosoy, Hawkeye, Adams, Ford, Clark. New Jersey: Hawkeye, Lincoln, Clark. North Carolina: Lee, Hood, Hill, Jackson. Ohio: Henry, Madison, Ross. Oklahoma: Clark, Hill, Dorman, Hood, Lee. Texas: Hill, Lee, Jackson. Virginia: Clark, Perry, Hill, Dorman, Hood, Ogden, Lee, Jackson. Wisconsin: Norchief, Chippewa, Blackhawk, Harosoy, Lindarin.

An outline map of the United States shows which varieties are adapted to which states.

857. *Soybean Digest.* 1961. Seed directory (Ad). Feb. p. 34.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, Virginia. For each listing is given the amount and varieties

of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

858. *Soybean Digest.* 1961. Seed directory (Ad). March. p. 34.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Alabama, Arkansas, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, Virginia. For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

859. Brim, Charles A.; Cockerham, C. Clark. 1961. Inheritance of quantitative characters in soybeans. *Crop Science* 1(3):187-90. May/June. [4 ref]
• ***Summary:*** "The subdivision of hereditary variance into portions due to additive effects, dominance effects, and epistatic effects of genes is useful in providing information on the inheritance of quantitative characters and in formulating breeding procedures.

"The purpose of the study to be discussed here was to estimate hereditary variance for populations derived from crossing inbred lines of soybeans." Address: 1. Research Agronomist, Crops Research Div., ARS, USDA; 2. Prof. of Experimental Statistics, North Carolina State College.

860. Dunleavy, John. 1961. Recent progress in soybean disease research. *Soybean Digest.* July. p. 10-12.
• ***Summary:*** Contents: Introduction. Diseases caused by fungi. Diseases caused by bacteria. Diseases caused by viruses. Diseases caused by nematodes.

This long paper begins: "During the past few years considerable progress has been made in soybean disease research. Serious threats to the soybean industry have arisen and research workers have met the challenge. The outbreak of the soybean cyst nematode in North Carolina and in the Mississippi Valley set in motion a series of steps by state and federal authorities to check spread of the nematode and to control the pest on land already contaminated. Severe outbreaks of Phytophthora root rot in Ohio limited growing of susceptible varieties. These are only two outstanding examples of how rapidly the soybean disease situation changes. A few years ago the soybean cyst nematode and Phytophthora were not recognized in the United States but today they are major disease problems.

"Diseases of plants are similar to diseases of man in many ways and they fall into the same groups. These groups are based on the type of organism that produces a disease. There are four principal groups: fungus diseases, produced by small, filamentous organisms sometimes called molds; bacterial diseases, produced by unicellular, microscopic organisms; virus diseases, caused by submicroscopic organisms; and nematode diseases caused by microscopic roundworms. Plant pathologists are actively engaged in research on soybean diseases in all of these areas and plant breeders are attempting to improve our present soybean varieties by developing resistance to some of the most important soybean diseases.

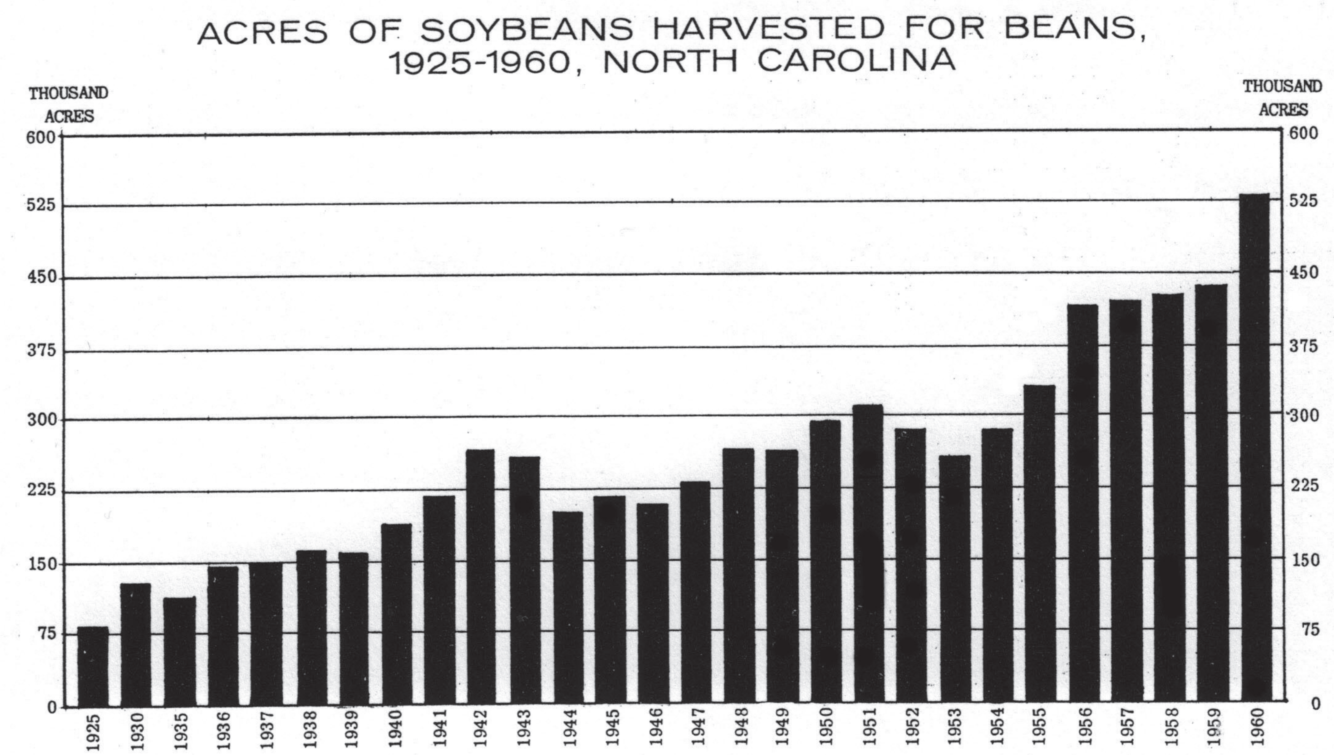
"Diseases Caused by Fungi: Most diseases of soybeans are caused by fungi. Phytophthora rot, a disease in this group, has recently received considerable attention from soybean researchers. The disease was found first in northwestern Ohio in 1951. A.F. Schmitthenner and A.J. Suhovecky, of the Ohio Agricultural Experiment Station, reported that the disease occurred in three phases: a seed rot, a seedling damping-off and a root rot. The varieties Monroe and Blackhawk were resistant, but all other recommended varieties such as Hawkeye, Lincoln, and Harosoy were severely damaged. R.L. Bernard and M.J. Kaufman, working in Illinois, cooperated with P.E. Smith and A.F. Schmitthenner in Ohio to study the inheritance of resistance to Phytophthora rot.

"They reported that resistance was controlled by a single dominant gene. This meant that this is one of the less difficult diseases with which plant breeders have to deal, but the development of resistant varieties, nevertheless, is a time-consuming operation that required a major shift of emphasis in the breeding program.

"Phytophthora rot has also been observed in North Carolina, Illinois, Indiana, Arkansas and Mississippi. In Illinois the disease was more prominent on stems than on roots. Stem lesions were observed on late maturing lines in Ohio in 1957 and appeared as reddish-brown, sunken streaks.

"The disease can readily be controlled by planting only resistant varieties. Most of the varieties grown in the South are resistant. In Indiana, A.H. Probst and K.L. Athow are transferring resistance to Shelby, Lindarin and several promising experimental strains. It is not known when these strains will be available for use. In Illinois, R.L. Bernard and D.W. Chamberlain are transferring resistance to several commonly grown susceptible varieties. They expect to have Phytophthora root rot resistant varieties in about 2 years."

Photos show: (1) Soybean plants damaged by the soybean cyst nematode in Perniseat County, Missouri. Note the normal plants in the background. Inset, cysts on soybean roots that caused plant damage. (2) A soybean leaflet showing the striking symptoms of bacterial pustule disease. (3) The two split soybean stems at the left were infected by the brown stem rot fungus. The stem at the right was not infected. (4) Left, plant with typical symptoms of bud blight. Right, a mature, healthy soybean plant grown a few feet from the plant at left. Address: Plant Pathologist, Crops Research Div., ARS, USDA; and Iowa Agricultural and Home Economics Experiment Station.



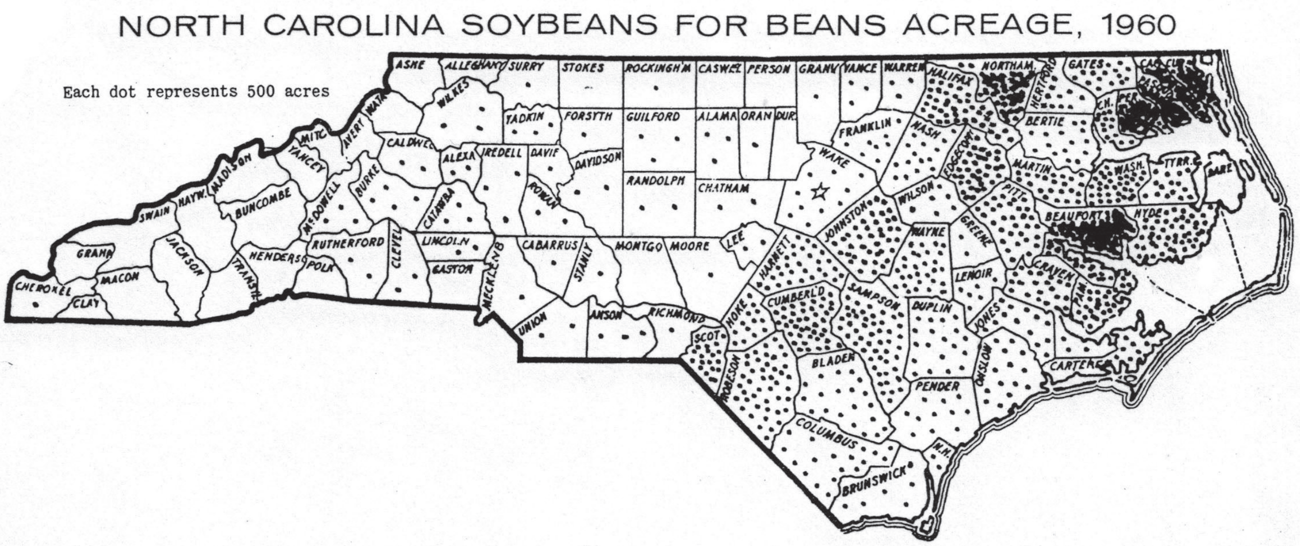
861. *North Carolina Agricultural Statistics.* 1961. Soybeans, featuring county estimates, 1925-1960. No. 105. 20 p. July.
• ***Summary:*** Contents: Production of soybeans in North Carolina. Acreage, utilization, yield and production of soybeans, 1924-1960, North Carolina. Table: Acres of soybeans harvested for beans, 1925-1960, North Carolina. Production, disposition and value of soybeans, 1924-1960, North Carolina. Acreage, yield and production of soybeans, 1950-1960, by states. Map: Distribution of soybeans acreage in North Carolina, 1960. Table: Production of soybeans for beans, 1935-1960, North Carolina. Quarterly stocks of soybeans, 1943-1960. North Carolina soybean county estimates: Acreage, yield, production, price and value, 1925-1960. Address: North Carolina Dep. of Agriculture, Raleigh.

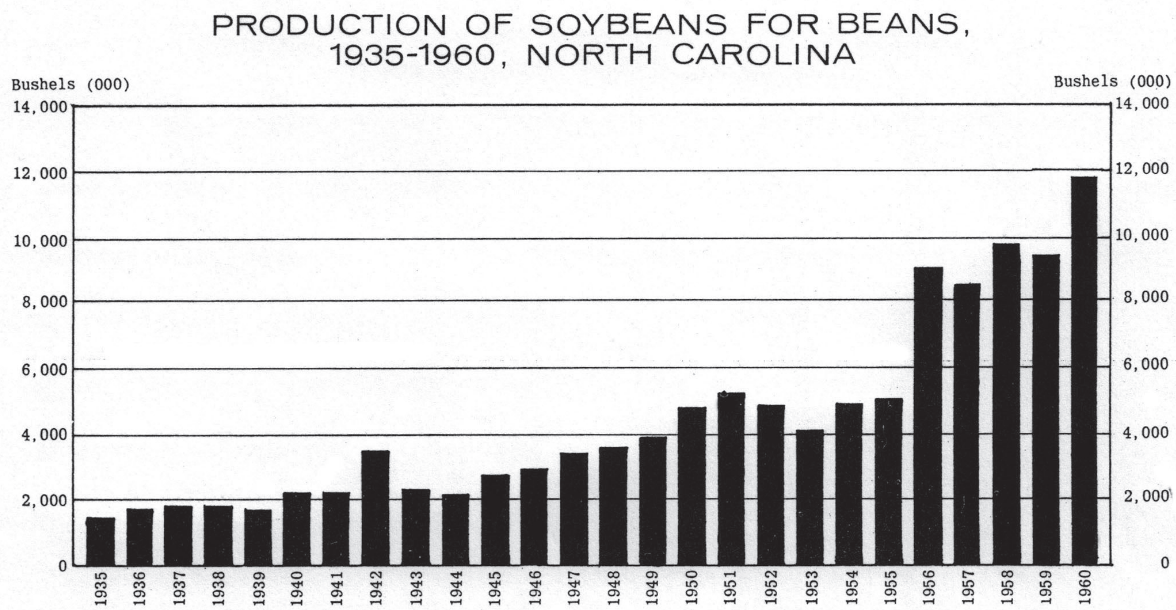
862. *USDA Agricultural Research Service.* 1961. Soybean cyst nematode: Progress in research and control. ARS 22-72. 20 p. Aug. ARS Special Report, by the Crops Research Division and the Plant Pest Control Division of the Agricultural Research Service.
• ***Summary:*** "The soybean cyst nematode (*Heterodera glycines* Ichinohe) has been positively identified from fields comprising a total of 60 thousand acres in parts of eight States. These States are North Carolina, Tennessee, Mississippi, Arkansas, Kentucky, Missouri, Virginia, and Illinois. The actual acreage presumed infested is several times the proved infestations. The reason for this difference is explained later in the section dealing with the location and extent of infestations (See page 11).

"Although the Nation's billion-dollar soybean crop is the most important among those threatened by this nematode, a number of other plants are susceptible in varying degrees to attack by the near-microscopic eelworm which penetrates and feeds on the roots of host plants.

"The near-microscopic size of the nematode contributes to the difficulty of discovering and containing infestations. Even at its largest stages, the soybean cyst nematode is too small to positively identify on the basis of appearance alone without laboratory examination. As a result, it is impossible for a farmer or even a trained member of a nematode-detection survey team to simply walk into afield, pull up an infested plant, and positively identify the cyst nematodes on its roots. The male of the species is too small to see without magnification, being only about one-thousandth of an inch thick and one-twentieth of an inch long. In its earlier stages, the female is also microscopic but the mature female becomes visible to the naked eye after its body is distended with eggs. And upon death, its brown, egg-filled carcass looks like a speck of dirt.

"Although the soybean cyst nematode can move only a few inches a year under its own power, the pest is easily spread by means of contaminated soil, bulbs, roots of plants, machinery, crops, or other articles from infested farms. And small populations of nematodes can build up rapidly to destructive proportions when conditions are favorable to their growth and reproduction–as when a vigorous crop of soybeans provides them with plentiful roots on which to feed. In fields where no soybeans or other host crops





are grown, a small proportion of the larvae in the cysts can survive for long periods (probably 4 years or more) and start a new infestation if soybeans are again planted.

"The characteristic symptoms of a nematode attack are yellowing and dwarfing of parasitized plants. For this reason, the disease condition caused by the parasite has sometimes been called by the descriptive name first given it in the Orient–"yellow dwarf." However, these yellowing and dwarfing symptoms are frequently absent with light infestations–and sometimes a heavy nematode population buildup can even be found late in the season on the roots of apparently healthy soybean plants.

"The damage from soybean-cyst-nematode infestation varies widely–with density of the nematode population, age and vigor of the plants attacked, soil fertility, moisture, and other factors–from nearly total loss of the crop to no observable above-ground damage."

Table 1, "Known distribution of the soybean cyst nematode, as of June 30, 1961," has four columns: (1) Names of the eight states. (2) Year first observed. (3) Number of counties it which it has been found in that state. (4) Number of acres on which proved to be infested in that state. Address: Northern Regional Research Lab., Peoria, Illinois.

863. Spears, Joseph F. 1961. Latest developments on the soybean cyst nematode. *Soybean Digest.* Sept. p. 28, 30-31.
• ***Summary:*** Contents: Introduction. 750,000 acres infested. Tennessee infestation. Nematode's weakness.

This article begins: "The fight against the soybean cyst

nematode, *Heterodera glycines* Ichinohe, is being carried to the fields and farms of the infested states in a two-pronged attack through:

"1–Quarantine regulations to prevent the pest from spreading and

"2–Recommended farm practices.

"By following these practices, farmers in the uninfested areas can protect themselves against the pest, and those with infested acreage can reduce both their losses and the danger of spread to other farms by holding down nematode populations.

"Both the quarantine regulations and recommended control measures utilize the latest scientific know-how for checkmating the soybean cyst nematode. The regulatory and control programs center their attack on known infested areas and adjacent farming sections with the greatest exposure.

"Success of any program of this nature depends on public understanding and compliance. The soybean cyst nematode program calls for across-the-board participation by all interested groups in the fight against the pest. Federal and state pest control authorities cooperate and work closely with farmers and everyone concerned with harvesting and handling soybeans and other articles which might carry the nematode.

"Growing awareness of the nematode problem, since its discovery at Castle Hayne, North Carolina, in 1954, has been demonstrated. For example, reports from county agents, individual farmers, and other interested persons of suspicious symptoms and unexplained crop losses have helped in a systematic search for infested areas.

"The near microscopic size of the nematode contributes to the difficulty in discovering and containing infestations. The soybean cyst nematode is too small to be positively identified on the basis of appearance alone without laboratory examination. Although the soybean cyst nematode can move only a few inches a year under its own power, the pest is easily spread by means of contaminated soil, bulbs, plant roots, machinery, or other articles moving from infested fields. Small populations of nematodes build up rapidly to destructive proportions when conditions are favorable to their growth and reproduction. This is particularly true in those areas where soybeans are grown continuously without crop rotation.

The characteristic symptoms of soybean cyst nematode attack are yellowing and dwarfing of parasitized plants. However, these symptoms may be absent in the presence of a light infestation. Damage from the soybean cyst nematode varies widely with density of nematode populations, age and vigor of the plants attacked, soil fertility, moisture, and other factors so that injury may range from total loss of the crop to no observable above-ground damage. The fact that no readily discernible symptoms accompany light infestations has complicated the soybean cyst nematode problem because (1) it makes it difficult to delimit infested areas, and (2) farmers may not be properly forewarned of damage to come.

"The soybean cyst nematode has been positively identified from fields comprising a total of 60,000 acres in parts of eight states. These states are North Carolina, Tennessee, Mississippi, Arkansas, Kentucky, Missouri, Virginia, and Illinois. Although the figure of 60,000 acres proven to be infested by the nematode gives some indication of the problem, it is not an accurate measure of the acres actually infested. In some heavily infested counties, for example, the actual acres infested, all of which are regulated under the quarantine, may be several times that checked by survey crews and proved to be infested.

"In northwestern Tennessee, northeastern Arkansas, and southeastern Missouri, extensive acreage in fields intermingled with or adjacent to known infested fields are presumed to be infested and placed under regulation as soon as actual surveys reveal a continuous pattern of heavy infestation nearby. Thus, funds and manpower have been conserved for more intensive surveys on the periphery of the infested areas.

"750,000 Acres Infested: Since the practical purpose of surveys is to determine the scope of the nematode problem and to locate and contain nematode infestations, it has been unnecessary to actually demonstrate the presence of cysts on every property. For this reason the actual infested acreage in various parts of the United States, particularly in the Mississippi Valley area, is much higher than that proved by examination to be infested, and this appreciably raises the infestation figure to be reckoned with. Based on the infestation pattern established by field surveys, it is estimated that the acreage infested in the United States may run in the neighborhood of three-quarters of a million acres.

"Systematic surveys have been carried on in the principal soybean producing states since 1956 and it is encouraging to note that no new states have been found infested since 1959."

A portrait photo shows Joseph F. Spears. Address: Chief Staff Officer, Control Operations, Plant Pest Control Div., Agricultural Research Service, USDA, Washington, DC.

864. Ahmed, Shaukat; Evans, Harold J. 1961. On the essentiality of cobalt for the growth of soybean. PhD thesis, Dep. of Botany & Bacteriology, North Carolina State College. 111 p. *
Address: North Carolina State College, Raleigh.

865. North Carolina Crop Reporting Service. 1961. North Carolina agricultural statistics: soybeans, featuring county estimates, 1925-1960. *North Carolina Agricultural Statistics* No. 105. 20 p. 30 cm. Illust. maps. tables. *

866. North Carolina Crop Reporting Service. 1961. North Carolina agricultural statistics: peanuts, featuring county estimates, 1925-1959. *North Carolina Agricultural Statistics*

No. 104. 20 p. 30 cm. Illust. maps. tables. *

867. Klingman, Glenn C.; Noordhoff, Lyman J. 1961. Weed control: As a science. New York, NY: John Wiley & Sons, Inc. 429 p. Illust. 24 x 15 cm.
• ***Summary:*** Accepted method of control are discussed for weeds in soybeans and many other crops. In chapter 8, "Carboxylic-aromatic compounds," the section on benzoic acids states that the herbicides Amiben and phthalic acid have given promising experimental results on soybeans (p. 146-47). In Chapter 10, "Substituted phenols," the section on DNBP states that is effective on soybeans. A photo shows a field of "soybeans treated with DNBP (amine salt) just after the soybeans emerged (crook stage). This treatment controlled weeds for 1 month without harm to the soybeans."

Diphenamid shows promise for controlling *seedling grasses* (such as crabgrass, goosegrass, green and yellow foxtail) in soybeans (p. 190).

In chapter 15, titled "Field crops grown in rows," is a section on soybeans: "Soybeans are less tolerant to present-day herbicides than most other crops. Even though several herbicides can be used, a weed control program must rely heavily upon tillage and agronomic practices that offer maximum competition to weed growth."

"The rotary hoe is an effective and economical weed killer in soybeans. For best results use it when the ground is slightly crusted and when weeds are just emerging, and not more than ¼ inch tall, recent research shows that rotary hoeing is effective even though the soil is moist." Preemergence herbicides used on soybeans include PCP, CDAA, CIPC, NPA, a mixture of CIPC and NPA, and DNBP (applied 1-2 days before crop emergence). Postemergence herbicides are restricted mainly to DNBP.

A section on peanuts starts on p. 235. Address: 1. Prof. of Field Crops, North Carolina State College; 2. Editorial Asst., Publications Leader, Federal Extensive Service, USDA.

868. *SoyaScan Notes.* 1961. Chronology of Chico-San, Inc. (Chico, California). 24 March 2011. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** 1955 Dec.–Herman Aihara and Chiiko (Cornellia) Yokota are married in New York. Cornellia arrived in the United States from Japan in Oct. 1955.

1961 summer–George Ohsawa, fearing that a nuclear war might be near, urges his followers to leave New York and find a place that was safer from radioactive fallout and good for growing rice. After extensive research, they chose Chico, California.

1961 Oct. 1–Thirty two people (11 families) arrive in Chico (in the Sacramento Valley of northern California) from New York City in a caravan of vans, buses, and station wagons. It is an area of fertile farmland where rice is already being grown. Among the people in the group who remained active in work with macrobiotic foods were Bob Kennedy, Herman and Cornellia Aihara, Teal Ames, and Dick Smith.

1961 Dec. 8–The group in Chico has started a bakery named "Chico-San" (Shumway 1961).

1962 March 6–The group in Chico incorporates a new food company named Chico-San, Inc.; it consists of a retail store and an import and wholesale business. It is capitalized with $10,000. In addition to a line of whole-grain products, they soon began to import a variety of macrobiotic foods from Ohsawa in Japan. The first store and food plant (they made sesame salt or *gomashio* and repackaged foods) was in the basement of a small hearing aid shop in Chico. The address was apparently 64, 5th Ave., Chico, California. It became the first macrobiotic food manufacturing company in the USA. Note: Infinity Foods in New York City was apparently the first macrobiotic import and wholesale company.

1962 Christmas–George Ohsawa visits Chico and lectures on macrobiotics.

1963–Ohsawa lectures in Boston (Massachusetts), New York City, and at the fourth macrobiotic summer camp in Chico. Lima Ohsawa and Cornellia Aihara give cooking classes. In Chico, Ohsawa suggests that the group try making rice cakes. He sends them a rice cake machine from Japan and production began in the fall of 1963. Rice cakes soon became Chico-San's first really popular and successful product.

1963–Junsei Yamazaki emigrates to Chico, California, from Japan.

1964–Yamazaki starts to make miso and shoyu for Chico-San.

1966 April 24–George Ohsawa dies. The Ohsawa Foundation now has offices in Los Angeles, New York, Paris and Tokyo.

1968 fall–Bob Kennedy of Chico-San signs a contract with the Lundberg brothers of Wehah Farm (Richvale, California) to grow short-grain brown rice organically, exclusively for Chico-San. Chico-San agrees to buy all brown rice planted in 1969.

1969–Lundberg brothers plant 78 acres of brown rice, which is harvested in the fall. Because of Chico-San's successful advertising campaign, one third of this crop as sold in advance and all was sold before the next year's crop was available. The rice

1969 fall–Wendell Lundberg visits Erewhon.

1970–Chico-San contracts for 200 acres of brown rice this year with Lundberg.

1970–Spiral Foods is organized by Chico-San and Peter Milbury to distribute Chico-San products directly to retail stores in the greater San Francisco Bay Area.

1970–Herman Aihara and Bob Kennedy establish the George Ohsawa Macrobiotic Foundation (GOMF). Junsei Yamazaki makes his first big batch of miso. First summer camp at French Meadows. Herman and Cornellia make their

first nationwide teaching tour.

1971–Noboru [not Naboru] Muramoto sensei arrives.

1972–The book *Miso and Tamari,* by Herman Aihara published.

1972 Sept. 14.–Fire destroys the Chico-San plant. It started as a short in a rice-cake machine. Chico-San is out of business for several months. The company resumed business at another location across town. But Chico-San lost its exclusive right to distribute Lundberg organically grown brown rice as the company had been unable to package and ship rice and rice products for several key months during the peak sales season.

1973–Herman Aihara establishes the Vega Institute in San Francisco. Noboru Muramoto lectures and his first book, *Healing Ourselves,* is published.

1974–Herman Aihara moves GOMF to Oroville from San Francisco. *Soybean Diet,* by Herman published.

1976. Muramoto moves to Glen Ellen.

1984 Nov. 19–Heinz U.S.A. acquires Chico-San Inc. a manufacturer and marketer of rice cakes and related products. Privately held Chico-San (headquartered in Chico, California) operates rice-cake production facilities in California, Mississippi, and New Jersey. Founded in 1962, the company has about 340 employees.

1985 Jan.–The Quaker Oats Company acquires the Arden Rice Cakes business. The natural foods portion of the business is incorporated under the Mother's brand. Chico-San is based in Chico, California; Arden in North Carolina.

869. Hanson, W.D.; Weber, C.R. 1962. Analysis of genetic variability from generations of plant progeny lines in soybean. *Crop Science* 2(1):63-67. Jan/Feb. [12 ref] Address: 1. Geneticist, Crops Research Div., Beltsville, Maryland (presently, Dep. of Genetics, North Carolina State College); 2. Agronomist, Crops Research Div. and Prof., Iowa State Univ., Ames, Iowa.

870. *Soybean Digest.* 1962. Grow the best soybean varieties: some late information from the state experiment stations. Feb. p. 6-9.

• ***Summary:*** "University of Arkansas Extension Service offers the following advice on selecting a soybean variety:

"'Some characteristics in selecting a good variety of soybeans to plant in addition to high yields are:

"'1–Sufficient plant height for high yields and harvesting.

"'2–Lodging resistance.

"'3–Shatter resistance.

"'4–Lower pod set sufficiently above the soil for efficient harvesting.

"'5–Date of maturity suitable for climatic conditions in production areas.

"'6–Disease resistance.

"'7–Yellow seeded.

"'8–High seed quality, purity, germination and a seedcoat that does not break easily in harvesting, drying and storage.

"'Good quality soybean seed planted in warm moist soil will usually be up to a good stand in 5 to 7 days.

"'Soybean seed stored from one planting season to another usually have a very poor germination percentage and are considered worthless for planting purposes under southern conditions." (Seed carried over from one season to the next in northern states should not be planted without a germination test)

"States Purdue Extension Bulletin 231: "'Choosing good seed of the right soybean variety is a highly important step in profitable soybean production. Registered or certified seed of the recommended varieties is available annually. Foundation seed is maintained for extensively used varieties.

"'Soil conditions, rotations, and time of planting are important considerations in choosing a variety. The same variety usually matures earlier on sandy soils than on clay, loam, or muck soils.

"'Generally, the variety that matures latest without frost injury will give maximum yields under most northern conditions. The use of two or more varieties differing in maturity is important when a large acreage is grown to help reduce production hazards because of extremes in weather during the growing and harvesting seasons.'

"Soybean varieties are sensitive to changes in latitude, and some are better adapted than others to local conditions. The map following shows in general the latest recommendations of agronomists in the soybean belt. For suggestions for your immediate locality contact your county agent or state extension service.

"See the list of seed sources in the 'Seed Directory' in this issue. Also, contact your county agent or state extension service for lists of registered and certified seed sources.

"For individual variety descriptions see the article, 'Leading Soybean Varieties,' on following pages.

"Varieties Dropped, Added Three northern varieties are omitted from the leading soybean variety list this year. They are Goldsoy, Renville, and Harly.

"Two varieties are added to the northern list: Kent, which was developed by Purdue University Experiment Station & USDA, and Bethel, which has rootknot nematode resistance, developed by the Delaware Experiment Station & USDA.

"The Dorman, Dortchsoy 67 and Yelnanda varieties have been dropped from the list of leading southern varieties. Hampton, developed by Coker's Pedigreed Seed Co., replaces Yelnanda in South Carolina and Georgia.

"Indiana Varieties: Leading varieties to be planted in Indiana are the moderately early Harosoy, Hawkeye, Lindarin, and the later Shelby, says K.E. Beeson, extension agronomist, Purdue University. In southern Indiana, Clark will be used extensively. The leading variety between the

late Clark and earlier soys is Shelby which should replace Lincoln because of higher yielding ability. The root rot problem, particularly in northeastern Indiana, requires the use of Blackhawk for resistance to this soil-borne disease. Blackhawk is added to the map of best adapted varieties in Indiana for the first time this year, due to its resistance to Phytophthora.

"For a complete bulletin on soybean production in Indiana write for Soybeans in Indiana, Extension Bulletin 231 (revised 1961), Agricultural Extension Service, Purdue University, Lafayette, Indiana.

"Iowa Varieties: The Iowa Extension Service offers the following information concerning soybean varieties in the state:

"Grant. Not suited as a full season variety in Iowa. Should be used only when planting has been delayed.

"Chippewa. Well adapted to the northern tiers of Iowa counties. Has the best performance record of any variety in its class. Can be used farther south in Iowa when planting has been delayed.

"Blackhawk. Suggested for the northern tiers of Iowa counties. Yields and stands up very well and is tall enough for easy combining. Can be used in central Iowa when planting has been delayed.

"Lindarin. Matures the same as Harosoy, averages 3 to 4 inches shorter, lodges less and compares favorably with it in all other characteristics. Hawkeye. Suggested for northern and central Iowa. The most widely grown variety in the northern half of Iowa and the Cornbelt. In extreme northern Iowa it should be planted early, May 10-20. Grows erect, has a good yield and oil content. Suited to southern Iowa when planting has been delayed.

"Adams. Adapted to the same general areas of central Iowa as Ford, but yields about 2 bushels per acre less.

"Ford. Suggested for use in north-central, central and south-central Iowa comprising five tiers of counties. Out-yields Adams and Lincoln, lodges less and has about the same height.

"Shelby. Matures 2 days later than Ford and has about the same height and lodging resistance. In the northern area of adaptation Ford outyields Shelby while in the southern area the reverse is true.

"South Carolina Varieties" From H.L. Musen, associate agronomist, South Carolina Experiment Station:

"In 4 years plantings Lee averaged below the 30-inch average height necessary for efficient combining. For this reason it is felt that Lee should not be planted in the Coastal Plains of South Carolina except possibly in the counties adjoining North Carolina and on rather heavy soils where they are known to do well.

"Jackson tends to give higher yields than CNS-4. Also, it withstands lodging better than CNS-4. Bienville has been in the experiment 3 years. In yields it has averaged more than Jackson for May plantings and the June 10 planting. Bienville lodges considerably when planted in May, but not as severely as CNS-4.

"At present Jackson and CNS-4 are suggested for planting through June 15 or 20 depending an location and soil type. For late plantings, Yelnanda and JEW-45 should be used to give maximum height. Three years' data indicate that Bienville is suited for early and late planting.

"Texas: From R.D. Staten, asssociate professor, Texas Agricultural and Mechanical College System, College Station, Tex.: 'The greatest problem confronting our growers... is trying to increase the percent protein of the soybeans produced on the High Plains of the Texas Panhandle. Research studies are under way to determine the cause of these low protein beans and to devise means, if possible, of correcting the problem.'

Photos: (1) Francis J. Williams, assistant director in charge of the University of Arkansas Rice Branch Experiment Station, Stuttgart, Ark., in a field of Hood, a southern-adapted variety. (2) A.H. Probst, Purdue Agronomist, crossing soybeans. (3) Field of seed of mature Chippewa, one of the better northern varieties, is examined by J.W. Lambert (left) and John Thompson, University of Minnesota agronomists.

871. *Soybean Digest.* 1962. Seed directory (Ad). Feb. p. 36.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, South Carolina, Tennessee, Virginia, Ontario (Canada). For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

872. Riggs, Robert D.; Hamblen, M.L. 1962. Soybean cyst nematode host studies in the family *Leguminosae. Arkansas Agricultural Experiment Station, Report Series* No. 110. 18 p. June. [11 ref]
• ***Summary:*** Contents: Introduction. 2. Literature review. 3. Materials and methods. Results and discussion. Summary. Literature cited.

The soybean-cyst nematode, *Heterodera glycines* Ichinohe, 1952, was first discovered in Japan in 1915 (6). Although the nematode has been the subject of much research, the host range has been limited to few plant species. Japanese workers reported the susceptibility of five species and U.S. Department of Agriculture workers in North Carolina and Tennessee added ten others. These investigators indicated that many plants were penetrated by larvae of the soybean-cyst nematode, but that development of mature individuals and reproduction was restricted to a relatively few plant species.

"The purpose of this study was to delineate more

completely the host range of the soybean-cyst nematode in the Leguminosae."

Page 17: "All lines and varieties of *Glycine max* were susceptible except Peking, PI 79693, PI 84751, PI 88788, PI 90763, and PI 209332. Some lines tested were more susceptible than the Lee variety, which was used as a check.

"All plants listed in this series belong to the family Leguminosae. Tests in progress and future tests will include other legumes and a number of non-leguminous crop plants and weeds which are common to the soybean-growing areas.

"Summary: In the Leguminosae family, 1,152 entries representing 302 species in 61 genera were inoculated with the soybean-cyst nematode, *Heterodera glycines,* to determine their host suitability. Three hundred and ninety-nine entries in 23 genera were classified as susceptible, and 270 entries in 12 other genera allowed limited reproduction. There were 64 species with susceptible entries, of which 51 were new records. Limited reproduction occurred on 72 other species, of which 65 were new records." Address: Dep. of Plant Pathology, Univ. of Arkansas, Fayetteville, AR 72701.

873. Van Der Jooste, Jasper W.; Moreland, Donald E. 1962. Soybean phenoxyesterase. *Nature* (*London*) 195(4844):907-08. Sept. 1. [8 ref]
• ***Summary:*** Esterases have been classified on the basis of their responses to organophosphorous inhibitors. Plant esterases have not yet been included in this classification. While characterizing plant enzymes, the authors found in soybean seedlings the enzyme phenoxyesterase which expressed considerable specificity for 2-naphthylphenoxyacetate (NOPA). This purified enzyme had an optimum pH of 6.0 (phosphate buffer). Address: Dep. of Crop Science, North Carolina State College and Crops Research Div., Agricultural Research Service, USDA, Raleigh, North Carolina.

874. Coker's Pedigreed Seed Co. 1962. Catalogue 1962-63 season. Hartsville, South Carolina. 45 p. 28 cm.
• ***Summary:*** A very attractive catalog, packed with photos. Contents: Introduction–60 years of service to Southern Agriculture, by Robert R. Coker, President, Coker's Pedigreed Seed Co. Cotton varieties (p. 4-7). Corn varieties (hybrid, p. 8-12). Sixty years of plant breeding–1902-1962 (excellent, detailed company history with many biographical sketches and portrait photos, p. 13-17). Department of plant breeding and agricultural research (p. 18-19). Coker's research program in the Mississippi Valley (with cotton, p. 20-21). Department of tobacco breeding and production (p. 22-23). Coker plant breeding spans the South (map of southern USA and Mexico with 65 breeding and testing locations labeled, p. 24-25). Department of sales and production (p. 26-27). Plant facilities and personnel (p. 28-29, incl. aerial view of Hartsville facilities). Department of farm operations (p. 30). Coker de Mexico (p. 31; main office in Mexico City). They come to see and learn (10,000 visitors came last season. Coker scientists keep no secrets. They share their knowledge generously and gladly with farmers, p. 32-33). Experimental department. Our office personnel. Eyes on the future. Quotation from David R. Coker in 1915 Coker Seed Catalog. The origin of the Red Heart trademark, granted on 13 April 1915 (p. 34-36). Tobacco varieties (p. 37-39). Oat varieties (p. 40-41). Wheat varieties (p. 42-43). Soybean varieties (Coker's Hampton and Coker Yelnanda, p. 44). Terms and conditions (inside rear cover).

Coker began in the spring of 1902 when Mr. David R. Coker began his first experimental work with cotton. Today (1962), the company's seed production acreage is in excess of 40,000 acres extending from northeastern North Carolina to the Mississippi Delta. The company employs over 300 individuals, including a large staff of college trained scientists, technical and sales personnel. In the early years, the company's work was limited to the breeding and improvement of a single crop–cotton. But gradually they expanded to other crops. A notable accomplishment is Coker's development of shatter resistant soybean varieties that combine disease resistance and good yielding ability.

The section titled "Sixty years of plant breeding" (p. 13) states that a revolution has taken place in Southern agriculture. "A major factor effecting this revolution has been the work of our scientists and the generous acceptance by farmers of the products of their work. Today, an estimated 65 per cent of the cotton acreage in the Southeast, 80 per cent of the oat acreage, 75 per cent of the flue-cured tobacco acreage, 40 per cent of the hybrid corn, and an increasing per cent of its soybean acreage is planted in varieties originating in the work of Coker scientists."

Josh Stanton (of Hartsville, South Carolina), who sent this catalog to Soyfoods Center in Jan. 1999, was a soybean breeder for Coker from 1966 to about 1991. He added the following note: "This period through the 1970s was Coker's best and most productive." Address: Hartsville, South Carolina.

875. Jackson, W.A.; Evans, H.J. 1962. Effect of Ca supply on the development and composition of soybean seedlings. *Soil Science* 94(3):173-79. Sept. [26 ref]
• ***Summary:*** "Summary: In the absence of added Ca in sand culture experiments, soybean seedlings rapidly developed a necrotic symptom of the primary leaves. Affected tissue contained from 0.08 to 0.12 me. Ca per g. In two of the experiments no significant reduction in root growth occurred, whereas in each experiment top growth was significantly reduced. Increasing the Ca supply eliminated the appearance of the symptoms on the primary leaves and restricted Mg accumulation in the tops, but it did not reduce the accumulation of Mg by the roots." Address: North Carolina State College.

876. Cartter, Jackson L.; Hartwig, Edgar E. 1962. The management of soybeans. *Advances in Agronomy* 14:359-412. [174 ref]
• ***Summary:*** Contents: I. Introduction: World production (958,275,000 bushels in 1960), United States production trends, utilization (processing to obtain oil and meal, hay and green manure). II. Soil and climatic adaptation: Areas of production in the United States, soil requirements, climatic adaptation (effect of temperature on plant growth, effect of temperature on composition of seed, effect of light on plant growth, effect of photoperiod on flowering and maturity, effect of soil moisture on growth). III. Time of planting and varietal adaptation: Effect on plant characters (maturity, plant height, lodging, seed quality, size of seed, seed yield), effect on composition of the seed. IV. Planting methods and equipment: Seedbed preparation (conventional, minimum tillage, deep tillage), row width and planting rate (row width, planting rate), double cropping (after fall-sown grain crops, after peas), special methods of planting, types of equipment. V. Rotation practices and erosion control: Effect on soybean yields, effect on the following crop, effect on weed population, soil residues from herbicides, erosion control. VI. Weed control: Effect of planting time on plant growth and weed competition, methods of cultivation, chemical weed control (pre-emergence herbicides, post-emergence herbicides). VII. Seed quality and seed treatment: Factors affecting seed quality and germination, seed treatment. VIII. Nutrient requirements: Nitrogen requirements and nodulation (effectiveness of nodulation as a source of nitrogen, methods of inoculation, survival of bacteria in the soil, effect of seed treatment on inoculation, effect of nitrogen applications), liming and pH levels (pH and plant development, calcium and magnesium requirements), phosphorus, potassium, trace elements, fertilizer practices and recommendations. IX. Water requirements and utilization: Water needs in relation to plant growth and development, irrigation and soil management. X. Growth-regulating chemicals. XI. Harvesting: When to harvest, harvesting methods. XII. Seed storage. XIII. Discussion. The USA now produces about 57% of the world's soybeans, followed by China (PRC; about 33%), Indonesia, Japan, Korea, USSR, Brazil, and Canada, in that order. By 1920, U.S. production was 3,000,000 bushels and the leading states were North Carolina, Virginia, Alabama, Missouri, and Kentucky–North Carolina producing 55% of the total. By 1931, the center of production had shifted to the North Central States, where it is at present. Address: 1. United States Regional Soybean Lab., Urbana, Illinois; 2. Stoneville, Mississippi.

877. Smith, Richard K.; Fleming, Sophie P.; Betts, Ronald E.; et al. comps. 1962. Agricultural statistics 1961. Washington, DC: U.S. Government Printing Office. 624 p. Index. 24 cm. For soybeans and soy products see p. 136-142, 150, 286, 289-90, 450, 452, 504.
• ***Summary:*** Page 140. Table 205. "Soybeans: Crushings, and oil and meal stocks, production and foreign trade, United States, 1950-1960." Soybeans crushed rose from 251.990 million bushels in 1960 to 401.225 million bu in 1958. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

878. Magee, Aden C. 1963. Biological responses of young rats fed diets containing genistin and genistein. *J. of Nutrition* 80(2):151-56. June. [25 ref]
• ***Summary:*** "Within recent years numerous investigations have been directed towards the detection, isolation, and characterization of naturally occurring plant estrogens. One of these compounds which has been studied is genistin, an isoflavone glucoside found in soybean meal. Genistin and its aglucone, genistein, have been shown to have adverse effects on reproduction, weight gain and the development of several internal organs of young mice." Genistein was isolated from commercial soybean meal that had presumably been heated. Young male rats were fed these plant estrogens for 4 weeks. "A dietary level of 0.5% of genistin or genistein resulted in significant decreases in weight gain and in the weights of the kidneys and spleens. Rats fed diets containing either plant estrogen had liver and spleen iron levels that were significantly higher than those of the controls, but hemoglobin and tissue copper levels were not affected by the feeding of either genistin of genistein. Levels of zinc in the bones and livers of the estrogen-fed rats were higher than the corresponding zinc levels of the controls. Genistin and genistein enhanced the deposition of calcium, phosphorus and magnesium in the bones of young rats. Bone Ca/P ratios were lower in the animals receiving diets containing the plant estrogens."

Rackis (1974, p. 170A) notes: "To obtain an effect from soybean meal equivalent to that observed in the experiments of Magee [1963], soybean meal would have to be the sole constituent of the diet." Address: School of Home Economics, The Woman's College of the Univ. of North Carolina, Greensboro, North Carolina.

879. Morgan, Frederic L. 1963. Bacterial pustule of soybeans. *Soybean Digest.* June. p. 8-9. First of a series on soybean diseases.
• ***Summary:*** "The causal agent of bacterial pustule of soybean was isolated in 1916 by Hedges (*J. of Agric. Research* 29:229. 1929). She named it *Bacterium phaseoli sojense.* Dowson later changed the generic name to *Xanthomonas,* because the bacteria are polar flagellate and produce a yellow pigment. Species and varietal names were retained; the latter indicates that soybean is a host. Therefore, the present name of the pathogen is *Xanthomonas phaseoli* (E.F. Sm.) Dows. var. sojense (Hedges) Starr and Burkh.

"Pustule-producing bacteria can grow to maturity and

divide in about 20 minutes, when they are in a suitable host or substrate. Hence, a large population can develop in a few hours. A single bacterium can infect a leaf. Populations of the bacteria become extremely large during summer in fields of diseased soybeans. Plants become infected during rain storms accompanied by wind. During winter populations decline, but some bacteria survive on seeds and in crop residue. These initiate the disease on susceptible hosts during the following summer.

"Disease Development and Symptoms: Leaf openings called stomates [stomata] which permit gas exchange with the atmosphere also let pathogenic fungi and bacteria enter plants. Pustule bacteria enter leaves this way and multiply between leaf cells of susceptible soybean varieties. After infection has taken place, 5 to 7 days is required for a pustule to form. During this time, leaf cells in the infected area grow larger and divide faster than normal, due to extra-cellular chemicals produced by the bacteria. Increased growth in a localized area and the mass of bacteria cause epidermal expansion of both leaf surfaces. These raised surfaces rupture and become pustules.

"Pustules are reddish or brown elevated spots and usually have narrow yellow halos. The average diameter of a pustule is about 1 mm. When leaves are severely infected, many pustules may fuse and share a common halo. Figure 1 is a photograph of pustules on the lower (A) and upper (B) leaf surfaces of soybean. Wildfire bacteria, *Pseudomonas tabaci* (Wolf & Foster) F. L. Stevens, are frequently associated with pustule lesions and in such cases halos are much broader.

"Yield Reductions: Diseases such as bacterial pustule and wildfire reduce soybean yields, because they destroy part of the food-manufacturing leaf area and cause dropping of severely infected leaves. Reduced leaf area results in insufficient nutrients to produce top yields. The end result is fewer and smaller seeds.

"Data from experiments by Hartwig and Johnson (*Agronomy Journal* 45:22. 1953) in North Carolina and Mississippi indicate that bacterial pustule reduces yield by as much as 8% to 15%. In Mississippi, such yield reductions can be expected in most years, if susceptible varieties are grown. The disease is especially severe in the South, because higher temperatures and more frequent showers during the summer favor growth and spread of the pathogen.

"Varietal Resistance: By 1924, the disease had been observed in most southern states. Late in that decade Lehman and Woodside (*J. of Agric. Research* 39:795. 1929) noted varietal differences in reactions to the disease. In 1943, Hartwig and Lehman observed that the variety CNS was highly resistant to bacterial pustule. CNS was originally selected from the variety Clemson by J.E. Wannamaker in South Carolina. Clemson originated from a soybean line introduced from Nanking, China, in 1927.

"Inheritance of resistance to bacterial pustule in soybean was studied by Hartwig and Lehman (*Agronomy Journal* 43:226. 1951) in North Carolina and by Feaster (*Missouri Agric. Ext. Station Bulletin* 487. 1951) by using CNS as the resistant parent in crosses. They found a single recessive gene responsible for resistance. The resistant gene was transferred to better agronomic lines through hybridization and selection, and today most southern varieties are bacterial pustule-resistant.

"Use of these varieties has eliminated the disease as a hazard to soybean production in the South, but has not eliminated the pathogen. Jones (*Phytopathology* 51:206. 1961) isolated bacteria from diseased red vine weeds, *Brunnichia cirrhosa.* Gaertn., and found they were the same as those producing bacterial pustule on the soybean. This finding demonstrates the pathogen can survive in the absence of soybeans.

"Control: Growing resistant varieties is the only practical means of controlling bacterial pustule. When choosing a soybean variety, the grower should select one with suitable agronomic properties for the locality with resistance to bacterial pustule and as many other diseases as possible. Resistant varieties adapted to the South and ranked according to maturity date are Scott, Hill, Hood, Lee, Hampton, and Hardee. Seed stocks of Clark 63, which is Clark with resistance to both bacterial pustule and phytophthora root rot, are being increased. Clark is a soybean variety adapted to the southern Cornbelt area of the United States."

A photo shows bacterial pustule on the lower and upper surface of soybean leaves. Address: Plant Pathologist, Crops Research Div., Agricultural Research Service, USDA, working in cooperation with the Delta Branch Experiment Station, Stoneville, Mississippi.

880. *Seed World.* 1963. Gleanings for growers: Bragg soyabean. 93(6):14. Sept. 27.
• ***Summary:*** This new soybean variety has been released for growers in South Carolina. Developed by scientists in USDA's Agricultural Research Service in cooperation with experiment stations in South Carolina, Georgia, and North Carolina, Bragg is midway between Jackson and Lee in maturity.

Note: It was probably named after the Confederate General Braxton Bragg.

881. Van Der Jooste, Jasper W.; Moreland, Donald E. 1963. Preliminary characterization of some plant carboxylic ester hydrolases. *Phytochemistry* 2(3):263-71. July/Sept. [23 ref]
• ***Summary:*** Carboxylic ester hydrolase preparations were obtained from acetone powders of soybean seedlings. A phenoxyester (phenoxyesterase) form soybean seedlings differed from enzymes previously described in that it was highly specific for 2-naphthyl phenoxyacetate (NPOA), not inhibited by *p*-chloromercuribenzoate (PCMB), and slightly

activated by diisopropylfluorophosphate (DFP). Soybean enzymes hydrolyzed NPOA more rapidly than 2-naphthyl acetate (NA). Address: Dep. of Crop Science, North Carolina State College, and Crops Research Div., Agricultural Research Service, USDA, Raleigh, North Carolina.

882. Wilber, Robert L. 1963. The leguminous plants of North Carolina. *North Carolina Agricultural Experiment Station, Technical Bulletin* No. 151. 294 p. Sept. See p. 267-69. [50* ref]
• ***Summary:*** This study was begun by Dr. William B. Fox in 1949 and continued until his accidental death in Nov. 1952. It was continued by Robert K. Godfrey. Contains a botanical description and an illustration (line drawing) of *Glycine Max.* Address: Asst. Prof. of Botany, North Carolina State, Durham.

883. Ross, J.P. 1963. Nematodes and soybeans. *Soybean Digest.* Oct. p. 6-7.
• ***Summary:*** "Plant parasitic nematodes annually cause significant soybean yield losses in the United States. Most reports of nematode damage to soybean crops have been from the southern states; however, investigations are currently being conducted in northern areas to determine the extent of nematode damage to soybean production. Aboveground symptoms of nematode damage may be similar to those caused by other conditions that affect the proper functioning of the root system, i.e., nutrient deficiencies, drought, and root diseases. Therefore, nematode damage to soybean plants in many cases is difficult to detect from aboveground symptoms.

"To diagnose nematode damage correctly, close examinations of the root systems are necessary. Since nematode populations vary from very high to very low within relatively short distances (3 to 4 feet) in a field, uneven plant growth usually is noted in infested fields.

"The amount of plant damage caused by parasitic nematodes is affected by factors such as nematode population level, soil type, weather conditions, and soil fertility. For instance, when attacked by certain nematodes, plants growing in deep sandy soils are more severely affected than plants growing in heavier soils. Nematode attacks frequently weaken plants and make them more susceptible to diseases which normally would be unimportant.

"The Sting Nematode, *Belonolaimus,* probably is the most devastating nematode to soybeans in localities where it occurs (fig. 1). It is generally limited to the sandy soils of the southeastern and southern coastal plain. Entire fields of soybeans have been killed shortly after emergence, and relatively low sting nematode populations may cause significant yield losses. This nematode usually does not enter the root but feeds on the root tips and along the sides of young roots. The affected root system takes on a bushy appearance and root tips are short, dark, and swollen (fig. 2). It is believed that plants sustaining sting nematode attack may be more susceptible to diseases caused by other soil-inhabiting pathogens.

"The extremely wide host range of the sting nematode makes its control by crop rotation very difficult. Heavily infested fields often will not support any kind of plant growth since many weeds as well as most cultivated crops are susceptible to damage. This nematode is readily controlled by applications of soil nematocides. However, at present, chemical control is not economically feasible for soybean production. No lines resistant to this nematode were detected in the soybean germplasm in tests conducted in North Carolina."

Note: This is the earliest English-language document seen (Dec. 2016) that contains the word "germplasm"–spelled as one word.

"Root-Knot Nematodes (*Meloidogyne* species) are probably the most widely distributed nematode pest of soybeans. There are at least four separate species of this nematode in the United States capable of inflicting damage to a soybean crop. With one exception (the northern root-knot nematode) these nematodes are essentially hot-weather organisms and are more important in the southern states where the growing seasons are long and the winters short.

"Soybean yield loss caused by root-knot nematodes is closely related to environmental conditions as well as to nematode population levels. Under ideal growing conditions with adequate moisture and fertility, root-knot-affected soybeans may produce good yields. However, when conditions prevail that subject the crop to unfavorable moisture or nutrition, considerable loss in soybean yield may result. Plants infected by root-knot nematodes are more susceptible to diseases caused by root-invading fungi than nematode-free plants.

"The most prominent root symptom caused by root-knot nematodes is the gall. These galls may vary from barely detectable swelling to knots about 2 inches across. Most root-knot nematode species cause large galls. The galls formed by the northern root-knot nematode, however, are very inconspicuous, and many small rootlets develop in clusters around points of nematode infection. Except in the egg stage, the root-knot nematode spends almost all of its life within root tissue. During the feeding process the nematode injects a stimulant into the root cells which react to form the 'knots.' These galls which develop are part of the root and usually have a texture similar to root tissue. The beneficial nitrogen-fixing nodules are easily distinguished from root-knot galls by their spongy consistency and their loose attachment to the root.

"Probably the best method to control root-knot in soybeans is to grow resistant varieties. Since strains of most root-knot nematode species exist resistant varieties are occasionally found to be susceptible. Nonetheless, the resistant soybean varieties are usually of great value on

root-knot nematode infested land. The Hardee, Jackson and Hill varieties have moderate root-knot resistance, and the recently released varieties Delmar and Bethel have excellent resistance to a common strain of root-knot nematode. Although application of nematocides or a dry summer fallow interspersed with occasional cultivation are both effective in reducing root-knot nematode populations, they are not economically feasible for soybean production.

"The Soybean Cyst Nematode (*Heterodera glycines*) is a serious pest first discovered attacking soybeans in the United States in southeastern North Carolina in 1954. Since then it has been found in other areas along the east coast and in six states in and around the Mississippi Delta. Quarantines have been set up in attempts to prevent spread.

"The cyst nematode has been the subject of considerable research at North Carolina State College, Raleigh. Rotation experiments proved that a 3- or 4-year rotation with a nonsusceptible crop, such as corn, cotton or cowpeas, will produce normal soybean yields. A black-seeded, hay-type soybean having high resistance to the nematode was discovered in North Carolina in 1957, and since then an intense breeding program has been conducted to incorporate the resistance into a commercially acceptable variety of the Lee type. All attempts to separate the high level of resistance from the black seedcoat, however, have failed.

"A soybean cyst-nematode resistant breeding line, designated NC-55, which is essentially the Lee variety with a black seedcoat, has been released for research purposes by the North Carolina Experimental Station and the U.S. Department of Agriculture. When grown in infested soil it yields well and is very effective in reducing cyst nematode populations since adult females develop only rarely. It is hoped that this line will provide a starting point from which a yellow-seeded, cyst-nematode-resistant soybean variety will be developed. Breeding programs are also in progress in Arkansas, Missouri, and Tennessee.

"Recent investigations at North Carolina State College have shown that soybeans attacked by the soybean cyst nematode are more susceptible to the Fusarium wilt disease; this disease is usually not a problem in soybean production. The southern stem rot disease (sclerotial blight) has been observed to be more severe in soybean fields where cyst nematodes prevail."

Photos show: (1) Soybean field showing damage caused by sting nematode. (2) Root systems of soybean seedlings showing sting nematode damage. Address: Plant Pathologist, Crops Research Div., Agricultural Research Service, USDA, North Carolina State College, Raleigh.

884. Brim, Charles A.; Ross, J.P. 1963. A cyst nematode resistant soybean strain. A research tool. *Soybean Digest.* Nov. p. 17.

• ***Summary:*** The new strain, designated NC55, is similar to the Lee variety but has a black seed coat. The variety Peking was found to be resistant to the soybean cyst nematode in 1957, but it matures too early for use in the infested area and it shatters badly. Address: USDA, North Carolina College, Raleigh.

885. 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.

886. *Soybean Digest.* 1964. Seed directory (Ad). Feb. p. 26.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Wisconsin, and Ontario (Canada). For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers. Coker's Pedigreed Seed Co. is listed in Hartsville, South Carolina. They sell Coker Hampton, Coker Hampton 266, Coker Stuart, and Coker 240.

887. Williamson, R.E. 1964. The effect of root aeration on plant growth. *Soil Science Society of America Proceedings* 28(1):86-90. Feb. [13 ref]
• ***Summary:*** "Soil aeration is necessary for respiration and for water and mineral absorption by plant roots. Aeration is important for supplying oxygen to the roots as well as for removing carbon dioxide and other toxic substances. Drainage to remove excess water from land provides a well-aerated upper layer of soil for good root growth.

"The aeration requirements for most field crops probably do not vary widely. However, it appears that different species have a different limiting aeration requirement... Also, the oxygen requirement varies with the stage of plant development and generally increases with increase in temperature." Address: USDA; North Carolina Agric. Exp. Station, Raleigh.

888. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1964. Results of the Cooperative Uniform Soybean Tests, 1963: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 218. March. 124 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/63soybook.pdf
• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Crops Research Division, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII.

The Introduction begins: "The program of the U.S. Regional Soybean Laboratory has been directed toward the development of improved strains of soybeans and the obtaining of fundamental information necessary to the efficient breeding of strains to meet specific needs. In the Southern Region, fundamental studies and breeding programs are conducted at three locations, Stoneville, Mississippi; Raleigh, North Carolina; and Gainesville, Florida. After promising new strains are developed at these breeding centers, or by any other cooperating agency, they are advanced to the preliminary and uniform regional tests, conducted in cooperation with the Southeastern States, This testing program enables the breeder to evaluate new strains under a wide variety of conditions, and permits new strains to be put into production in a minimum amount of time.

"Ten uniform test groups have been established to

evaluate the better strains developed in the breeding programs. The Groups 00 through IV are adapted in the northern part of the United States, and the Group IV through VIII are grown in the southern part. Within their area of adaptation, there is a maturity range of 12 to 18 days within each maturity class. The best standard variety available of each maturity class is used as a check variety with which to compare new strains as to seed yield, chemical composition, maturity, height, lodging, seed quality, and reaction to diseases. For the groups grown in the southern area, the check varieties are Kent, Hill, Hood, Jackson, and Bienville. At Stoneville, Mississippi, where all maturity classes will mature, the approximate maturity dates of these varieties when planted during the first half of May are: Kent, September 8; Hill, September 20; Hood, October 8; Jackson, October 25; and Bienville, November 1." Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

889. *Soybean Digest.* 1964. Seed directory (Ad). March. p. 40.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Wisconsin, and Ontario (Canada). For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers. Coker's Pedigreed Seed Co. is listed in Hartsville, South Carolina. They sell Coker Hampton, Coker Hampton 266, Coker Stuart, and Coker 240. Is this the earliest listing seen for Coker (South Carolina) in this directory.

This directory also appears in the April 1964 issue (p. 38).

890. *Soybean Digest.* 1964. North Carolina breaks 60-bushel barrier again. June. p. 18.
• ***Summary:*** "For the third time in 4 years the 60-bushel barrier in soybean production has been topped by North Carolina farmers, according to the *Southern Planter.*

"Russell Brock, Rt. 2, Mount Olive, has been named North Carolina soybean growing champion for 1963 with a yield of 60.1 bushels per acre. His was the only 60-bushel yield officially recorded in the state during the past growing season. Thus, he earned membership in the state's exclusive "50-Bushel Soybean Club" with bushels to spare.

"The state record of 62.4 bushels per acre was recorded in 1961.

"The runner-up in the annual contest was Joe Ratcliff, of Pantego, with a yield of 54.1 bushels per acre. Ratcliff was the state champion in 1962 with a yield of 53.4 bushels. Second runner-up was Harold Gregory, of the Gregory Community, Currituck County, with a yield of 53.7 bushels. Sam Ward and Joe Maxwell, Cherokee County, were the District III winners with a yield of 48.9 bushels per acre.

"A total of 40 people entered the contest last year with an average yield of 44.8 bushels per acre being produced. The state average is 24 bushels per acre.

"Brock is the first farmer outside of northeastern North Carolina to win the contest since it was started in 1960 by the Agricultural Extension Service to promote good soybean production practices. He planted the Lee variety in late May in 40-inch rows. He limed at the rate of 2,000 pounds of lime per acre as recommended by a soil test. No fertilizer was recommended, but he used 500 pounds of 5-10-10 per acre at planting. The soybeans were cultivated twice with a rotary hoe and once with shallow sweeps. They were sprayed with a combination of DDT and toxaphene to control corn earworms in late summer.

"Joe Ratcliff, while placing first in 1962 and second in 1963, followed almost the same management practices. He planted the Lee variety in the middle of May using about 240 pounds of 2-12-12 fertilizer per acre. A soil test showed the lime content of his soil satisfactory. His weed control was good.

"Both Mr. Ratcliff and Mr. Brock averaged over 40 bushels per acre on nearly 200 acres of soybeans planted in 1963."

891. Frederick, Lloyd R. 1964. Latest developments in soybean inoculation. *Soybean Digest.* Sept. p. 63-65.
• ***Summary:*** "Inoculation of soybeans by rhizobia, the nodule bacteria, has been a tremendous success. Naturalized strains of rhizobia are found in most soils where the soybean has been grown for a period of years. The unique ability of nodulated legumes to use nitrogen (N_2) from the air has helped give the soybean its prominent place in U.S. agriculture.

"We, along with researchers in other places, are trying to narrow the 'knowledge gap' about soybeans and inoculation. How do rhizobia enter the plant and cause nodules to form? Why are some strains of rhizobia more infective and effective than others? What kind of rhizobia have become naturalized in our soils? Can superior rhizobial strains be established in the nodules of soybeans when other rhizobial strains are present in the soil? How can inoculation level be evaluated? Many other questions arise, but our considerations will be limited to a few aspects of soybeans and inoculation.

"How do rhizobia infect a plant and cause the formation of a nodule? Only certain rhizobia infect certain legumes, that is, there is a very specific relationship between legume and rhizobium. Rhizobia which nodulate soybeans are commonly called soybean rhizobia and have the scientific name, *Rhizobium japonicum.* These may have many strains which vary in infectiveness (ability to form nodules) and effectiveness (ability of nodules to fix N, for plant use).

"The rhizobia multiply and develop along the growing root. So do many other bacteria. In some legumes, a curling of the root hair cells has been observed as the first sign of rhizobial infection. A growth-promoting substance, indoleacetic acid (IAA), can be formed by rhizobia. IAA has also been thought to cause root hair curling. IAA may play a role in infection, but that role is not yet clearly defined. Swedish workers, especially Fahraeus and Ljunggren, have found that some legume roots make an enzyme, called polygalacturonase, when they are in the presence of the carbohydrate capsular material formed by the rhizobia. Since root cell walls also contain carbohydrates of this type, this pectic enzyme could result in softening of the root cell wall which could allow the rhizobia to enter the root. This idea seems promising, but the intriguing mystery of the infection of the root by rhizobia is still essentially unsolved. More knowledge about the mechanism of infection could result in more effective inoculation. We hope to learn a great deal more about the plant's role in infection and nodulation.

"The bacterial part of this partnership has been known less than a hundred years. When the soybean was introduced into the United States, inoculum was necessary to establish nodules on the plant because no rhizobia of the right kind were present. Today, we find naturalized strains of rhizobia in most soybean-growing areas.

"To find out more about these rhizobia, some way of identifying them quickly had to be used. A serological technique was used. The rhizobia were injected into the vein of a rabbit, whose blood then formed antibodies which reacted with the rhizobia that were injected, but not with other rhizobia. If a suspension of rhizobia cause a precipitation with the serum from the rabbit blood, these rhizobia are in the same serological group. Through the leadership of Dr. H.W. Johnson, and co-workers at Beltsville, the soybean rhizobia had been placed into numbered serological groups. Different serological groupings of rhizobia in soils of Iowa, Maryland, Mississippi, and South Carolina were found by USDA workers.

"Dr. Damirgi, while at Iowa State, did a more detailed study of the rhizobia in Iowa soils. Serogroup 123 was dominant in most soils without free lime in the surface (pH less than 7.8), was present in 21% to 92% of the soybean nodules from different soils, and was present in an average of 52% of the soybean nodules tested. Dr. Damirgi discovered a new serogroup, now called 135, which occupied 60% to 90% of the nodules in Iowa calcareous soils. Most of the nodules in Iowa were infected with one of four serogroups: 123, 135, 31 and 3. Serogroups 3 and 31 were found in small percentages in many soils. In one field, samples of soybean nodules were taken every 30 feet along a slope where the pH changed from 5.6 to 8.3. In the samples from soil having a pH less than 7, serogroup 123 was found in most nodules (60% to 95%). Less than 100 feet away, in calcareous soil with a pH about 8, 75% to 90% of the nodules were infected with serogroup 135. While the pH of the soil had a marked effect on 123 and 135, other soil factors which may affect the dominancy of a serogroup need evaluation.

"Influence of Variety: The host variety has an influence on both the infectiveness and effectiveness of the rhizobia. Many of you are familiar with the work Dr. C.R. Weber has done in developing soybean isolines for nodulation which are genetically alike except that of a pair the susceptible one will nodulate and the resistant one will not nodulate under field conditions. These nodulating and nonnodulating isolines offer a unique tool for measuring symbiotic relationships which were heretofore difficult to assess. An example is the use of a pair of isolines at Ames to determine that about 3 pounds of fertilizer were needed to give an increase of 1 pound of nitrogen in the soybean plant. Use of these soybean isolines also may yield the key to resistance and susceptibility of legume plants to nodule formation. Elkan and his co-workers at North Carolina have found that the microbial flora around the roots are different for each member of the isoline pair. Growing the pair in close proximity reduced the nodulation of the susceptible isoline. Roots of the resistant isoline excreted materials which changed the rhizobia to the noninfective bacteroid form. Clark showed that grafting did not change the susceptibility of the root to nodulation. On the other hand, the rhizobial strain does affect the nodulation response. While many rhizobial strains effectively nodulate the susceptible soybean isoline, only a very few strains have produced nodules on the resistant isoline in sand culture, and nodulation has not been found on the resistant isoline in field soils.

"Apparently, serogroup 123 is not only effective but also very competitive in infectivity for most of the soybean varieties currently used in Iowa. Rhizobia in serogroup 3 and 123 were mixed in the initial inoculum for Hawkeye in ratios of 10:1, 1:1 and 1:10. Serogroup 123 was found in half or more of the nodules with all these ratios. At the present time, we can say that there are some real interactions between host variety and rhizobial serotype, but the causes of these relationships remain to be determined.

"We've been talking about soybeans. And inoculation. Inoculation of a legume should result in effective nodules on the legume. Today, inoculated rhizobial strains must possess superior infectivity and effectivity to be of value. Inoculation should be evaluated by proper tests. What do the tests for inoculation mean? In the common, grow-out test, several seeds are planted in sand in a container; the plants are grown in a greenhouse or growth chamber. A positive test for inoculation with rhizobia is obtained if the four- to six-week-old plants have nodules and good growth with dark green leaves. We were surprised to find that a positive test really means only that at least one seed carried a few rhizobia per seed. We have repeatedly found all plants nodulated even if only one seed carried rhizobia. Apparently, this result is obtained because of transfer of rhizobia from one plant to

another in the sand culture. (This transfer of inoculum in sand culture is probably due to multiplication of the rhizobia and their movement through the medium. The transfer of rhizobia in field soils probably would be much more limited.) Much better information on the level of inoculation can be obtained if seeds are grown in separate containers. With such a test, by proper dilution, the number of effective rhizobia per seed can be determined.

"Today's Problem: Today, the inoculation problem is not simply one of providing a compatible rhizobium for soybeans in a soil which has no soybean rhizobia present. Instead, we are faced with the challenge of providing superior strains in the inoculum and inoculating in a manner which will establish those strains in the nodules. Recent work by Johnson, Means and Weber indicated that the usual inoculation techniques generally were not very effective in establishing new strains in the nodules of soybeans grown in field soils containing naturalized rhizobia. Inoculation with certain strains of rhizobia, however, nearly always resulted in an increase of that strain in the nodules. Increasing the amount of inoculum, the use of stickers (sugar, gum arabic, honey, other additives) and time of inoculation showed promise of increasing the effectiveness of inoculation, but much yet is to be learned about inoculation under today's conditions.

"Infective and effective Rhizobium japonicum can supply soybeans with abundant and economical nitrogen from the air (N_2). Improved methods of inoculation with superior, selected strains of rhizobia may well be one of the simplest and most economical ways of increasing yields of soybeans."

A photo shows Lloyd Frederick. Address: Dep. of Agronomy, Iowa State Univ., Ames, Iowa.

892. Hinson, Kuell; Hartwig, E.E. 1964. Bragg and Hardee soybeans. *Crop Science* 4(6):664. Nov/Dec. [2 ref]
• ***Summary:*** Gives details on the following soybean varieties: Bragg (Reg. No. 43), Hardee (No. 44). Bragg was released in 1963 in North Carolina, South Carolina, and Georgia.

Note: Most of the soybeans that Hartwig released were named after Civil War generals. Braxton Bragg (1817-1876) was one of only 8 men who reached the rank of full general in the Confederate army. Address: 1. Geneticist; 2. Research Agronomist. Both: Crops Research Div., ARS, USDA, Gainesville, Florida, and Stoneville, Mississippi.

893. Nichols, Thomas Everett, Jr. 1964. Interregional competition in the soybean crushing industry with particular attention to the southeast. PhD thesis, Duke University. 167 p. Page 2798 in volume 25/05 of Dissertation Abstracts International. *
Address: Duke Univ., Durham, North Carolina.

894. *Soybean Digest.* 1965. Seed directory (Ad). Feb. p. 39-40.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, South Carolina, Tennessee, Texas, Wisconsin. For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

Commonly sold varieties are: Adams, Amsoy, Bragg, Chippewa 64, Clark 63, Custer, Dare, Davis, Ford, Hampton, Hardee, Harosoy 63, Hawkeye, Hawkeye 63, Hill, Hood, Jackson, Kanrich, Lee, Lindarin 63, Merit, Ogden, Pickett, Rebel, Semmes, Shelby, and Wayne.

Proprietary varieties include: Hale 7, from Hale Seed Farms, Burdette, Arkansas. Bellatti-L263, from Louis Bellatti, Mt. Pulaski, Illinois.

895. *Soybean Digest.* 1965. Corn and soybeans in North Carolina future. Feb. p. 21.
• ***Summary:*** "A large part of the future of North Carolina agriculture lies with corn and soybeans, a Wilson, N.C., grain merchant says. He is Raeford Flowers, branch manager for Cargill, Inc., one of the world's largest grain companies.

"Mr. Flowers, pointing to steadily increasing yields and production in the two crops, said that, as tobacco acreage allotments are cut back (there was a 10% cut in the 1964 crop), more and more North Carolina farmers will 'realize the opportunity offered by corn and soybeans for replacing this lost income.'

"He said U.S. Agriculture Department figures bear out what he called a 'continuing agricultural revolution in the state–particularly in the Coastal Plain.'

"The state's growth in soybeans has been spectacular, Mr. Flowers said. He noted that the North Carolina average yield of 26 bushels an acre is more than 3 bushels over the national average and well above four major soybean producing states of the mid-west–Ohio, Minnesota, Missouri and Kansas.

"'Of course, weather conditions have been very favorable this past year, but that fact certainly doesn't have anything to do with the continued growth in these crops over the past 6 or 7 years, because they weren't all good years,' he said."

896. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1965. Results of the Cooperative Uniform Soybean Tests, 1964: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 221. March. 132 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/64soybook.

pdf
• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Crops Research Division, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII. Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

897. Greer, H.A.L.; Anderson, I.C. 1965. Response of soybeans to triiodobenzoic acid under field conditions. *Crop Science* 5(3):229-32. May/June. [9 ref]
• ***Summary:*** The authors report a favorable response of soybeans to TIBA (2,3,5 triiodobenzoic acid) under field conditions. Note: Following this report, much research activity and recent commercial sales of this growth regulator have occurred in the indeterminate (Northern) soybean-growing regions. Address: 1. Former Research Associate, now Instructor, Appalachian State Teachers College, Boone, North Carolina; 2. Associate Prof. of Agronomy and Botany, Iowa State Univ; Iowa Agric. Exp. Station, Ames.

898. Winters, Rhett Y. 1965. Charles William Dabney: Educator, administrator and scientist. *North Carolina State University at Raleigh, School of Agriculture and Life Sciences, History Series.* No. 2. 23 p. July. [6 ref]
• ***Summary:*** A oval portrait photo inside the front cover shows Dr. Dabney. The following biographical sketch was written by Dr. J.D. Eggleston, President Emeritus of the college. He viewed Dabney as a "specific shining example of a college product."

Dabney was born in Hampden-Sydney, Virginia on 19 June 1855. He graduated at Hampden-Sydney College in 1873 with the degree of Bachelor of Arts. In order to have funds to enter the university, he taught at a country public school, where he prepared boys for college.

"Following the war of 1861-65, and the depleting days of Reconstruction, the South was financially prostrate. Young Dabney's father, a minister and classical scholar, who had been Stonewall Jackson's Chief-of-Staff, and Dr. L.L. Holliday, his science teacher at Hampden-Sydney, impressed upon the young man the necessity for upbuilding the South by the development of its material and human resources. He therefore determined to specialize in the natural sciences, to which he had had only an introduction at Hampden-Sydney.

Starting in 1874: "He spent three years at the University of Virginia, studying chemistry, physics, and mathematics. He was fortunate in having as his teacher in chemistry the famous John W. Mallet (an Englishman who had studied in Germany and who had introduced laboratory work at the University). As Dabney intended to study in Germany he studied French and German under Schale de Vere, who spoke both languages. Diplomas not being given at that time, he received certificates of graduation in all these subjects. To prepare himself for public speaking, he did active work in the Jefferson Literary Society, as he had done at Hampden-Sydney.

"After one year of teaching the sciences at Emory and Henry, Virginia, where he introduced laboratory work in chemistry and physics, he studied at the University of Gottingen and during the holidays, attended lectures at Berlin, under Friedrich Woehler [lived 1800-1882], then considered the foremost chemist in Germany; under Hoffman, under Von Helmhotz and under Du Bois Reymond. With great physical strength and health, with a mind as strong as oak, he put forth his utmost efforts to improve every minute in his studies in organic and inorganic chemistry; in mineralogy, and gave time to the study of agricultural chemistry. He took his degree of Doctor of Philosophy, magna cum laude, in two years.

"In Europe Dabney had visited and studied at the Agricultural Institute in Goettingen and had added to his knowledge of scientific field work in agriculture by studying the reports of the Director of the Rothamsted Farm in England." (1)

"Charles Dabney returned home to pursue the purposes outlined by his father and teacher. There were few men in this country with such basic training in the sciences relating to agriculture at that time and few positions for such men except as professors in a small number of institutions of higher learning. Industries had not yet learned the value of such men and salaries were very low. Few public leaders and very few politicians were aware of the opportunities for improving agriculture through the application of the natural sciences. Some thought the hoe and the plow more important instruments than the test tube for solving problems of the farmer.

"In North Carolina public and political opinion invisioned [envisioned] the new land grant college as a trade school for farmers and mechanics. But President Battle of the University called attention to the need for higher education for farmers which would lead them to take their positions with other learned professions such as doctors and lawyers. (2)

Also contains detailed sections on Dr. Dabney as: The Educator (In 1887 he went to Knoxville to take charge of the University of Knoxville. He established a new vision of the goal of education in the South, and one that was pursued). The Administrator. The Scientist. The Man.

Page 21: "The soybean received its first study at this station, as to varieties, soil, fertilizers, cultivation, and yield. Chief interest in the bean at this time was as a livestock feed

and parts of the plant were compared with cow peas and other fodders." Note 1. In the Station's 1883 Annual Report, Dr. Dabney wrote a detailed section titled "The soja bean–*Soja hispida"* (p. 116-27).

Note 2. This 1883 Report is the earliest scientific publication seen on the soybean in North Carolina (May 2017) and the earliest publication seen on soybeans from a North Carolina Agricultural Experiment Station. It is also the earliest document seen (May 2017) that clearly referred to the cultivation of soybeans in North Carolina. This document contained the earliest clear date seen for the cultivation of soybeans in North Carolina (1882).

Dr. Dabney saw the need for establishing a separate land-grant college in North Carolina, apart from the University in Chapel Hill, and took an active role among the leaders of the state who promoted the approval of the legislation of 1887 to establish in Raleigh the North Carolina College of Agriculture and Mechanic Arts (known today as North Carolina State University). In fact, in early 1887 he wrote the bill that established the college. The bill was enacted into law on 3 March 1887 and the college opened on 3 Oct. 1889. Dabney Hall, which houses the Department of Chemistry, was later named in his honor.

Dr. Dabney did not remain in the state to see the opening of A&M on October 3, 1889. In 1887 he became President of the University of Tennessee (Knoxville) and served there until 1904. "While serving as president of the University of Tennessee, Dr. Dabney accepted President Grover Cleveland's appointment as Assistant Secretary of Agriculture and was granted temporary leave from the University [he was gone from 12 Dec. 1893 to 27 March 1897]. When McKinley succeeded Grover Cleveland as President [in 1897], he invited Dr. Dabney to remain as Assistant Secretary, and as an added inducement the appointment carried the title Director of Scientific Research with continuing status when new administrations came into office." While serving as Asst. Secretary of Agriculture, Dabney introduced soybeans to Seventh-day Adventist soyfoods pioneer Dr. John Harvey Kellogg of Battle Creek, Michigan.

From 1904 until 1920 Dr. Dabney was President of the University of Cincinnati. Honorary degrees were conferred upon Dabney by Davidson College in 1899, Washington and Lee University in 1900, Yale University in 1901, Johns Hopkins University in 1902, and the University of Cincinnati in 1937.

Note 3. Dr. Dabney died on 15 June 1945 (Friday) of acute coronary thrombosis at age 90 in a hospital in Asheville. He was buried in Cincinnati, Ohio. He was survived (in 1945) by two daughters, Mrs. Alexander Thompson and Mrs. John Ingle. For about 3 years Dr. Dabney had maintained a summer home in Montreat, near Asheville, North Carolina. During the winter, he resided at Winter Park, Florida, and was en route from there when he suffered the fatal attack. Address: Director, North Carolina Agric. Exp. Station, 1925-1937.

899. Byrd, Tom. 1965. Pioneer agronomist saw soybean potential in state [Charles Burgess Williams]. *News and Observer* (*Raleigh, North Carolina*). Aug. 16. p. 17.
• ***Summary:*** "What satisfaction C.B. Williams would probably get if he could ride across the green fields of North Carolina today!

"On almost every farm, he would see evidence of a dream come true.

"Charles Burgess Williams was a man who in one respect lived before his time. He had a vision for the farmers of North Carolina and that vision centered around the soybean. He promoted the soybean for more than 50 years. And at time of his death, it looked as if much of this effort had been in vain.

"Flourishing: But now the story is different. The soybean has taken hold. It is growing, flourishing, and, in fact, providing one of the brightest spots in the nation's agricultural economy.

"C.B. Williams (1871-1947) earned many distinctions in life. Born at Shiloh in Camden County, he was a member of the first class at North Carolina A. and M. College, now N.C. State University at Raleigh. He was captain of the university's first football team, its first instructor in chemistry, its first head of the agronomy department and its first dean of agriculture.

"All told, he was to serve the university for 53 years, a record that is yet to be equalled. It is said that in his prime he knew more about the crops and soils of North Carolina than any other man. Williams Hall, the university agronomy building, is named for him.

"Almost Alone: It was the soybean, however that was to occupy a special place in the life of this pioneer agronomist. He became convinced early in his career that the soybean was one of the most valuable plants ever to come to North Carolina. At that time, Williams stood almost alone in his convictions; his was a voice in the wilderness. Few trained agronomists, even in the U.S. Department of Agriculture, had yet seen the potential of this plant. Williams saw that all new introductions of soybeans were tested in North Carolina. he conducted variety demonstrations, fertilizer demonstrations and breeding work. He wrote pages of copy for newspapers and farm Magazines extolling the virtues of soybeans. He used the old Farmers' Institutes and their successors as part of his campaign.

"Not only did he encourage farmers to grow soybeans, but he urged oil mills to buy the beans for crushing purposes, and he made suggestions to manufacturers about using the beans for varnishes, paints and other purposes.

"The late Frank Jeter, who was associated with Williams for 40 years, once wrote in his capacity as agricultural editor at N. C. State: "'Many a time, I have seen the learned

agronomist crunching a bit of cracker or cookie made from soybean flour... He claimed it was delicious. Perhaps if he had let his claim remain at 'nourishing' and left off the matter of taste, he would have been more successful in having soy flour adopted as a staple item of diet.'

"Williams' interest in soybeans probably stemmed from his boyhood days on a Camden County farm. The plant had been brought into the area a few years before. Williams himself once said that the first soybeans coming to North Carolina had been brought to Hyde County about 1870 by an old sea captain from the Orient. They later spread to other coastal locations. Growers called them 'Japan,' 'coffee berries' and other names.

"In a way Williams was successful with his promotional campaign. North Carolina adopted the soybean for a brief period. Some new verities were originated; studies were made as to shattering; the two-wheel mechanical soybean harvester was invented; and the place of the bean in crop rotations was investigated.

"First Oil Plant: A significant milestone was reached on Dec. 13, 1915. On that date the Elizabeth City Oil and Fertilizer Company changed over from crushing cottonseed to crushing soybeans. This was the first commercial manufacturer of soybean oil and meal in the United States.

"But then trouble set in. As soybeans began to spread from the coastal lowlands, tobacco growers said the land was made too fertile by the legume. Other kinds of troubles seemed to follow the bean when it was planted for a number of years on a farm. Tobacco growers did not know about crowding more plants on the more fertile soil or balancing the increased nitrogen, with more phosphate and potash.

"So soybeans lost favor in North Carolina. The Midwest took them on.

"Editor Jeter observed shortly after Williams' death in 1947: 'He was not a man who could be rushed into rash statements (about) his convictions... I think... he... (was) somewhat disappointed in his fellow North Carolinians who would not see in the soybean the crop what he believed it to be.'

"Large Acreage" If only Williams could have lived a few more years! The tide had already begun to turn by 1947. Soybeans were coming back to North Caroline in a manner that probably would have exceeded his fondest dreams.

"This year, Tar Heel farmers are expected to plant nearly 900,000 acres of the crop. Only tobacco and cotton will bring them more cash income.

"Nationally, the soybean has become the country's greatest oilseed crop. It has overtaken such traditional crops as wheat, cotton and tobacco as America's chief earner of dollars in the export market.

"Production continues to expand. Prices remain good. There are no burdensome surpluses. Truly the soybean is an abnormality in this area of farm plenty.

"Many Uses: Williams' dream of soybean cookies and soybean flour for human consumption has not materialized, at least not in the United States. But it is doubtful if many Americans go through many days each year without using a soybean product.

This versatile little legume now provides about two-thirds of all domestic vegetable oil From this oil comes such things as margarine, shortening, salad dressing, paints, detergents and industrial chemicals. About three-fourths of all oilseed meal for livestock and poultry comes from the soybean. Separated soybean protein is used in such things as adhesives, paper coatings, textile sizing and other manufactured products.

"And looking to the, future, scientists see in the soybean the hope for getting more protein for the half-starved peoples of the world."

900. Brim, C.A.; Ross, J.P. 1965. Pickett, a cyst nematode resistant soybean. *Soybean Digest.* Aug. p. 16-17.
• ***Summary:*** "Pickett, the first yellow-seeded soybean variety resistant to the soybean cyst nematode (*Heterodera glycines*), was released by the crops research division, Agricultural Research Service, and the agricultural experiment stations of Arkansas, Missouri, North Carolina, Tennessee, and Virginia on July 1... Pickett is very similar to the variety Lee." Address: ARS/USDA, North Carolina State Univ., Raleigh.

901. Grace, Clara Fouts. 1965. Fouts family history. 3 p. Aug. Unpublished typescript.
• ***Summary:*** "The genealogical research for this history was done by Helen Bridge Thurman. Bits of history were recorded by Solomon Fouts, my father, concerning his experiences during his lifetime. Since I am the only survivor of his immediate family, I have tried to assemble these facts into a simple story concerning one of the early settlers of this wonderful country of America." Clara Fouts Grace, the author, was born on 29 Aug. 1878. At the time she wrote this, she lived in Fort Wayne, Indiana. She died on Labor Day [the first Monday in September = Sept. 5] of 1965.

In 1727 Baron [sic] Hans Michel (John Michael) von Pfoutz brought his family to American from Germany on the ship William & Sarah. His name was later shortened to Fouts. There were five in the family: John Michael, his wife Catherine, and three children: John, Frederick, and Margaret. The family settled in a valley in Pennsylvania, between the Juniata and Susquehanna Rivers. They were the first settlers and the valley came to be named Pfoutz Valley. The old homestead property was sold in 1860. Margaret married Andrew Hoover and moved to Randolph County, North Carolina. Her most famous descendant was Herbert Hoover, 31st President of the United States. John Pfoutz also went to Randolph County in 1756, taking with him his five year old son, John Andrew. John Andrew's son, Frederick, was born on 27 June 1772. Frederick's son, Noah, was born on 27 March 1801, in North Carolina. His family moved to

Montgomery County, Ohio, in 1802. There his son, Solomon, was born on 16 Dec. 1826. He moved his family to Indiana in the fall of 1833.

There follow lengthy excerpts from Solomon Fouts' Reminiscences of the Early Settlement of Carroll and Cass Counties–including the great meteor shower of 1833, killing snakes, meetings with Indians in a canoe, making clothes from flax. "In the winter of 1837-38 Noah and a neighbor, Joseph Neff, sold their land at a good profit and moved their families east of the Michigan Road about 3 miles, on what was then known as the Miami Reserve, secured from the Miami Indians in the Treaty of 1826, and ceded to the State of Indiana to construct a canal. They were the first white settlers in Deer Creek township, Cass County, Indiana. With the assistance of a surveyor they got suitable locations near together, for mutual protection. Mr. Neff moved March 26, 1838. Noah's family moved March 28." The winter of 1842-43 was long remembered by the older settlers as being very long and cold.

"I do not have any dates for the time that Solomon's family lived in Deer Creek township, but my memory leads me to believe that seven of the nine children were born during that period; the second child, Judson, died when he was about six months old. She also does not recall the date when Solomon purchased the farm of his father-in-law, James Bridge; this farm was located on the west side of the Michigan Road, a mile south of the village of Deer Creek. There he built his dream house, a two-story brick. "To anyone who had lived in log cabins and frame houses all his life, this building would be a mansion. The brick was made on the location."

The history ends: "I have no date for the building of the permanent house of Solomon and Margaret Bridge Fouts, but I believe it was in 1876 or 1877. It was a beautiful show place along the Michigan Road. The yard had some unusual trees that I shall always remember. There were two tall cedars and on each side of these were two smaller cedars of a different variety, with branches clear to the ground. Aside from the maples and elms there was a tamarack tree that Grandfather Bridge had driven north of Logansport to find. A trumpet vine found its way to the top of the tree, making it beautiful to behold.

"My father and mother lived happily in this home for thirty some years. They both died there. All the daughters of the family were married in the home. My brother Taylor and I were the only ones born there. The house was destroyed by fire on March 5, 1929."

On the bottom half of the third (last) page is an illustration of a lovely country estate, with a 3-story mansion surrounded by tall trees, a large barn to the far left, and several people in a carriage pulled by one horse in the foreground. Talk with Mara Bowman Hendress (Taylor Fouts' granddaughter). 1999. March 27. This illustration shows the permanent house of Solomon and Margaret Fouts,

built in about 1876 or 1877. It later became the main home of Taylor Fouts and his family. Its main house burned on 5 March 1929; Taylor and one hired man rebuilt a new but smaller house atop of the foundation and basement of the one that burned. The barn burned in about 1978. A second barn (the one on which "Soyland" was written) is not visible; it would be behind the trees, between the main house and the barn. The conical shaped tree to the right of the main house is a tamarack; it is now huge. The main house is now located about 50 feet from a major highway–State Road 29.

Note 1. In 1975 John Scott Davenport, a university professor and expert genealogical researcher, wrote an excellent article titled "Earliest Pfautz / Fouts families in America" in the *National Genealogical Society Quarterly* (Dec., p. 243-58). He followed this in 1982 with a letter to the Fouts family in Indiana. He argued convincingly that parts of the early lineage of the Fouts family genealogy, as Helen Bridge Thurman had researched and recorded it, were incorrect. Hans Michael was not a "Baron" and the relationship of this Fouts family to the ancestors of President Herbert Hoover is confused.

Note 2. According to a 1980 letter to Jeanette Helms from the County Clerk, Perry County, Pennsylvania, the Pfoutz Valley still exists outside of Millerstown, Perry Co., Pennsylvania. Address: Fort Wayne, Indiana.

902. Howell, R.W. 1965. Current soybean production research. *Soybean Digest.* Sept. p. 25-26.

• ***Summary:*** "The cooperative soybean research program of the U.S. Department of Agriculture and the state experiment stations has been discussed at your last two meetings by Dr. Herbert Johnson and Dr. Marion Parker. You are aware from their talks that resources (funds) for soybean production research have been increased in recent years. Dr. Ennis has discussed the increased emphasis on weed and nematode control in soybeans.

"Additional resources that became available for soybean research in the fiscal year 1965 enabled us to expand our work on breeding, diseases, and physiology to improve yields, crop quality, and efficiency of production. About half of these new resources were devoted to expansion of work

in our own fields and laboratories, and about half for work under contract with other research agencies. In strengthening our own so-called 'in-house' program of research we are providing our first laboratory and greenhouse facilities for work on nodulation and on physiology of the soybean plant at Beltsville.

"Dr. B. E. Caldwell is succeeding Dr. Herbert Johnson in our research on nodulation. One of the serious limitations on practical exploitation of the nodulation work has been difficulty of establishing a new strain of rhizobia in a field with an existing population. Inoculation techniques are being studied and there is some reason for encouragement, although there are many complexities related to soil types, to interactions of soybean and bacterial genotypes, and to methods of applying the inoculum.

"Last fiscal year we negotiated cooperative agreements with three universities for soybean research with the following objectives:

"1–The University of Missouri will develop cyst nematode-resistant varieties for the Midwest. These varieties should become available faster than the nematode spreads into new areas, if the rate of spread is not greatly increased.

"2–North Carolina State will conduct research on photosynthesis, and a comparison of varieties for differences in efficiency of photosynthesis. Many separate pieces of evidence point to variables in photosynthesis as significant in crop production, and we expect to place substantial emphasis on basic studies in this area in the future.

"3–Purdue University will conduct research on nucleic acids in soybeans, with particular attention to comparisons in high protein and normal types. Nucleic acids are the biochemical carriers of inheritance and they are key participants in protein synthesis. This work may have general implications contributing to all phases of our work.

"In addition to resources for these activities we received funds for a study of mycotoxins in soybeans. Agreements have been made with Iowa State University and Virginia Polytechnic Institute for identification of molds and assay of the toxin hazard. We are collecting samples of many soybean varieties each week during seed development and for several weeks after maturity at locations in all soybean producing areas for use in this study.

"Further Problems: Geo. M. Strayer has asked me to comment on problems requiring further effort, and on our plans for attacking these problems.

"Soybean production problems come down to increased yields. This is our No. 1 objective. But we are continually diluting this effort because of the necessity of attacking related problems. For example, emphasis in recent years on getting good Phytophthora-resistant varieties has delayed the introduction of Phytophthora-susceptible varieties. Development of a cyst-nematode-resistant variety required many man-years.

"Our rate of progress is largely a question of manpower. Our scientists almost always have been short of adequate help. We are now able to increase support of our scientists with more subprofessional help and, at some locations, additional facilities. We have not yet achieved the emphasis on plant physiology that is needed. We plan to employ a physiologist to work specifically on photosynthesis. This will be related to the work in North Carolina but will not duplicate it. We plan to establish at least two and possibly three other scientific positions. Final arrangements have not been made as to the exact programs or location of these positions. However, there is need for a plant breeder for the Delta area (this is more urgent since Dr. Matson resigned from the Portageville, Missouri, station), a pathologist, and/or a breeder to be concerned with improvement of seed quality. Other professional positions are being considered.

"Our contract funds in 1966 and later years will be used for specific projects by which useful information can probably be obtained in 2 to 5 years. We will continue to invite agronomy and plant pathology departments and other research organizations to make proposals. We received more good proposals than we could support last year.

"Many New Varieties: The recent increases in our funds have enabled us to initiate work in several scientific areas and to increase effort in others. The results will be reflected in improved soybeans for the farmer in the future. It is significant that 1965 has seen the largest number of new varieties from the cooperative USDA-state experiment station program that we have ever released in 7 years.

"Enumerating these chronologically in the order of release, Traverse variety was released with Minnesota and adjoining states last spring. This variety with a colorless hilum has been developed especially for the export market and represents a tangible result of the increased support of soybean research in Minnesota for the last few years.

"Pickett has been released with North Carolina and several other southern states as a variety resistant to the soybean cyst nematode. We think this will take the heat off so far as severe problems from the cyst nematode are concerned in most areas.

"Amsoy variety has been released with Iowa and other states, and is especially adaptable to north central Iowa and areas of comparable latitude.

"Dare is another new southern variety, most of the developmental work of which was done in North Carolina. It adds significant disease resistance.

"Semmes was released by Mississippi and other states and Davis by Arkansas. Each of these has Phytophthora resistance.

"While the number of varieties released is not the only criterion for research advances, it is an end product which is most useful to you. Yet I must repeat what has been said before, that our knowledge of the basic biology of soybean production continues to be deficient. We constantly face the threat of more serious disease problems; we fail to

understand why the soybean produces less than some other crops, and why we cannot write a reliable prescription to produce 50 or 60 or 70 bushels; and we have not found the key to that will-of-the-wisp, hybrid soybeans. All of these questions concern us, but of necessity, they can get only limited attention from our present staff. They offer stimulating and promising opportunities for research that will provide better soybeans in the future."

A portrait photo shows R.W. Howell. Address: USDA, ARS, CR, Soybean Investigations, Beltsville, Maryland.

903. National Soybean Processors Association. 1965. Year book, 1965-1966 (Association year). Chicago, Illinois. 63 p. • ***Summary:*** On the cover (but not the title page) is written: "Year Book and Trading Rules, 1965-1966." Contents: Constitution and by-laws and code of ethics. Officers, directors and committees for 1965-66. Membership of the National Soybean Processors Association. Trading rules on soybean meal. Appendix to trading rules on soybean meal: Official methods of analysis (moisture, protein, crude fiber, oil {only method numbers listed}, sampling of soybean meal {automatic sampler, probe sampler}). Trading rules on soybean oil. Definitions of grade and quality of export oils. Tentative soybean lecithin specifications. Appendix to trading rules on soybean oil: Uniform sales contract, grading soybean oil for color (N.S.P.A. tentative method), methods of analysis (A.O.C.S. official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses; soap stock, acidulated soap stock and tank bottoms (only method numbers listed).

The section titled "Officers, directors, and committees" (p. 12-15) states: President: Robert G. Houghtlin. Secretary: J.W. Moore. Treasurer: R.E. Fiedler. Executive Committee: L.W. Andreas, Chairman, Wilfred F. Carle, T.W. Bean, B.A. Townsend (term ending Sept. 1966). J.W. Moore, M.D. McVay, R.E. Fiedler, E.B. Copeland (term ending Sept. 1967). R.G. Houghtlin.

Board of Directors: Chairman of the board: L.W. Andreas. Vice chairman of the board: T.W. Bean. Immediate past chairman of the board: S.E. Cramer. (Term expiring Sept. 1966): R.A. Denman, Joe C. Givens, R.G. Golseth, Floyd E. Hiegel, H.D. Rissler, R.B. Williams. Term expiring Sept. 1967: T.J. Barlow, Elmer L. Buster, Elster B. Copeland, F.L. Morgan, H.R. Scroggs, B.A. Townsend. Term expiring Sept. 1968: Donald B. Walker -> Win Golden, Wilfred Carle, Arthur Frank, M.D. McVay, William King Self, Harry E. Wiysel. General counsel: Raymond, Mayer, Jenner & Block, Chicago, Illinois. Washington counsel: Sellers, Conner & Cuneo, DC. Washington representative: George L. Prichard, DC. Managing director, National Soybean Crop Improvement Council: Robert W. Judd, Urbana, Illinois.

Standing committees: For each committee, the names of all members (with the chairman designated), with the company and company address of each are given–Traffic and transportation. Technical. Oil trading rules. Industrial oil. Lecithin. Meal trading rules. Uniform rules and standards for soybean meal. Crop improvement council. Soybean research council. Soybean grades and contracts. Safety and insurance. Regional: Illinois, Indiana, Ohio, Kentucky, and eastern Missouri; Iowa, Minnesota, Nebraska, the Dakotas, Kansas, and Western Missouri; Mississippi River Delta Sections.

The following organizations, and individuals are members of NSPA: Allied Mills, Inc., Chicago, Illinois; Taylorville, Illinois; Guntersville, Alabama. Archer-Daniels-Midland Co., Minneapolis, Minnesota; Decatur, Illinois; Mankato, Minnesota; Fredonia, Kansas; Bloomington, Illinois. Arkansas Grain Corp., Soybean Division, Stuttgart, Arkansas (Wilfred F. Carle); Helena, Arkansas (W.E. Higginbotham). Big 4 Co-op. Processing Assn., Sheldon, Iowa (Kenneth J. McQueen). Buckeye Cotton Oil Div. of, The Buckeye Cellulose Corp., Cincinnati Ohio (R.B. Williams); Little Rock, Arkansas; Augusta, Georgia; Memphis, Tennessee. Cargill, Inc., Minneapolis, Minnesota (M.D. McVay, Jay Haymaker); Chicago, Illinois (Robert Cournoyer); Cedar Rapids, Iowa (C.W. Bohlander); Des Moines, Iowa (W.J. Wheeler); Fort Dodge, Iowa (George J. Cox); Sioux City, Iowa (A.L. Peterson), Washington, Iowa (William R. Matson); Wichita, Kansas (Ralph S. Moore); Memphis, Tennessee (Philip St. Clair); Norfolk, Virginia (D.H. Leavenworth). Central Soya Co., Inc., Fort Wayne, Indiana (B.A. Townsend); Decatur, Indiana (T.H. Alwein); Indianapolis, Indiana (R.E. Syster); Chicago, Illinois (Willard C. Lighter); Gibson City, Illinois (George R. Walter); Belmond, Iowa (J.R. Wright); Bellevue, Ohio (Harry Stokely); Marion, Ohio (Leroy Rich); Chattanooga, Tennessee (Jack Rosenberger). Delphos Soya Products Co., Delphos, Ohio (Floyd E. Hiegel). Delta Cotton Oil and Fertilizer Co., Jackson, Mississippi (Alfred Jenkins). Farmers Grain Dealers Assn. of Iowa (Cooperative) Soybean Processing Division, Mason City, Iowa (H.D. Rissler). Farmers Union C.M.A. [CMA], St. Joseph, Missouri (Arthur E. Frank). Fremont Cake & Meal Co., Fremont, Nebraska (Harry E. Wiysel). Galesburg Soy Products Co., Galesburg, Illinois (Max Albert & Regi Simon -> Elnathan Anderson, Box 711). General Vegetable Oil Co., Fort Worth, Texas (J.D. Morton). Gooch Milling & Elevator Co., Lincoln, Nebraska (M.R. Eighmy). Grain Processing Corp., Muscatine, Iowa (G.A. Kent, F.J. Prochaska, H.P. Woodstra). Honeymead Products Co., Mankato, Minnesota (L.W. Andreas, W.B. Cox, J.I. Maslon, C.T. Mullan, L.K. Rasmussen); Huegely Iowa Milling Co., Cedar Rapids, Iowa (Joe Sinaiko, Bob Scroggs, Les Liabo). Kansas Soya Products Co. (The), Emporia, Kansas (Elmer L. Buster). Lauhoff Grain Co., Danville, Illinois (Ralph G. Golseth, Loren R. Larrick, Laurie J. Slocum). Marshall Mills Co., Marshalltown, Iowa (J.B. Saccaro). Minnesota Linseed Oil Co., Minneapolis, Minnesota (R.J. Lindquist, Jr.). Mississippi Cottonseed Products Co., Jackson, Mississippi

(H.E. Covington). Missouri Farmers Assn., Grain Div., Mexico, Missouri (Kermit F. Head). Owensboro Grain Co., Owensboro, Kentucky (William M. O'Bryan). Paymaster Oil Mill Co., Houston, Texas (T.J. Barlow, C.R. Bergstrom); Phoenix, Arizona (O.C. Harris); Jackson, Mississippi (John Bookhart). Perdue (A.W.) & Son, Salisbury, Maryland (Robert L. Brodey). Planters Industries, Inc., Rocky Mount, North Carolina (W.T. Melvin). Planters Manufacturing Co., Clarksdale, Mississippi (A.K. Shaifer). Quincy Soybean Products Co., Quincy, Illinois (Theodore W. Bean, John Franks). Ralston Purina Co., St. Louis, Missouri (Donald B. Walker, W.L. Golden); Kansas City, Missouri (A.V. Couch); Bloomington, Illinois (R.C. Witte); Decatur, Illinois (R.E. Baer); Lafayette, Indiana (A. Hardy); Iowa Falls, Iowa (W. Bower); Louisville, Kentucky (J. Gardner); Raleigh, North Carolina (J.L. Bumgardner); Memphis, Tennessee (J.K. Sartain). Riverside Oil Mill, Marks, Mississippi (William King Self). Sisketon, Missouri (P.B. Bartmess). Southern Cotton Oil Div., Hunt Foods and Industries, Inc., New Orleans, Louisiana (F.L. Morgan); Newport, Arkansas (Jerry Jeffrey); Macon, Georgia (M.S. Long); Greenville, Mississippi (M.D. Kolb); Goldsboro, North Carolina (W.W. Davis). Southern Soy Corp., Estill, South Carolina (R.A. Denman). Southern Soya Corp. of Cameron, Cameron, South Carolina (Charles Everett Bullard). Staley (A.E.) Manufacturing Co., Decatur, Illinois (J.W. Moore, E.C. Lane, H.E. Lents); Painesville, Ohio (D.J. Hopkins). Swift & Co., Chicago, Illinois (Scott E. Cramer, W.W. Moore). Townsends, Inc., Millsboro, Delaware (P.C. Townsend). Tri-County Co-op Soybean Assn., Dawson, Minnesota (Joe C. Givens). West Tennessee Soya Mill, Inc., Tiptonville, Tennessee (Tyler Terrett). Yazoo Valley Oil Mill, Inc., Greenwood, Mississippi (N.F. Howard).

Associate Members: American Feed Stores Home Organization, Inc., Minneapolis, Minnesota. Anderson Clayton & Co., Foods Div., Dallas, Texas. Armour & Co., Chicago, Illinois (Harry K. Bean [crossed out]). Capital City Products Co., Div. of Stokely-Van Camp, Inc., Columbus, Ohio. Cereales y Concentrados, Mexico City, Mexico (Francis Tovar [crossed out]). Colchester Processing Co., East St. Louis, Illinois [crossed out]. Cooperative Mills Inc., Baltimore, Maryland. Corn Products Co., New York City, New York (R.W. List). General Mills, Inc., Kankakee, Illinois (Gerald G. Wilson) [handwritten in]. Grasas Vegetales, S.A., Guadalajara, Jalisco, Mexico (Mr. Collighon) [handwritten in]. Greendale Soy Products, Inc., Kinmundy, Illinois (Elwin G. Ingram) [handwritten in]. Glidden Co. (The), Durkee Famous Foods, Div., Chicago, Illinois (Gerald J. Daleiden). Hartsville Oil Mill, Hartsville, South Carolina (Edgar H. Lawton, Jr.). Huegely Elevator Co., Nashville, Illinois (J.W. Huegely). HumKo Products– Div. of National Dairy Products Co., Memphis, Tennessee (Sam Cooper). Kraft Foods Div. of National Dairy Products Corp., Chicago, Illinois (G.M. Gibson). Lever Bros Co., New York City, New York. Maple Leaf Mills Ltd., Toronto, Ontario, Canada (W.G. Milliken) [handwritten in]. Nebraska Consolidated Mills Co., Omaha, Nebraska [crossed out]. Pacific Vegetable Oil Corp., San Francisco, California. Procter & Gamble Co. (The), Cincinnati, Ohio. Quaker Oats Co. (The), Chicago, Illinois. Spencer Kellogg Div. of Textron Inc., Buffalo, New York. Supersweet Foods Div., International Milling Co., Minneapolis, Minnesota. Valley Mills, Vicksburg, Mississippi. Wesson Div., Hunt Foods and Industries, Inc., Fullerton, California. Ralph Wells & Co., Monmouth, Illinois (Willis H. Wells). Address: 3818 Board of Trade Building, Chicago 4, Illinois.

904. Murphy, S.G.; Elkan, G.H. 1965. Nitrogen metabolism of some strains of *Rhizobium japonicum* having different nodulating capacities. *Canadian J. of Microbiology* 11(6):1039-41. Dec. [4 ref]
• ***Summary:*** This article begins: "Previous reports have described studies on an isogenic mutant strain of soybean that does not form nodules in the presence of strains of *Rhizobium japonicum* capable of nodulating the parent soybean strain under similar conditions (1, 2, 3). Clark reported a number of strains of *R. japonicum* capable of effectively nodulating both the parent and mutant soybean plants." Address: Dep. of Microbiology, North Carolina State Univ., Raleigh.

905. 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.

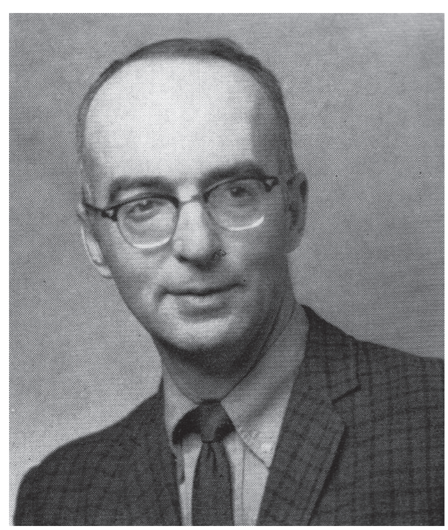
906. *Soybean News* (*NSCIC*). 1966. J.L. Cartter retires: First director of the U.S. Regional Soybean Laboratory. [Dr. Richard L. Bernard appointed] Acting director. 17(2):1. Jan.
• ***Summary:*** "Mr. Jackson L. Cartter terminated more than 37 years of service for the U.S. Department of Agriculture in soybean production research and administrative duties on December 30, 1965. A native of Missouri, 'J.L.' as he is known to his friends, received his B.S. degree in Agronomy from Montana State College in 1925, his M.S. degree in Agronomy from Iowa State College in 1927, and did additional graduate study in agronomy and plant physiology at the University of Wisconsin in 1927 and 1928. He started as a soybean breeder for U.S.D.A. in Ohio in 1928, transferred to Virginia in 1933, and moved to Illinois in 1936 to become director of agronomic research in what is now the U.S. Regional Soybean Laboratory.

"Mr. Cartter's outstanding service to the soybean industry was recognized in 1956 through his election to honorary life membership in the American Soybean Association. He has served as a member of the Advisory Board to the National Soybean Crop Improvement Council since its inception in 1948. In 1949 Mr. Cartter represented the U.S.D.A. abroad in studying the possibility of expanding the soybean crop and markets in several European countries.

First director of the U. S. Regional Soybean Laboratory

"Mr. Cartter has made outstanding contributions to agronomic science as related to soybean production and breeding. He has contributed to the solution of soybean production problems through his publications, the cooperative research projects, the introduction of new varieties, and the exchange of breeding materials. He is author and co-author of many publications and has been called 'one of the outstanding workers and leaders in breeding research on soybeans.'

"Dr. Richard L. Bernard, research geneticist, was appointed Acting Director of the U.S. Regional Soybean Laboratory to succeed Mr. J.L. Cartter who retired Dec. 30.



"Dr. Bernard received his B.S. and M.S. degrees from Ohio State University. He earned his Ph.D. in plant breeding at North Carolina State College and joined the staff of the U.S. Regional Soybean Laboratory in 1954."

Portrait photos show Jackson L. Cartter and Richard L. Bernard.

907. *Seed World.* 1966. Gleanings for growers: Dare soybeans. 98(4):22, 24. Feb. 25.
• ***Summary:*** Dare is a new soybean variety which was released last year by USDA and the agricultural experiment stations of Maryland, Missouri, North Carolina, Oklahoma, and Virginia.

Dare gave higher yields than the cultivars Hood and Lee; it has smaller seeds of higher oil but lower protein content. It matures 4 days earlier than Hood and it is resistant to the diseases *Cersospora kikuchii, Corynespora cassiicola,* and *Pseudomonas tabaci.*

908. *Soybean Digest.* 1966. Best adapted [soybean] varieties. Feb. p. 18.
• ***Summary:*** On a full-page outline map of the eastern half United States (plus Ontario; extending as far west as the western borders of North Dakota, South Dakota, and Nebraska {104º west longitude}) the name of each state appears along with soybean varieties best adapted to various parts of that state. The states shown with varieties are: North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, Arkansas, Louisiana, Michigan, Illinois, Kentucky, Tennessee, Mississippi, Alabama, Georgia, Ohio, Pennsylvania, New Jersey, Maryland, Delaware, West Virginia, Virginia, North Carolina, South Carolina, northern Florida.

A sampling of varieties for several states (listed from north to south within each state): Wisconsin–Flambeau, Norchief, Merit, Chippewa 64, Harosoy 63, Lindarin 63. Ohio–Chippewa 64, Harosoy 63, Lindarin 63, Ford, Ross, Clark 63. Ontario: Merit, Hardome, Chippewa, Harosoy, Harosoy 63, Harman. Arkansas: Hill, Hood, Lee, Bragg, Rebel.

909. Humphries, Bill. 1966. Soybeans could boost income $3.4 million in 15 counties. *News and Observer* (*Raleigh, North Carolina*). March 18.
• ***Summary:*** "Farmers in 15 central counties of the State have an opportunity to increase their income this year by $3.4 million.

"How? By planting an additional 39,000 acres of soybeans and boosting the average yield for this crop from 25 bushels to 26½ bushels an acre.

"Almost 52 million of the increase could occur just in the seven counties of the Capital Area–Franklin, Granville, Harnett, Johnston, Vance, Wake, and Warren.

"The other eight counties are Durham, Orange, Person, Wilson, Alamance, Chatham, Lee, and Nash.

"The 15 counties last year produced 96,810 acres of soybeans. Their potential, according to information presented at a meeting here Thursday, is 135,660 acres.

$8.6 million: Value of the 1965 production was $5.2 million; the potential value from the expanded acreage is $8.6 million.

"T.E. Nichols Jr., extension economist, told the meeting that North Carolina farmers could 'double or even triple current soybean production and find a ready market for beans at prevailing or slightly lower prices.'

"He pointed out that our share of national production is relatively small, the poultry and livestock industries of the Southeast are expanding, and we are conveniently located for exporting the crop.

"'We feel,' he asserted, 'that soybeans have a leading role to play in shaping the future of North Carolina agriculture.'"

"A soybean crop yielding 35 bushels an acre will return about $60 income above cash costs. That's approximately the same income that could be expected from a corn crop yielding 90 bushels an acre."

"In other words, just few more bushels per acre will double the actual net profit per acre for the man raising 25 bushels per acre.

"How do you get the extra yield?

"One very good way would be to follow the soybean all-practice outline developed by Dr. Howard G. Small of N.C. State University and others. A copy of the outline is available through local county extension offices. Or you may obtain one by writing the Crop Science Department of the University at Raleigh."

910. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1966. Results of the Cooperative Uniform Soybean Tests, 1965: Part II. Southern States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 225. March. 132 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/65soybook.pdf
• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Crops Research Division, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII. Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

911. Powers, Leroy W. 1966. Articles of Incorporation of North Carolina Soybean Producers' Association, Inc. Raleigh, North Carolina. 5 p. June 1. Unpublished typescript.
• ***Summary:*** The first 2 pages are the articles of incorporation, drafted and submitted by Powers and fellow officers on 1 June 1966. The signature of each officer appears on page 2. The initial office of the association was 130 Williams Hall, North Carolina State University, Raleigh. The names and addresses of the first 12 members of the eventually 30-member board of directors, and the 10 incorporators are given.

Page 3 is certification by a notary public on June 1. Page 4 is certification by the North Carolina Secretary of State on June 2. Page 6 is the final incorporation on June 6 by the Secretary of State.

Note: Williams Hall was probably the hall at NCSU that was named after C.B. Williams, a soybean pioneer from North Carolina.

912. Jones, Guy L. 1966. Re: Appearance before the North Carolina Board of Agriculture, June 7, 1966. Letter to the 11 directors of the North Carolina Soybean Producers' Association, June 3. 1 p. Typed, with signature on letterhead (photocopy).
• ***Summary:*** "Mr. Leroy Powers asked that we notify each of you and remind you of the of the hearing before the Board of Agriculture... on June 7, 1966. At that time this group will request certification and permission to conduct the referendum among soybean producers."

"Commissioner Graham asked that we be prepared to discuss with the Board four points. 1. The amount of the assessment, 2. what we would expect this organization to do for the farmers of North Carolina, 3. what would be the broad categories of use of the funds that were collected, and 4. do we wish the Department of Agriculture to make the collections for the organization."

This memorandum was sent to Leroy W. Powers. John G. Reed, Jr., Howard Small, S.M. Cozart, Marion Dilday, W.I. McLamb, G.M. Goforth, Stanley Cross, Jerry L. Bumgardner, G.T. Underwood, John A. Winfield, and Hassell Thigpen.

Note: This is the earliest English-language document seen (Oct. 2008) that uses the word "referendum" in connection with a soybean checkoff program. Address: Agronomy Specialist, Agriculture Extension Service, North Carolina State Univ., Raleigh, NC 27607.

913. North Carolina Soybean Producers Association–New state soybean association. 1966. Organized June 6 at Raleigh.
• ***Summary:*** Powers, Leroy W. 1966. *Articles of Incorporation of North Carolina Soybean Producers' Association, Inc.* Raleigh, North Carolina. 5 p. June 1. Unpublished typescript. The first 2 pages are the articles of incorporation, drafted and submitted by Powers and fellow officers on 1 June 1966. The initial office of the association was 130 Williams Hall, North Carolina State University, Raleigh. Page 6 is the final incorporation on June 6 by the Secretary of State.

Soybean Digest. 1966. "N.C. to vote on checkoff." July. p. 22. "The North Carolina Soybean Producers Association has been formed and has filed its charter with the North Carolina secretary of state."

914. Humphries, Bill. 1966. Soybean group formed, assessment vote OK'd. *News and Observer* (*Raleigh, North Carolina*). June 8.
• ***Summary:*** "A new organization known as the North Carolina Soybean Producers Association, Inc., has filed its charter with Secretary of State Thad Eure.

"The State Board of Agriculture, meeting here Tuesday, authorized the association to hold a referendum. To determine whether producers of soybeans wish to assess themselves not more than one-half cent per bushel to maintain and protect the future of this important crop in North Carolina. Tentative plans call for the referendum to be held in early fall–probably in September so that the program can become effective on this year's crop.

"Funds should be collected from producers by grain buyers at assembly or first-handler markets. In addition there would be associate membership fees from related agribusiness.

"Officers of the new association are Leroy W. Powers of Moyock, president; John G. Reed Jr., Planters Industries, Rocky Mount, vice president; Dr. Howard G. Small, N.C. State University, Raleigh, secretary; and S.M. Cozart, Wilson, treasurer.

"Big Business: Soybeans are big business in North Carolina and soon will become the third largest income producing crop in the State. Some 810,000 acres were harvested last year with yields averaging 24½ bushels an acre. Gross value of the crop to producers was about $47.6 million. By 1971 it could be $90 million."

"Also, soybeans are harvested after completion of tobacco marketing and in many cases tobacco warehouses can be used for soybean storage. Cargill operates six soybean buying stations in Western Carolina and is a substantial factor in the soybean market."

915. Small, Howard G., Jr. 1966. Soybeans have returned to the East Coast. *Soybean Digest.* July. p. 20.
• ***Summary:*** "The soybean, often referred to as the 'Wonder Crop' of the century, was originally introduced in North Carolina around 1870 by an old sea captain who secured seed in the Orient. From such meager beginnings about a century ago we have the basis for the tremendous soybean industry of today.

"An estimated 843 million bushels of soybeans were produced in the United States during 1965. This represents a

SOYBEAN ACREAGE HARVESTED FOR BEANS

(1,000 acres)

	1962	1963	1964	1965
N. C.	558	597	681	810
S. C.	640	710	746	895
Ga.	72	81	120	168
Va.	389	350	382	393

cash value of slightly more than $2 billion to the American farmer. The soybean has indeed found a place in the New World agriculture.

"South Carolina, Georgia, Virginia, and North Carolina account for the majority of the acreage along the lower East Coast. Total acreage planted in these states during 1965 and harvested for beans was approximately 2,266,000 acres. This represented 7% of the total U.S. acreage. In 1948 these four states accounted for only 408,000 acres or 2.5% of the total acreage planted to soybeans.

"Why has the soybean returned to the East Coast? A lack of government acreage controls on soybeans would have to qualify as the No. 1 reason for such a big increase in acreage in this area. Most of the crops planted on the East Coast are subject to acreage control. Tobacco, corn, cotton, peanuts, grain sorghum, and small grain all fall in this category. The soybean has not yet entered into the area of crop controls because there is no present surplus.

"Effect of Controls: Establishment of production controls for most row crops grown in the four-state area has caused the acreage of the crops to decline. This idle land has rapidly been absorbed by a growing soybean industry particularly in the East Coast region. The table above shows the recent trend in acreage since 1962. This trend is expected to continue because of the easy access of beans produced in this area to the deep water ports of Norfolk, Virginia, and Charleston, South Carolina. Being close to the export markets is a prime advantage the East Coast soybean producer has over the midwestern producer.

As acreage increased on the East Coast so did the soybean processing facilities. The ability of this area to produce an adequate supply of high-quality beans for the mills and for export cannot be disregarded as another reason for the increased acreage shown in the table.

"The recent rapid changes in production technology and management techniques are causing an agriculture revolution in the East Coast area. Increased cost of production of such crops as tobacco has caused many farmers to look for crops that can be 100% mechanized. Rising labor cost through the enactment of the minimum hour wage law will certainly influence farmers in their selection of crops. Farmers are looking for crops with good profit potential, low cost of production and low man-hour requirements. The soybean fits all three categories.

"Price Has Been Good: Average price of soybeans paid to the farmer in this area has not been under $2.30 per bushel at harvest in recent years while the price has been as high as $2.95 per bushel. Many of these producers are averaging 30 to 45 bushels per acre on large acreage. Even the new soybean producer has been obtaining good soybean yields. For example, the average yield of soybeans in North Carolina has remained in the 23.5- to 24.5-bushel range while acreage has increased by 250,000 acres. The yield of 24.5 bushels per acre in North Carolina in 1965 is a new state record yield. This was also harvested from a record number of acres. New producers are adapting to this crop and the technology of producing it faster than their predecessors.

"The outlook for soybeans in the four states of Georgia, South Carolina, North Carolina, and Virginia for 1966 is promising. Acreage will probably increase again in 1966 but will be limited in certain states by the amount of tillable land available. In 1965 the average yield of soybeans for the four states was Georgia 20 bushels; South Carolina 23 bushels; North Carolina 24.5 bushels; and Virginia 21 bushels. This level of production is expected to increase as farmers become more proficient in the production of this new money crop. This author would estimate the harvested acreage in the four states to be approximately 2.5 million acres in 1966 or an increase of 10%. Changing farm program in other commodities, particularly cotton, could cause a large jump in acreage in the two Carolinas."

A photo shows a clean field of North Carolina soybeans with good growth–at the Coastal Plain Research Station.

916. *Soybean Digest.* 1966. N.C. to vote on checkoff. July. p. 22.

• ***Summary:*** "The North Carolina Soybean Producers Association has been formed and has filed its charter with the North Carolina secretary of state. The N.C. State Board of Agriculture has authorized the new Association to hold a referendum to determine whether the state's soybean producers favor a checkoff of not over one half cent per bushel to be collected by grain handlers. Tentative plans call for the referendum to be held in early fall so the program can become effective on this year's crop.

"The purpose of the checkoff, which is permitted by North Carolina law on a favorable vote of the producers of a commodity, would be to protect the future of soybeans in North Carolina. There would also be associate membership fees from related agribusiness."

Note: The Feb. 1968 issue of *Soybean Digest* (p. 26) confirms that this organization is named North Carolina Soybean Producers Association.

917. *Soybean Digest.* 1966. N.C. growers vote soybean checkoff. Oct. p. 15.

• ***Summary:*** "North Carolina soybean producers will pay a

half cent per bushel checkoff on 1966-crop soybeans as the result of a favorable vote on a referendum in that state Sept. 9. This will be the first statewide checkoff ever put into effect on soybeans. About 75% of the 11,000 producers voting favored the checkoff.

"The referendum was conducted by the North Carolina Soybean Producers Association by authority of the N.C. State Board of Agriculture. Purpose of the checkoff is to protect the future of soybeans in North Carolina.

"The North Carolina Soybean Producers Association was formed last summer. Officers are: Leroy W. Powers of Mycock, president; John G. Reed, Jr., Planters Industries, Rocky Mount, vice president; Dr. Howard G. Small, N.C. State University, Raleigh, secretary; and S.M. Cozart, Wilson, treasurer.

"Affiliation with the American Soybean Association is pending."

Note: This is the earliest document seen (May 2017) concerning a soybean checkoff referendum and program–anywhere, worldwide. Again, North Carolina was a soybean pioneer. It marked the beginning of a major new era for the American Soybean Association.

918. *Soybean News* (*NSCIC*). 1966. Leader of U.S.D.A. soybean research [Dr. B.E. Caldwell]. 18(1):1. Oct.
• ***Summary:*** "Dr. Billy E. Caldwell of Beltsville, Maryland, has been appointed Leader of Soybean Investigations in the Crops Research Division, U.S. Department of Agriculture. He succeeds Dr. Robert W. Howell, who is now Chief, Oilseed and Industrial Crops Research Branch."

"The U.S.D.A. has soybean production research personnel in nine states and has state collaborators in about 30 states. The regional research program, which Dr. Caldwell will lead, also includes cooperation with research workers in two Canadian provinces."

"Dr. Caldwell joined the soybean research staff in 1963. He is a native of North Carolina, a graduate of North Carolina State University and received his Ph.D. degree from Iowa State University."

919. Montgomery, James Riley. 1966. The Volunteer State forges its university: The University of Tennessee, 1887-1919. *University of Tennessee Record* 69(6):1-231. Nov. [22 ref]
• ***Summary:*** On pages 72-73 is a section about Charles Dabney, who would later do most of his work with soybeans in North Carolina.

"In 1893 Dabney, a loyal member of the Democratic party, (14) was offered the post of assistant secretary of agriculture in Grover Cleveland's second presidential term. He had sought the position and enjoyed support from members of the Land-Grant Association. (15) His appointment to such a position seemed to offer several advantages to the University. Its president would have a chance for additional learning, experience, and public contacts. Dabney also convinced the faculty and trustees that federal funds for land-grant colleges were in immediate danger, as Secretary of Agriculture J. Sterling Morton had declared 'his intention not to favor the continuance of the appropriations of 1887 [Hatch Act funds], [sic] and 1890 [Second Morrill Act].' Trustees of the University agreed that because these were standing appropriations which could get before Congress only upon the recommendation of the Secretary of Agriculture or by the House Committee on Appropriations (and Joseph D. Sayers of Texas, chairman of the House Committee, intended to drop them for the sake of economy), land-grant college administrators had cause to worry about the future of federal support. (16)

"The Trustees granted Dabney a semi-leave of absence. He continued to draw $2,000 of his salary, in return for which he agreed to make at least four visits a year to the campus and fulfill his major administrative responsibilities. (17) At the same time he received $4,500 from the federal government. He remained in the federal office from January, 1894, until the late fall of 1897. (18)

"In all fairness it must be said that Dabney faithfully visited the campus and attended Trustee meetings. He corresponded with the faculty and kept rather close to Knoxville affairs. (19). It should also be noted that the Democratic Administration made little if any effort to drop the federal support measures to land-grant colleges and universities. To say that Dabney personally and individually prevented such a move cannot be substantiated. Even his memoirs make no mention of it. (20) Dabney apparently wanted the federal position for the additional money it brought and for the prestige of the office. (21)

"In handling the matter, University Trustees may have erred in allowing Dabney to hold two positions and draw two salaries. The University gained little from the appointment and several negative features developed. Dabney became a more widely known figure, which increased the likelihood of other organizations bidding for his services." (22)

920. Graham, James A. 1967. Re: Check for $37,500 from North Carolina soybean assessment. Letter to Mr. James R. Oliver, Treasurer, North Carolina Soybean Producers Association, Inc., Homestead Acres, Route 2, Fairmont, North Carolina 28340, Feb. 27. 2 p. Typed, with signature.
• ***Summary:*** "We are enclosing a check in the amount of $37,500.00 payable to N.C. Soybean Producers Association, Inc., representing collections of the soybean assessment as indicated in the report attached. We are pleased to be of service in this excellent promotional program." A copy of the letter was sent to Leroy Powers, President, N.C. Soybean Producers Assoc., Inc., Moyock, NC 27958.

The attached 1-page report is titled "Soybean assessment for the 1966-67 season." Number of bushels reported at ½ cent per bushel: 14,305,110.45. Collections: $71,546.99. The

State of North Carolina
Department of Agriculture
Raleigh

JAMES A. GRAHAM
COMMISSIONER

February 27, 1967

Mr. James R. Oliver, Treasurer
N. C. Soybean Producers Association, Inc.
Homestead Acres, Route 2
Fairmont, North Carolina 28340

Dear Mr. Oliver:

We are enclosing check in the amount of $37,500.00 payable to N. C. Soybean Producers Association, Inc., representing collections of the soybean assessment as indicated on report attached.

We are pleased to be of service in this excellent promotional program.

Sincerely,

James A. Graham

GM/gn
Enclosure

CC: Mr. Leroy Powers, President
N. C. Soybean Producers Association, Inc.
Moyock, North Carolina 27958

NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

February 27, 1967

TO: N. C. SOYBEAN PRODUCERS ASSOCIATION, INC.
MR. JAMES R. OLIVER, TREASURER
HOMESTEAD ACRES, ROUTE 2
FAIRMONT, NORTH CAROLINA 28340

SOYBEAN ASSESSMENT
1966-67 SEASON

NO. BUSHELS REPORTED AT ½¢ per BUSHEL	COLLECTIONS TO DATE
14,305,110.45	$ 71,546.99

N. C. SOYBEAN PRODUCERS ASSOCIATION, INC.

Voucher No. 1	12/19/66	$ 33,000.00
Voucher No. 4	2/27/67	37,500.00
Cash in bank	2/27/67	1,046.99
		$ 71,546.99

James A. Graham
COMMISSIONER OF AGRICULTURE

cc: Mr. Leroy Powers, President
N. C. Soybean Producers Association, Inc.
Moyock, North Carolina

BUILD NORTH CAROLINA BY USING NORTH CAROLINA PRODUCTS

voucher for the first collection of $33,000 is dated 19 Dec. 1966.

Note: This is one of two checks issued during the season as part of North Carolina's soybean checkoff program, the first such state program in the USA. The first funds were collected in 1966. It was not until three years later, 1969, that checkoff programs were started in other states (South Carolina and Louisiana). Address: Commissioner, North Carolina Dep. of Agriculture, Raleigh.

921. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1967. The Uniform Soybean Tests: Southern States, 1966. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 228. Feb. 131 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/66soybook.pdf
• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Crops Research Division, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII. Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

922. Schutz, W.M.; Bernard, R.L. 1967. Genotype x environment interactions in the regional testing of soybean strains. *Crop Science* 7(1):125-30. Jan/Feb. [6 ref]
• ***Summary:*** "The existence of genotype x environment interactions and their effects on progress from selection are widely recognized. Genotype x year interactions are always of importance in developing improved varieties. Genotype x location interactions are of relatively little importance in selecting material for local adaptation but often assume a dominant role in selecting for wide adaptation." Address: Research Geneticists, Crops Research Div., ARS, USDA, Raleigh, North Carolina, and Urbana, Illinois.

923. *Soybean Digest.* 1967. Arkansas Soybean Assn. in step toward checkoff. Feb. p. 106, 108.
• ***Summary:*** "More than 400 Arkansas Soybean Association members held their third annual meeting at Helena, Arkansas, Jan. 12 to explore new ways of keeping soybeans the top cash crop in the United States and abroad." Laurel C. Meade (of West Lafayette, Indiana), president of the American Soybean Association addressed the group, noting that the greatest growth in soybean production since 1945 has occurred in the South. "The Delta has the largest soybean fields in the world, which will bring $215 million to Arkansas farmers from the 1966 crop."

R.W. Fischer, president of Soypro International (Cedar Falls, Iowa) said "Soybeans as an economical food could end starvation and wars in the world." Walter Grant of Worthington Foods showed the audience samples of high protein foods made by his company that are now on the market.

"During the annual business session a resolution was passed directing the officers to proceed toward state legislation to make legal the collection of a per-bushel deduction at the market place for financing research and market promotion. The checkoff program would become operative on a favorable vote by soybean producers. Of the 12 major southern soybean producing states, according to secretary Hartz [Jake Hartz, Jr.], Georgia and North Carolina already have appropriate acts, and Louisiana has permissive legislation not specifically dealing with soybeans. In northern states, similar bills are being entered in the current legislative sessions of Minnesota, Iowa, and Illinois."

A photo shows Laurel C. Meade with Sam Howe, president of the Arkansas Soybean Association (Wabash) and R.W. Fischer, president, Soypro International, Cedar Falls, Iowa (only the right half of Fischer's face is visible).

924. Small, Howard G. 1967. Soybean now No. 3 crop in N.C. *News and Observer* (*Raleigh, North Carolina*). March 14.
• ***Summary:*** Production figures for the 1966 crop show that 36.6 million acres were harvested, producing 931.5 million bushels, for an average yield of 25.4 bushels per acre–a new U.S. record.

"This represents the largest acreage of soybeans ever planted in North Carolina, and the soybean joins corn as the only other row crop of more than a million acres."

"Soybeans now rank third in gross sales of farm crops in North Carolina. Only tobacco and corn bring in more gross income to our farmers, with tobacco being valued at approximately $511 million and corn at $89 million. If one looks at the national situation for 1966, he will find soybeans as the number one 'cash' crop at 2.4 billion dollars, corn second at 2.3 billion, and wheat third at 1.9 billion. What happened to four and five? Well, cotton was in fourth at 1.7 billion, and tobacco was fifth at 1.3 billion."

As of Feb. 1, a North Carolina extension specialist will start to work with their production problems. "The appointment of an extension specialist to devote all of his time to the advancement of soybeans and net farm income from soybeans is a giant step forward toward making the soybean an even more important crop to North Carolina producers."

"On Jan. 16 and 17 the winners of the first National Soybean Yield Contest were announced. Two soybean growers had yields of 93 bushels per acre on a five-acre plot or the equivalent of 232 bushels of corn per acre. Mr. Pick

in Illinois and Mr. Beeson in Iowa proved that high yields of soybeans are possible. Many other growers from 17 states produced.

"'Unlimited' would probably be the most appropriate word to describe the outlook for soybeans." Address: Extension agronomy specialist, North Carolina State Univ. at Raleigh.

925. *News and Observer* (*Raleigh, North Carolina*). 1967. Grant aids soybean research. May 15.

• ***Summary:*** "The North Carolina Soybean Producers Association has made a $6,300 grant to North Carolina State University to support research on weed control in soybeans.

"James S. Gardner, executive secretary of the association, presented the check to Dr. Paul Harvey, head of the Department of Crop Science."

In 1965 North Carolina soybean farmers lost an estimated $3.2 million to weeds.

926. Brim, C.A.; Schutz, W.M.; Collins, F.I. 1967. Nuclear magnetic resonance analysis for oil in soybeans, *Glycine max* (L.) Merrill, with implications in selection. *Crop Science* 7(3):220-22. May/June. [5 ref]

• ***Summary:*** "Nuclear magnetic resonance spectroscopy (NMR) has been shown to be rapid and accurate for determining oil content of partially dried seeds" (Conway & Earle 1963). "Very close agreement has been obtained (Collins, unpublished data), between NMR analysis and conventional extraction methods for oil content in soybeans grown in a number of environments. NMR analysis is nondestructive and a sample size may vary from a single seed to 25 g." Address: North Carolina & Urbana, Illinois.

927. Epps, James M.; Chambers, Albert Y. 1967. Control of the soybean cyst nematode. *Soybean Digest.* June. p. 6-9. [9 ref]

• ***Summary:*** The long subtitle: "The cyst nematode is now found in 91 counties in nine states, the most recent being Vanderburgh County, Indiana. Rotation, use of nonhost crops, summer fallow, or a resistant variety to reduce soil infestations are all important as methods of control. Three resistant varieties have been released to date–Pickett, Dyer, and Custer. Commercial seed of all three varieties will be available in 1968 for planting in infested areas.

"Introduction: The soybean cyst nematode, *Heterodera glycines* Ichinohe 1952, causes a disease of soybeans described as 'Yellow Dwarf' in Japan and as 'Soybean Cyst Nematode Disease' in the USA. The disease was first found in Japan in 1915, in Korea in 1936, and in Manchuria in 1938. In 1954, Winstead, Skotland, and Sasser (9) reported finding the disease in Pender County near Wilmington, North Carolina. Two years later, it was found in Lake County, Tennessee, near Ridgely (1). The U.S. Department of Agriculture has since found infestations in 91 counties in 9 states as follows:

"Arkansas–Arkansas, Clay, Craighead, Crittenden, Cross, Desha, Greene, Independence, Jackson, Jefferson, Lawrence, Lee, Lincoln, Lonoke, Mississippi, Monroe, Phillips, Poinsett, Pope, Prairie, Randolph, St. Francis, and Woodruff.

"Illinois–Alexander, Johnson, Massac, Pope, Pulaski, and Union.

"Indiana–Vanderburgh.

"Kentucky–Ballard, Carlisle, Fulton, Graves, Henderson, Hickman, and McCracken.

"North Carolina–Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Edgecombe, Gates, Johnston, New Hanover, Pasquotank, Pender, Perequimans, Sampson, Tyrell, and Wayne.

"Mississippi–Boliver, Coahoma, De-Soto, Issaquena, and Tunica.

"Missouri–Bollinger, Butler, Cape Girardeau, Dunklin, Mississippi, New Madrid, Pemiscot, Ripley, Scott, and Stoddard.

"Tennessee–Benton, Chester, Carroll, Crockett, Dyer, Fayette, Gibson, Hardeman, Haywood, Henry, Humphreys, Lake, Lauderdale, Madison, Obion, Shelby, Tipton, and Weakley.

"Virginia–Isle of Wight, Nansemond, Norfolk, Princess Anne, and Southampton.

"Additional new infestations are being found each year.

"Most recent counties and the states where the nematode has been found in some cases on single farms:

"Vanderburgh County, Indiana; Pope County, Illinois; Chester and Humphreys Counties, Tennessee; Norfolk County, Virginia; Henderson and McCracken Counties, Kentucky; Boliver and Issoquena Counties, Mississippi; Carteret, Chowan, Craven, and Edgecombe Counties, North Carolina; and Independence, Jefferson, Lincoln, Lonoke, Monroe, Pope, and St. Francis Counties, Arkansas.

"Symptoms and Signs: Soybeans grown in soil heavily infested with the soybean cyst nematode are stunted, appear generally unthrifty, and undergo a yellowing that progresses upward from the lower leaves. Death of plants may occur where infestations are extremely heavy. Symptom expression is more severe early in the growing season during periods of moisture stress.

"Reduced nodulation and extensive rotting of the roots are frequently associated with severe infection, but the only specific sign is the presence of the white-to-brown-colored females on the roots. Weeds often develop in the infested soybean fields due to reduced shading and lack of competition by infected plants.

"Studies indicate great variability in symptoms and pathogenicity in the various infested areas. Cooperative studies are under way at Jackson, Tennessee, and Beltsville, Maryland, to determine whether or not morphological differences in the nematode species can be associated

with the variable symptomatology and pathogenicity of populations found in the various infested areas. In preliminary studies, the results indicate that there are morphological (physical) differences in nematode populations in the several infested areas.

"Host Range: The kinds of cultivated plants on which the soybean cyst nematode can reproduce appears to be fairly limited. Common crop or host plants that support the nematode are wild soybean; annual, common, and Sericea lespedezas; Azuki, mung, and snap beans; hairy vetch; and white lupine (2, 3, 6). Henbit deadnettle, or winter mint, a member of the Labiatae family, was the first recorded host that is not in the legume family.

"Over 2,000 other plants have been studied by scientists to determine the full host-range of plants to the soybean cyst nematode (4, 7, 8). More than 1,100 different species are known to allow at least limited reproduction of the nematode. Fortunately, most of the susceptible species are wild plants not found in soybean fields. However, such common weeds as henbit deadnettle (winter mint), mouse-ear and common chickweed; beard-tongues; common mullen; sesbania (coffee bean); low hop clover; and sicklepod will serve as alternate hosts for the soybean cyst nematode.

"Spread: Soybean cyst nematodes may be spread by movement of the nematodes alone or in infested soil associated with farm implements, plants, animals, wind, and runoff water. The nematode can move only a few feet each year by its own efforts.

"During bean harvest, small balls of soil or 'peds,' about the size of seed, become mixed with seed. If the soil in the field were infested with the nematode, the peds may contain enough cysts to spread nematode infestation to new fields when the seed is planted. We are now conducting experiments to develop methods of killing nematodes that occur in seedstocks containing infested peds.

"Control We are investigating four methods for reducing or controlling nematodes in soybean fields. The methods under study are soil fumigation, crop rotation, use of resistant varieties, and adjusting the time of planting so as to prevent excessive crop damage. The experiments reported here were conducted at Ridgely, Tennessee."

Discusses: Soil fumigation. Crop rotation. Resistant varieties. Time of planting. Expanded nematode research.

A photo shows a typical view of a field showing severe damage caused by the soybean cyst nematode.

Seven bar graphs show: Soybean cyst nematode larvae counts in spring and fall under different cropping sequences: (A) continuous Hill soybeans; (B) continuous cotton; (C) cotton, Hill soybeans, cotton, Hill soybeans. cotton; (D) cotton, cotton, Hill soybeans, Hill soybeans, Hill soybeans; (E) cotton, Hill soybeans, Hill soybeans, cotton, cotton; (F) Peking soybeans, Hill soybeans, Peking soybeans, Hill soybeans, Peking soybeans; (G) continuous Peking soybeans. Address: 1. Nematologist, Crops Research Div., Agricultural Research Service, USDA; 2. Asst. Prof. of Plant Pathology, Dep. of Agricultural Biology, Tennessee Agric. Exp. Station, Jackson, Tennessee.

928. Small, Howard G., Jr.; Phillips, Dan V.; Falter, John. 1967. Producing soybeans. *North Carolina State College of Agriculture, Extension Circular* No. 381. 27 p. Aug. Revision of 1954 ed.

• ***Summary:*** Contents: Practices for Profit. Rotations ("Two or three years of continuous soybeans may lower soil fertility and build up problems with nematodes, insects, diseases, and weeds"). Lime Needs ("Lime by soil test. Aim for a pH of 6.0"). Fertilize for Higher Yields (Fertilize on the basis of a soil test. "The soil is the main key to higher yields. Soils with inadequate phosphate, potash, and lime cannot produce the higher yields possible with soybeans"). Varieties ("Choose a variety on the basis of its yield, time of harvest, disease resistance and seed quality. Plant North Carolina certified seed. Three good early varieties are Hill, Dare, and Hood. Five good late varieties are Lee, Pickett, Bragg, Jackson and Hampton 266). Planting (Use quality seed. Plant in rows for maximum yield. Plant 8-10 beans per foot of row. Mulch planting or minimum tillage). Weed Control. Harvesting (Harvest as soon as bean moisture reaches 13%). Diseases. Disease Control Guide. Insect Control. Insect Control Guide. Marketing. Seasonal Prices (Peak prices are in May. Lowest prices are often at harvest time in Oct.).

"Practices for Profit: You can increase your present yield by ten or more bushels by adapting the techniques of production outlined in this publication for soybeans in North Carolina. Increased acres planted plus higher yields per acre mean more net profit for you.

"World food demands and increased domestic usage in the next five years will put a load on the ability of soybean producers to meet production needs. A portion of these needs can be met by increasing yields through soil testing, liming, and fertilization. Further gain is possible in weed, insect, and disease control through use of chemicals, rotation, and overall good management. Inoculation, use of certified seed, and molybdenum also mean gains.

"Expanding and improved markets will demand higher quality soybeans. Processors and exporters demand high quality soybeans. It is to your advantage to produce a superior quality soybean free from damage and most of all free from foreign material. Soybeans that meet No. 1 grade standards shall weigh 56 pounds or more per bushel, have 18 percent or less moisture, 10 percent or less splits, and have not more than 2 percent total damage. Foreign material must be 1 percent or less by weight, and the grade must contain not more than 1 percent of black, brown, and/or bicolored soybeans in yellow or green soybeans. Further, they cannot be materially weathered or purple stained if they are to meet the No. 1 grade standard. All soybeans are brought on a No. 1 basis in North Carolina and soybeans not meeting

this grade bring somewhat less." Address: 1. Agronomy Extension Specialist; 2. Plant Pathology Extension Specialist; 3. Entomology Extension Specialist. All: North Carolina State Univ., Raleigh.

929. *Soybean Digest.* 1967. The changing face of ASA [American Soybean Assoc.]. Sept. p. 6.
• ***Summary:*** Photos show the following ASA directors and staff. Executive committee: Harris Barnes, Jr., president. Seeley Lodwick, vice president. Leslie Tindal, secretary. John Sawyer, secretary. Laurel C. Meade, past president.

Directors: Roger Killingsworth, Texas. F.C. Laughinghouse, North Carolina. W.B. Tilson, Texas. C. Joseph Coleman, Iowa. Frank Hoxie, Iowa. Harold Kuehn, Illinois. La Verne Workman, Illinois.

Staff: Chet Randolph, executive vice president. Kent Pellett, editor, *Soybean Digest.* Howard E. Grow, executive secretary, ASA Soybean Research Foundation.

930. Aeroglide Corporation. 1967. "Miracle bean:" Anderson, Clayton & Co. is helping to perform the miracle (Ad). *Soybean Digest.* Nov. p. 2.
• ***Summary:*** Anderson, Clayton & Co., formed as a cotton merchandising organization in 1904, has long been a processor of vegetable oils. Recently the company expanded its soybean operations with the construction of new mills at Vicksburg, Mississippi, and Osceola, Arkansas.

Aeroglide supplied a 3,000 bushel-per-hour drier for each plant. Aeroglide Driers were also installed at Anderson Clayton's soybean plants in Jackson, Mississippi, and Cruz Alta, Brazil. Address: Box 1839, Raleigh, North Carolina 27602. Phone: 919-834-3601.

931. *Soybean Digest.* 1967. Ralston Purina closes Decatur [Illinois] processing plant. Nov. p. 32.
• ***Summary:*** "Ralston Purina Co. of St. Louis, Missouri, closed its soybean processing plant at Decatur, Illinois on Nov. 1 for an indefinite period... The company's other soybean processing plants are located at Bloomington, Illinois; Lafayette, Indiana; Raleigh, North Carolina; Louisville, Kentucky; Memphis, Tennessee; Kansas City [Missouri]; and Iowa Falls, Iowa."

932. Upchurch, Woody. 1967. Soybean industry builds on foundation laid by Tar Heel farmers, businessmen (News release). North Carolina State University, Raleigh. 4 p. Dec. 19.
• ***Summary:*** "Farmers of the flatlands of northeastern North Carolina were the first to grow 'soja beans' as a U.S. farm crop. The first commercial processing of soybeans [in North Carolina] was done 52 years ago at Elizabeth City."

This year North Carolina soybeans are worth $63 million, and the state's third most important income producer behind tobacco and corn. In 1882 the "wonder crop" was officially welcomed to the state with these comments by Charles W. Dabney, the director of the Agricultural Experiment Station: "The beans have an extraordinarily favorable composition. The plant's tremendous bearing power together with its composition render it the most promising plant which lately has been introduced to us... 'Eastern country' farmers took Dabney's recommendations to heart.

"Early records indicate that some soybeans were being grown before Dabney's evaluation of them in 1882. Some believe Christopher Wilson Hollowell, owner of Bayside plantation near Elizabeth City, was the first to grow soybeans as a farm crop.

"His grandson, Frank W. Hollowell Jr. who still manages much of the original farm, says he can't document the claim for his grandfather, but he believes soybeans were grown on the farm as early as the late 1870's...

"After evaluations of its own, the North Carolina Agricultural Experiment Station recommended soybeans to the state's farmers in 1882 as a possible replacement for the poor-doing cowpea.

"Said the writer in the Station's 1882 annual report: 'Where it is the object to produce the greatest amount of food upon the smallest area, the soja bean is surely deserving of some attention.'

"Until this time, soybeans had been regarded as a botanical curiosity in the U.S...

"The first processing that W.T. Culpepper and his colleagues did at Elizabeth City Oil and Fertilizer Co. may have been the most significant breakthrough in getting the industry established." Culpepper was manager of the mill and a member of the state legislature.

"The elder Culpepper's foresight was officially recognized in 1952 by the National Soybean Processor's Association when it presented Mrs. Culpepper with documents recognizing her husband as the first commercial processor of domestic soybeans.

"The first beans were processed in Elizabeth City in December 1915. Processing caught on fast in other sections of eastern North Carolina. The Winterville Cotton Oil Co. at Winterville and the Havens Oil Co. of Washington, North Carolina, crushed 30,000 bushels of beans as an experiment in 1916.

"The oil meal was excellent protein for livestock and the soybean oil was in strong demand, particularly during the fat and oil shortage caused by World War I.

"The Midwest quickly took North Carolina's lead, both as a producer and processor of soybeans... The state is now 11th in national production with slightly more than a million acres." Address: School of Agriculture and Life Sciences, Dep. of Agricultural Information.

933. Upchurch, Woody. 1967. Soybean industry building on foundation laid in N.C. *News and Observer* (*Raleigh, North*

Carolina). Dec. 25. p. 37.
• ***Summary:*** This article is based on a news release issued this month by Upchurch (which see). A photo shows W.T. Culpepper, Jr., a legislator and businessman, standing next to a portrait of his father, W.T. Culpepper, which hangs on the wall of his office in Elizabeth City. In December 1915 his father (who was manager of the mill) and colleagues processed the first commercial soybeans in North Carolina at the Elizabeth City Oil and Fertilizer Co. in Elizabeth City. Address: School of Agriculture, North Carolina State Univ., Raleigh.

934. Upchurch, Woody. 1967. Tar Heel state claims first U.S. soybeans. *Citizen and Times* (*Asheville, North Carolina*). Dec. 25. p. 47.
• ***Summary:*** This article is based on the news release issued by Upchurch this month (which see). Address: School of Agriculture, North Carolina State Univ., Raleigh.

935. *SoyaScan Notes.* 1967. Chronology of soybeans, soyfoods and natural foods in the United States 1966-1967 (Overview). Dec. 31. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** 1966, April 9. Erewhon opens as a small (10- by 20-foot) macrobiotic and natural foods retail store at 303-B Newbury Street in Boston, Massachusetts. Aveline and Michio Kushi are the founders and Evan Root is the first retail store manager. Erewhon is the first food store of its kind in America, and it soon serves as a model for many other similar natural foods stores across America. Erewhon starts to grow in Oct. 1967 with the arrival of Paul Hawken.

The natural foods movement in America is in its infancy, advocating a return to traditional whole foods, naturally grown and processed. It's predecessor, the health foods movement (which started in the 1930s, based on the new public interest in vitamins), now largely sells vitamin, mineral, and protein supplements.

1966, Nov. America's first soybean checkoff program voted in by North Carolina soybean growers, who will pay half a cent per bushel checkoff on the 1966 crop. This new income source marks the start of a new era for the American Soybean Association.

1967. The All-India Coordinated Research Project on Soybean is founded in India, after about 4 years of pioneering soybean work there by American Land Grant Universities, funded largely by the Rockefeller Foundation. This story is well told in Carroll P. Streeter's book A Partnership to Improve Food Production in India (1969).

1967. Soy idli developed by Steinkraus and van Veen at Cornell University, New York. These small steamed cakes are the first traditional Indian fermented soyfood to be fortified with soy flour. The fortification of basic foods in Third World countries with soy flour becomes popular.

1967. Philsoy brand soymilk launched in Los Baños, Philippines, with aid from Cornell University food scientists Bourne and Steinkraus.

1967. Proceedings of International Conference on Soybean Protein Foods published by USDA Agricultural Research Service. The conference was held 17-19 Oct. 1966 at Peoria, Illinois. Many of the 276 attendees were pioneers in the field. A similar conference on Soybean Products for Protein in Human Foods had been held in 1961 at the same location. A major theme at both is that protein malnutrition is now the world's most widespread deficiency disease.

1967. Soybean production in Latin America reaches 1 million metric tons (tonnes), up 10-fold since 1953.

936. *Soybean Digest.* 1967. State fair booth by N.C. Association. Dec. p. 10.
• ***Summary:*** In October, the North Carolina Soybean Producers Association participated in the annual state fair at Raleigh with a booth displaying the many food products in which soybeans are used as an ingredient, including meats, strawberries, coconut with artificial flavor, soy bean flour, Snowdrift, soy sauce, mayonnaise, and salad dressings. The response was excellent, according to Jim S. Gardner, executive secretary of the Association. "Surprisingly enough, many people had never had the idea of the value of the soybean to everyday living." A photo shows woman at the booth with the display of soybean products.

937. Byrd, Richard E. 1968. Re: Receipts and disbursements of the North Carolina Soybean Producers' Association for the period 5 August 1966 through 31 August 1967. Letter to North Carolina Soybean Producers' Association, Inc., Raleigh, North Carolina, Jan. 10. 2 p. Typed, with signature.
• ***Summary:*** Total cash receipts were $84,155.65, of which $78,500.00 came from "Assessments" [state soybean checkoff]. Total cash disbursements were $58,192.74, of which by far the largest amount ($26,195.70) was for research grants. American Soybean Assoc. dues were $2,400 and salaries were $6,188. The balance in the account on 31 August 1967 was $25,962.91. Address: Certified Public Accountant, Raleigh, North Carolina.

938. Aeroglide Corporation. 1968. Southern Soya: A story of growth paralleled only by the soybean (Ad). *Soybean Digest.* Jan. p. 9.
• ***Summary:*** A full page ad. "The 'Miracle Bean' found early appreciation by Stiles M. Harper and Grover F. Bowers–1947 in Estill, South Carolina. With the strong belief that soybeans were fast becoming a vitally important Southeastern crop, these men started [apparently in 1947] preparing seed beans with an Aeroglide Seed Drier."

"As a partnership, Harper and Bowers now own controlling stock in Southern Soya Corporation [which began operation in about 1963]. This company is the solvent soybean processing plant operated at Estill in conjunction

with the 2.5 million bushel Harper and Bowers grain elevator. Their plant here is equipped with Aeroglide Driers. Harper and Bowers also have controlling stock in Southern Soya Corporation of Cameron, South Carolina with 2.5 million bushels storage and two Aeroglide Driers."

Photos show Stiles M. Harper and Grover F. Bowers, standing. Address: 6300 Hillsborough Rd., Raleigh, North Carolina 27602; 202 Aeroglide St., Emporia, Kansas. Phone: 919/834-3601 or 316/342-1645.

939. Colvin, B.M.; Ramsey, H.A. 1968. Growth of young calves and rats fed soy flour treated with acid or alkali. *J. of Dairy Science* 52(2):270-73. Feb. [1 ref]
• ***Summary:*** "Abstract: Calves fed a milk replacer containing alkali-treated fully cooked soy flour as the only source of protein grew as well as calves receiving acid-treated flour and more rapidly, than calves fed untreated flour. Growth in weanling rats fed either acid-treated or alkali-treated soy flour was superior to that for rats fed untreated flour." Address: Dep. of Animal Science, North Carolina State Univ., Raleigh, North Carolina. Colvin's present address: Dep. of Biochemistry, Oklahoma State Univ., Stillwater, Oklahoma.

940. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1968. The Uniform Soybean Tests: Southern States, 1967. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 234. Feb. 131 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/67soybook.pdf
• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Crops Research Division, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII.

Page 2: "Cooperating agencies and personnel for the Southern Region.

"Soybean Investigations, Beltsville, Maryland: B.E. Caldwell, Leader

"Laboratory Headquarters, Urbana, Illinois: R.L. Cooper, Agronomist-In-Charge, R.L. Bernard, Research Geneticist, F.I. Collins, Oil Chemist, O.A. Krober, Protein Chemist (on leave), R.L. Bishop, Chemist, R.W. Rinne, Plant Physiologist, W.L. Ogren, Plant Physiologist.

"Southern Region Headquarters, Stoneville, Mississippi: Edgar E. Hartwig, Agronomist, B.L. Keeling, Pathologist, T.C. Kilen, Geneticist, Kathryn W. Jamison, Statistical Clerk, Calton J. Edwards, Jr., Research Technician, J. Kenneth Buckner, Research Technician, Pat Butler, Research Technician.

"Raleigh, North Carolina: Charles A. Brim, Agronomist, John P. Ross, Pathologist, W.M. Schutz, Geneticist, M.F. Young, Research Technician, Clifford Elledge, Research Technician.

"Gainesville, Florida: Kuell Hinson, Geneticist, Howard F. McGraw, Research Aid." Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

941. *Soybean Digest.* 1968. Seed directory (Ad). Feb. p. 50.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Texas, Virginia. For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

Commonly sold varieties are: Adams, Amsoy, Bragg, Chippewa 64, Clark 63, Custer, Dare, Davis, Disoy, Ford, Hampton, Hardee, Harosoy 63, Hawkeye 63, Hill, Hood, Jackson, Lee, Lindarin, Merit, Ogden, Pickett, Rebel, Semmes, Shelby, and Wayne.

Proprietary varieties include: Hale 7, from Hale Seed Farms, Burdette, Arkansas. Bellatti-L263, from Louis Bellatti, Mt. Pulaski, Illinois.

942. North Carolina Soybean Producers Assoc. 1968. Growing soybeans? (Color motion picture). North Carolina. *
• ***Summary:*** See article in *Soybean Digest.* Nov. 1967, p. 22. "North Carolina Produces Color Movie on Soybeans."

"A color motion picture promoting higher soybean yields and interest in soybeans as a profitable crop is being filmed by the North Carolina Soybean Producers Association, says Jim S. Gardner, executive secretary of the Association, Raleigh.

"The film, which is to be narrated and edited professionally, should be completed next March. After that it will be shown to North Carolina television stations, school groups, civic organizations, and others who express an interest in it, says Gardner.

"The film starts with the soybean as a seed and takes it through planting, harvesting, transportation, processing, and on to food manufacture, says Gardner. 'We have shots of experimental work to increase yields, to control weeds, and of various test plots. We have film on processing, grain elevators, and of problems involved caused by the lack of on-the-farm storage.

'Also included will be some shots of the American

Soybean Association convention in Peoria last August.'

"Gardner says the film will be available for showing to out-of-state organizations including other state soybean associations by some time late next summer." A small portrait photo shows Jim S. Gardner.

Note: The title of the film is not given. Address: North Carolina.

943. Colvin, B.M.; Ramsey, H.A. 1968. Soy flour in milk replacers for young calves. *J. of Dairy Science* 51(6):898-904. June. [18 ref]
• ***Summary:*** Calves were fed milk replacers containing fully-cooked soy flour as the only source of protein. The nutritive value of the soy flour can be markedly improved by treating the flour in an acid environment (pH 4.0 for 5 hours at 37ºC) prior to feeding. Address: Dep. of Animal Science, North Carolina State Univ., Raleigh, North Carolina.

944. *Soybean Digest.* 1968. Princess Soya contest. Aug. p. 7.
• ***Summary:*** Photos show the six lovely candidates: Mary Laatz from Illinois; Myrene Jones from Minnesota; Helen Tindall from Mississippi; Annette Fairless from North Carolina; Darra Williamson from South Carolina; and Leslie Cook from Arkansas. The judges for the United States' first "Princess Soya" contest will be Lewis Remele, Joe Coleman, and Maynard Speece.

"The candidates for the title of the first national "Princess Soya"–six state contest winners–will mix judging interviews with public appearances during the American Soybean Association's 48th annual meeting.

"The candidates (pictured above) and their chaperones will attend a 'get acquainted' session on Sunday night. Monday morning they will be among–the guests at the Ladies Coffee.

"Judging interviews will be conducted Monday afternoon. The girls will be individually introduced to the assembled convention during the evening banquet by Jack Dillard of station KWKH, Shreveport. The winner will be crowned as a finale to the event.

"The six candidates chosen (at press time) are sponsored by their respective state soybean associations. The Louisiana Soybean Association also expects to enter a state winner."

945. *Soybean Digest.* 1968. Honorary life members [American Soybean Assoc.]: Walter W. Sikes, John Sawyer, Herbert W. Johnson. Sept. p. 22.
• ***Summary:*** "Walter W. Sikes spent over 30 years with USDA. He joined the Department in 1935 and became associated with the sales of oilseeds and products in 1948. He has been director of the fats and oils division, Foreign Agricultural Service, since 1958. As director, he has been primarily responsible for the programs helpful to increasing their commercial sales abroad.

"Mr. Sikes has traveled extensively, promoting sales of soybeans and soybean products around the world. It was mainly through his efforts that U.S. soybean oil has been accepted in India and Pakistan. His staff has worked closely with the American Soybean Association and the Soybean Council in their worldwide market development efforts. ASA has long enjoyed excellent relations with FAS through the liaison with Walter Sikes.

"Mr. Sikes is now retired from FAS and resides in Largo, Florida. He holds a B.A. degree from Wake Forest College, North Carolina.

"John Sawyer of London, Ohio, has been tireless in his efforts for the soybean growers of America. He is a past president of the American Soybean Association, 1957-59, has been a member of the board of directors since 1952, and is now treasurer and a member of the executive committee. Mr. Sawyer visited Japan in 1958 as a member of a trade mission while he was president. Mr. Sawyer has many and varied interests, not only in the, field of soybeans, of which he is a large producer. As manager of Orleton Farms, Inc., he operates a family grain and livestock farm of some 5,000 acres in central Ohio, other Ohio farming operations and cattle ranches in Montana, Florida, and Pennsylvania, also an enterprise in Florida where 10 acres of radishes are harvested daily throughout the year.

"Mr. Sawyer is a graduate of Princeton University. He is married and the father of four daughters.

Dr. Herbert W. Johnson has played a large part in the improvement of soybeans and the development of new soybean varieties in the U.S. He is now head of the agronomy department of the University of Minnesota. He grew up on a small farm in western Tennessee, received his B.S. degree from the University of Tennessee and his PhD from the University of Nebraska.

"Dr. Johnson started his soybean breeding research with the U.S. Department of Agriculture in 1948 in North Carolina, where he participated in the development of the Jackson and Lee varieties. He transferred in 1953 to the Plant Industry Station at Beltsville, Maryland, as head of the soybean section, where he was in charge of USDA's soybean improvement program until he went to the University of Minnesota in 1964. At the University of Minnesota he has laid out a program that literally 'takes the soybean plant apart and watches it tick.'"

Portrait photos show Sikes, Sawyer, and Johnson. Address: 1. USDA FAS; 2. Ohio; 3. USDA Breeder, Head, Dep. of Agronomy, Univ. of Minnesota.

946. *Soybean Digest.* 1968. Two new directors named to ASA [American Soybean Assoc.] board; reelect officers. Sept. p. 18-19.
• ***Summary:*** "There are now 16 state associations affiliated with the American Soybean Assoc., including Alabama, Arkansas, Georgia, Indiana, Iowa, Illinois, Louisiana, Minnesota, Mississippi, Missouri, North Carolina, Ohio,

South Carolina, Texas, Tennessee, and Virginia." "Officers of the newly affiliated state associations are" given for Alabama, Georgia, and Virginia.

Photos show the following: (1) ASA reelected officers Leslie Tindal (secretary), John Sawyer (treasurer), Harris Barnes (president), Seeley Lodwick (vice president). (2) Two new ASA directors: Everett Royer of Irwin, Ohio, and Joe Pepper of Weston, Missouri. (3) Executive vice president Chet Randolph, and president Harris H. Barnes. (4) Awards committee: Howard E. Grow (administrative assistant), Chester Biddle, Charles V. Simpson, chairman. (5) Scott Sawyers of Tokyo [Japan], W.B. Tilson of Texas, and Larry Krueger advertising/membership.

947. Breth, Steven A. 1968. The soybean cyst nematode threat. *Crops and Soils Magazine* 21(1):7-13. Oct.
• ***Summary:*** This article begins: "Not all soybean growers know what the soybean cyst nematode looks like, but they will. It's almost inevitable." The cyst nematode was first discovered in the USA in New Hanover County, North Carolina, in 1954. Two years later it was found in Lake County, Tennessee, and Pemiscott County, Missouri. Today over 100 counties have infestations. A map (p. 9) of the southeastern USA shows how the soybean cyst nematode has spread, on a county by county basis. Address: Editor, Crops & Soils. Magazine.

948. *Soybean Digest.* 1968. Phase 1 lifts off. Oct. p. 10.
• ***Summary:*** "Phase 1, ASA's plan of contribution by growers and agribusiness to launch a program of worldwide market development, is airborne. The results as of Sept. 13, when this was written, were: 120 growers had contributed a total of $3,526.24." Soybean growers voted to adopt the program at the American Soybean Assoc. annual convention in New Orleans several weeks ago. Note: All contributions are voluntary; this is not a "checkoff" program.

Action related to Phase I in the following states is discussed: Illinois, Iowa, Arkansas, South Carolina, Louisiana, and North Carolina. "The Arkansas Soybean Assn. slated three regional meetings of state and county leadership, involving hundreds of leading growers, to establish the groundwork for moving ahead to a statewide action program."

An illustration shows the tail of a rocket, with "asa" written on it, during lift-off.

949. North Carolina Soybean Producers Association, Inc. 1968. Did you know (News release). Suite 230, North Hills Office Mall, P.O. Box 17514, Raleigh, North Carolina 27609. 1 p. Nov. 1.
• ***Summary:*** "The champ of all beans, Mr. Soybean has been variously described as 'Gold from the Soil,' 'Golden Nugget,' 'Miracle Crop,' and in a variety of other glowing terms... Truly, soybeans is a miracle crop." Address: Raleigh, North Carolina. Phone: 919-787-6358.

950. *Soybean Digest.* 1968. A progress report: Phase 1. State associations and county committees. Nov. p. 20.
• ***Summary:*** "Condition: Off and running. Receipts to date: $15,141 from growers and agribusiness. Status: 15% of an additional $100,000 by Aug. 1, 1969." In North Carolina, Arkansas, and Texas ½ cent per bushel [checkoff] deductions are automatically made at the first point of sale.

951. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1969. The Uniform Soybean Tests: Southern States, 1968. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 237. Feb. 131 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/68soybook.pdf
• ***Summary:*** Except for the cover, this document is typewritten.

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: Map: Locations of cooperative uniform soybean tests, Southern States, 1968. Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII. Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

952. *Soybean Digest.* 1969. Seed directory (Ad). Feb. p. 46-47.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Alabama (1 supplier), Arkansas (10), Delaware (1), Georgia (2), Illinois (11), Indiana (6), Iowa (11), Kentucky (1), Louisiana (1), Michigan (1), Minnesota (12), Mississippi (2), Missouri (5), Nebraska (7), New York (2), North Carolina (5), Ohio (4), Oklahoma (1), South Carolina (1), Tennessee (8), Virginia (2), Wisconsin (1 listing). For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers rather than named seed companies.

953. *News and Observer* (*Raleigh, North Carolina*). 1969. Solon hails soybean: 'Queen of crops.' March 1.
• ***Summary:*** The soybean had its moment in the limelight Friday as Senator George Wood (Democrat from Camden) took to the floor of the state Senate "to praise the noble bean and bemoan what he called 'the growing urban orientation of this State.'" He received a standing ovation. The soybean is

now North Carolina's No. 2 money crop.

A 3½ by 4½-inch black-and-white photo titled "First Crop" shows two men standing in a field of soybeans. The man on the right has a soybean plant (which he is using as a pointer) in his right hand. The caption reads: "The first commercial crop of soybeans in this country may have been grown on this farm near Elizabeth City. Farm owner Frank W. Hollowell Jr. (right) pointed to a likely production area for Pasquotank County extension chairman Swindell Lowery. Hollowell's grandfather, Wilson Hollowell, is credited locally with growing the first soybeans as a farm crop in the U.S.

Note 1. Samuel Bowen grew soybeans near Savannah, Colony of Georgia, in 1765 (Hymowitz & Harlan 1983). This was more than a century before Wilson Hollowell could have grown soybeans in North Carolina–in the 1870s or 1880s.

Note 2. It is not clear whether or not this photo was published with this article. A separate document shows that it was (also?) apparently published on Dec. 18 and Dec. 24, 1967. It's source: N.C. State photos.

Note 3. This is the earliest English-language document seen (July 2007) that uses the term "noble bean" to refer to the soybean.

Note 4. This is the earliest English-language document seen (July 2007) that uses the term "Queen of crops" to refer to the soybean.

954. Colvin, B.M.; Lowe, R.A.; Ramsey, H.A. 1969. Passage of digesta from the abomasum of a calf fed soy flour milk replacers and whole milk. *J. of Dairy Science* 52(5):687-88. May. [2 ref]

• ***Summary:*** Note: This is the earliest document seen that mentions abomasum or abomasal in connection with soy. *Webster's Dictionary* defines abomasum (derived from New Latin, via the Latin *ab* + *omasum* = the tripe of a bullock), a word first used in about 1760, as "the chamber of the ruminant stomach that is fourth and has a true digestive function." The adjective is abomasal. Address: Dep. of Animal Science, North Carolina State Univ., Raleigh, North Carolina 27607.

955. *Soybean Digest.* 1969. "Princess Soya" contest. Aug. p. 28.

• ***Summary:*** "The 1969 National "Princess Soya" contest will be a highlight of the Myrtle Beach [South Carolina] convention. At presstime six states had entered contestants with Arkansas and Missouri also expected to do so. The six young ladies vying for the national title are: Donna Abercrombie, 18, Jonesboro, Louisiana; Marilyn Joyce Ballard, 19, Fuquay-Varina, North Carolina; Julie Ann Carlson, 18, Chokio, Minnesota; Roxanne Copeland, 21, Lamar, South Carolina; Catherine Heindl, Canton, Mississippi; and Phyllis Stremming, 21, Dieterich, Illinois. Judges for the contest include John Sawyer, ASA national treasurer and national board member; Fred Watts, Jr., General Manager, South Carolina Farm Bureau Marketing Assn.; and a representative of the American Home Economics Assn.

Portrait photos show six young beauties, with the name and state of each below the photo. Most are wearing a crown or diadem.

A 7th and large photo shows: Mary Ellen Laatz, Grande Ridge, Illinois, 1968 National "Princess Soya."

956. Barnes, Harris H., Jr.; Randolph, Chet. 1969. A massive program mounted: ASA report. *Soybean Digest.* Sept. p. 19-22.

• ***Summary:*** At the annual meeting of the American Soybean Assoc. in New Orleans last year, there was evidence of a new outlook and attitude. "An entire section of the growers' convention dealt with market development and more precisely the need to mount a massive program to move soybeans and soybean products." The ASA's 15-year-old program in Japan has provided experience and the nucleus for expansion into other countries, including Taiwan, Korea, Germany, and Iran. The ASA has signed a $1.6 million agreement with the Foreign Agricultural Service for market development in 17 countries during the next two years.

"It's particularly encouraging to note that three states have now held soybean checkoff referendums that passed by sound majorities. In Louisiana it was 77%, North Carolina 82%, South Carolina 80%... In addition, Minnesota, Missouri, Texas, and Ohio have all passed enabling acts... The above is evidence growers support the ASA effort to step up market development work." Yet ASA membership has failed to grow. Address: 1. President; 2. Executive vice president. Both: American Soybean Assoc.

957. *Soybean Digest.* 1969. Certificates of meritorious service. Sept. p. 17.

• ***Summary:*** Contains a description and photo of each of the following men who have worked to help soybeans in America: (1) Dr. Jean W. Lambert of Minnesota (Education and research). (2) Verne Strickland of Raleigh, North Carolina (Farm communications). (3) John Stevens (Service within the association. AS southern field representative for the American Soybean Association; he brought nine state soybean associations into being). (4) Dr. J.C. Hackleman of Illinois ("For his service to soybeans and the American Soybean Assn. over a period of time surpassed by no other man").

958. *Soybean Digest.* 1969. Soybeans were grown first on North Carolina flatlands. Oct. p. 44.

• ***Summary:*** This is a summary of an article by Woody Upchurch in the News and Observer (Raleigh, North Carolina). See news release by Upchurch, Dec. 1967. One photo in *Soybean Digest* shows Frank W. Holloway, Jr.

pointing out the spot where the first commercial crop of U.S. soybeans may have been grown near Elizabeth City, North Carolina. Another portrait photo shows W.T. Culpepper, who processed the first U.S. grown soybeans commercially in 1915. His son, W.T., Jr. is shown standing beside the portrait.

959. *Soybean Digest.* 1969. Phase II kicked off in several states. Nov. p. 13.
• ***Summary:*** Phase II is a voluntary ½ cent per bushel checkoff on soybeans at the first point of sale. This American Soybean Assoc. program has been kicked off in several states according to ASA field director Merv Syverson. Funds collected from this program will go for market development in Japan, Germany, and Iran. Some states have moved directly into Phase III, which uses state enabling legislation to gain the ½ cent per bushel deduction. "North Carolina, Louisiana, and recently south Carolina have circulated referendums and will automatically collect the funds at the first point of sale."

Progress from other Midwest states: The Ohio legislature has passed a checkoff bill and is anticipating a referendum. In Indiana a checkoff bill has not yet passed, but the Indiana Soybean Growers Assn. has voted to go to Phase II. In Illinois the Land of Lincoln Soybean Assn. has gone into Phase II both at the elevator and later on in direct grower contact. Minnesota has passed a checkoff bill but has not yet set the date for a second referendum. The Minnesota Soybean Growers Assn. is working on a membership drive and has instituted a voluntary checkoff. The Nebraska Soybean Assn. plans a drive in December for the minimum 400 members for affiliation with the ASA. The Missouri legislature has passed a checkoff bill and the Missouri Soybean Assn. is preparing for a referendum; the date is to be set.

960. *Soybean Digest.* 1969. Louisiana takes lead... commits checkoff funds: Market development. Dec. p. 3.
• ***Summary:*** "The Louisiana Soybean Promotion Board voted unanimously Nov. 12 in Alexandria to invest ¼ cent per bushel from the state's soybean checkoff funds in market development projects funded through the American Soybean Institute.

"The states of North and South Carolina in addition to Louisiana have passed referendums authorizing an automatic checkoff of ½ cent per bushel on all soybeans grown in those states. Louisiana is the first state to take official action investing ¼ cent of the funds collected, which have totaled $49,000 to date. Requests for refunds total 1%. The other ¼ cent per bushel collected by the Louisiana Board will be designated for promotion and research at a later date.

"Farmers in states without legislated checkoff are contributing to Phase II, which is a voluntary checkoff of ½ cent per bushel at first point of sale to their state associations with ¼ cent going to support the market development program."

961. *Soybean Digest.* 1969. Growers continue to back soybeans nationally: Market development. Dec. p. 3.
• ***Summary:*** "Funds continue to flow in from farmers supporting the American Soybean Assn.'s campaign to promote soybean sales abroad. Many states are in Phase II of the development program which is a voluntary checkoff of ½ cent per bushel made at the [first] point of sale.

"Phase II is an interim program until states pass legislation which enables an automatic deduction of ½¢/bu from all soybean sales. (The ½ cent will be refunded to any farmers who prefer not to support the market development activities in states where growers have passed a checkoff referendum.)

"The legislative program and referendum, Phase III, have already been passed in North Carolina, South Carolina, and Louisiana.

"Funds raised under these programs will be used to develop and expand world markets for soybeans. Funds are matched by the Foreign Agricultural Service [FAS], and in some cases by local processors–so every dollar contributed by farmers is multiplied 5 to 10 times.

"Results of market development activities have been so successful in Japan and Spain that additional funds will be used to develop markets in France, Italy and other nations in Europe and the Far East. Japan and Spain are the biggest importers of U.S. soybeans..."

962. National Soybean Processors Assoc. 1969. Year book & trading rules–1968-1969. Washington, DC: National Soybean Processors Association. 64 p. 23 cm. Spiral bound.
• ***Summary:*** Contents: Constitution and by-laws (As amended Aug. 6, 1968). Officers and directors. Names of members. List of standing committees. Trading rules on soybean meal. Appendix to trading rules on soybean meal: Official methods of analysis (moisture, protein, crude fiber, oil {only method numbers listed}, sampling of soybean meal {automatic sampler, probe sampler}). Trading rules on soybean oil. Definitions of grade and quality of export oils. Tentative soybean lecithin specifications. Appendix to trading rules on soybean oil: Uniform sales contract, grading soybean oil for color (N.S.P.A. tentative method), methods of analysis (A.O.C.S. official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses; soap stock, acidulated soap stock and tank bottoms (only method numbers listed). Foreign trade definitions (for information purposes only). Address: 1225 Connecticut Ave., N.W., Suite 314, Washington, DC 20036. Phone: 202/659-4610.

963. *News and Observer* (*Raleigh, North Carolina*). 1970. Soybean yields on N.C. farms show increase. Jan. 19.
• ***Summary:*** In North Carolina, both the individual grower

record and the state average record were broken during the past season.

The new individual champion is Dewey Smith, Route 7, Fayetteville, who grew 66.2 bushels of No. 1 soybeans per acre; the old record, set in 1967, was 64.6 bushels.

The state average soybean yield was 26 bu/acre, as part of the 1969 estimated crop of 1 million acres. It was a good year for soybeans, according to Dr. John Clapp. extension specialist at North Carolina State University.

If a soybean grower is unable to get a yield of 30 bushels per acre, his main obstacles are probably acid soils (fixed by liming) and generally low soil fertility, weeds, and insects.

More growers in North Carolina should be liming their soybean fields.

964. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1970. The Uniform Soybean Tests: Southern States, 1969. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 241. Feb. 131 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/69soybook.pdf

• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture. Agricultural Research Service. Crops Research Division, cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII. Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

965. *Soybean Digest.* 1970. Seed directory (Ad). Feb. p. 42-43.

• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, North Carolina, North Dakota, Ohio, South Carolina, South Dakota, Tennessee, Virginia, Wisconsin, Canada (Ontario).

For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

Commonly sold varieties in three states include:

Arkansas: Bragg, Custer, Dare, Davis, Dyer, Hale 7, Hampton 266, Hill, Hood, Lee, Picket, York.

Delaware: Delmar, Kent.

Georgia: Bragg, Coker, Davis, Hampton, Hardee.

Illinois: A-100, Adams, Amsoy, Beeson, Calland, Chippewa, Clark 63, Corsoy, Cutler, Hark, Harosoy, Harosoy 63 Hawkeye, Hawkeye 63, Kent, Lindarin 63, Morton 333, SRF 300, Wayne.

966. American Soybean Association. 1970. Soybean Digest Blue Book Issue. Hudson, Iowa: American Soybean Assoc. 176 p. March. Index. Index of advertisers. 22 cm.

• ***Summary:*** Starting on page 54 is a section titled "Charting the course of soybean trade," which states: "Steadily bigger harvests, strong foreign demand, and aggressive market development have combined to make soybeans the leading U.S. crop as a dollar earner in foreign markets. We exported over $1.1 billion worth of soybeans and soybean products in 1967-68, and our share of world exports has risen from 2% in 1934-38 to about 90%. Output from about 2 out of every 5 harvested soybean acres goes abroad as beans or products. See the following pages."

On the top half of p. 55 is a bar chart titled "U.S. soybean exports as a share (percentage) of total U.S. agricultural exports. The percentage increased from about 1½% in 1948 to about 17½% in 1968.

On the bottom half of page 55 is a graph titled "Trend of U.S. soybean exports, 1944-68. It starts at zero in 1944-48 and increases to just over 250 million bushels in 1968. Since 1964 it has been growing more rapidly that previously.

On the top half of p. 56 is a bar chart titled "State shares of U.S. soybean exports," which shows the dollar value of exports from 10 leading states in 1954 and 1968. The states, in descending order of 1968 exports are Illinois, Iowa, Arkansas, Missouri, Indiana, Minnesota, Mississippi, Ohio, Louisiana, and North Carolina.

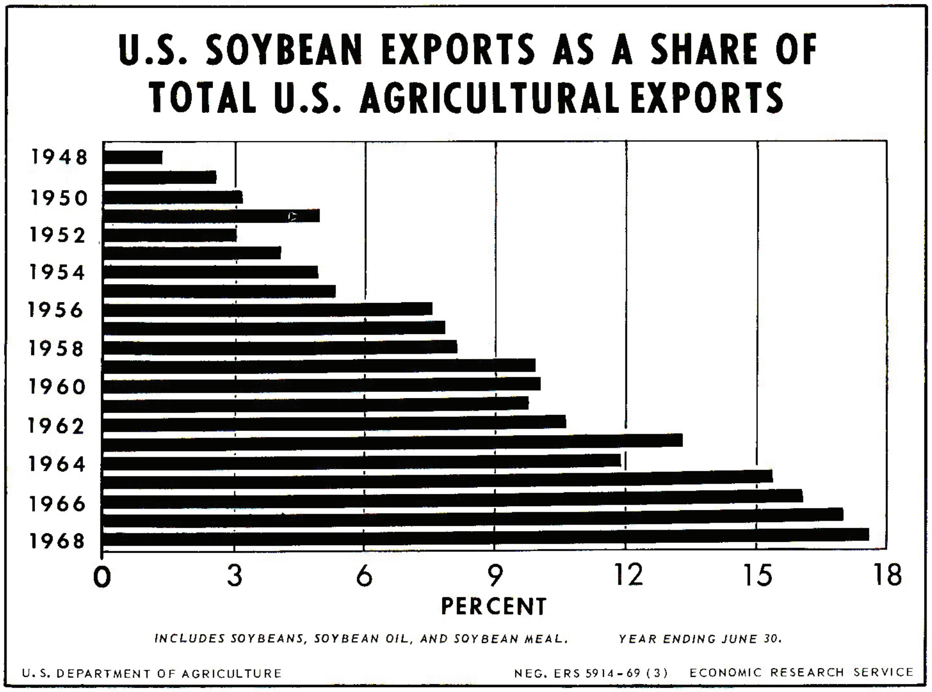
On the bottom half of p. 56 is a bar chart titled "Ten leading U.S. soybean export markets, 1968," with the amount of soybeans exported to each market in million bushels. The countries in descending order are Japan (50), Netherlands (38), West Germany (32), Spain (28), Canada (23), Denmark (15), Italy (16), Taiwan (12), Israel (10), and Belgium-Luxembourg (9). Address: Hudson, Iowa.

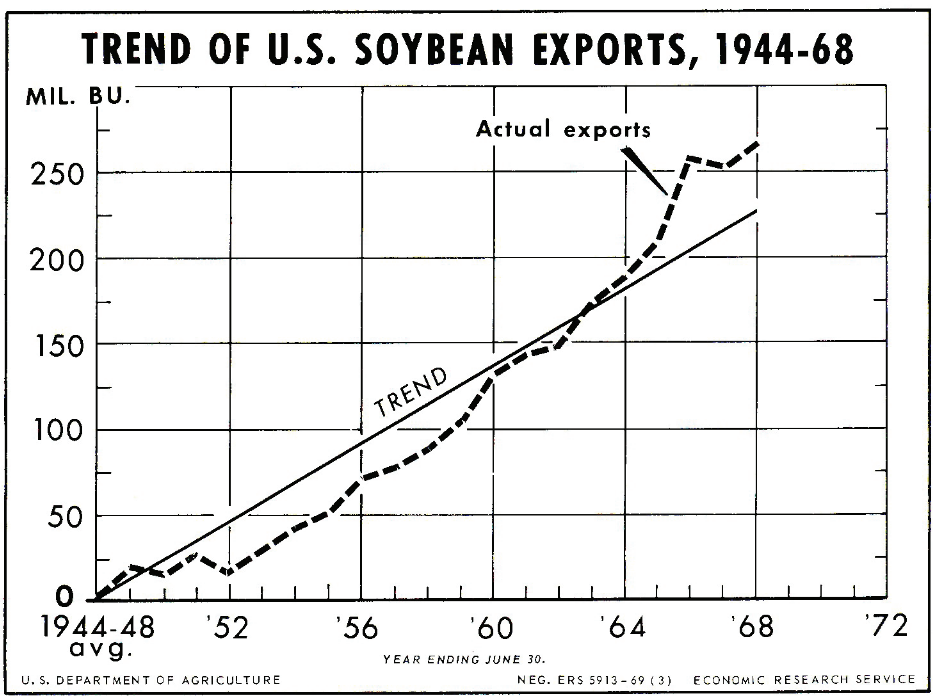
967. Dies, Edward Jerome. 1970. In the beginning... *Soybean Digest.* Aug. p. 42-44.

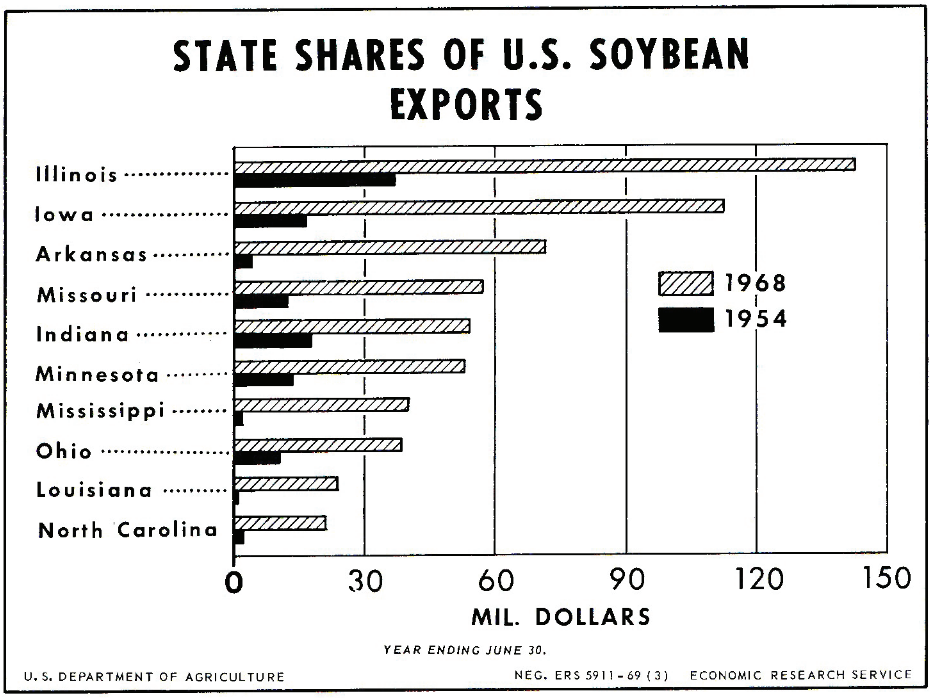
• ***Summary:*** The article begins: "Far back when the Pyramids were being built, 3 centuries before the Tower of Babel, and 12 centuries before Solomon fashioned his temple, the little soybean was hoary with age.

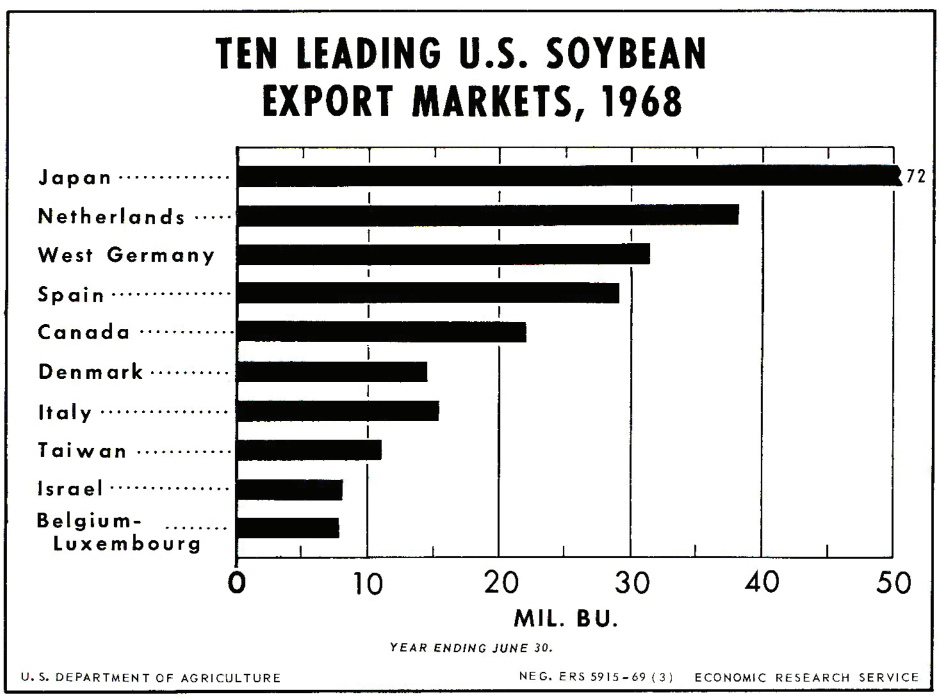
"As to the first brave men to eat the legume, we must accept a charming little vignette from antiquity. It tells of a rich caravan, laden with gold and furs, crawling homeward from an east China town. It was surrounded by bandits. The fat merchants took refuge in a rocky defile easy of defense. Days 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,


U.S. SOYBEAN EXPORTS AS A SHARE OF TOTAL U.S. AGRICULTURAL EXPORTS
1948
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
0
3
6
9
12
15
18
PERCENT
INCLUDES SOYBEANS, SOYBEAN OIL, AND SOYBEAN MEAL.
YEAR ENDING JUNE 30.
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 5914-69 (3)
ECONOMIC RESEARCH SERVICE


TREND OF U.S. SOYBEAN EXPORTS, 1944-68
MIL. BU.
Actual exports
250
200
150
100
50
0
TREND
1944-48 avg.
'52
'56
'60
'64
'68
'72
YEAR ENDING JUNE 30.
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 5913-69 (3)
ECONOMIC RESEARCH SERVICE


STATE SHARES OF U.S. SOYBEAN EXPORTS
Illinois
Iowa
Arkansas
Missouri
Indiana
Minnesota
Mississippi
Ohio
Louisiana
North Carolina
1968
1954
0
30
60
90
120
150
MIL. DOLLARS
YEAR ENDING JUNE 30.
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 5911-69 (3)
ECONOMIC RESEARCH SERVICE


TEN LEADING U.S. SOYBEAN EXPORT MARKETS, 1968
Japan
72
Netherlands
West Germany
Spain
Canada
Denmark
Italy
Taiwan
Israel
Belgium-Luxembourg
0
10
20
30
40
50
MIL. BU.
YEAR ENDING JUNE 30.
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 5915-69 (3)
ECONOMIC RESEARCH SERVICE

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.

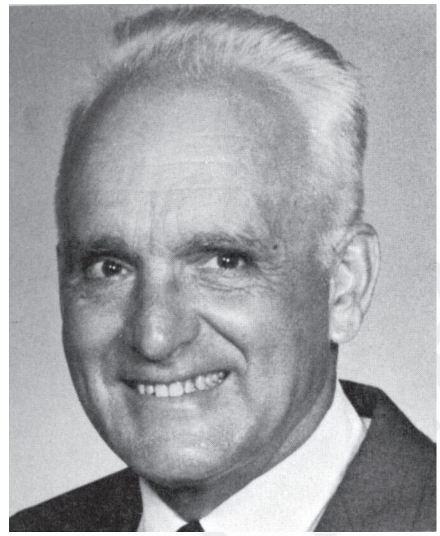
The pioneer growers were Smith and Riegel in Illinois; Elmer and E.F. (Soybean) Johnson, and G.G. McIlroy in Ohio; J.B. Edmondson, the three Fouts brothers, and Charles Meharry in Indiana. The pioneer soybean processors and NSPA, the American Soybean Assoc., and Henry Ford.

"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."

968. Pellett, Kent. 1970. Soybeans: a crop made by people who tried harder. *Soybean Digest.* Aug. p. 24-28, 30-32, 34-35.

• ***Summary:*** A superb history of the American Soybean Association on its 50th anniversary and of soybeans in America. Contents: Introduction. Market-oriented from the first. ASA's founding at Camden, Indiana (3 Sept. 1920 at Soyland). George M. Strayer takes helm; founds *Soybean Digest* (Nov. 1940 at Hudson, Iowa). The great growth of the markets. Restrictions on margarine. The market for exports (after World War II, Japanese American Soybean Institute, Soybean Council of America, American Soybean Institute {ASI}, and USDA Foreign Agricultural Service). Soybeans are big business. State soybean associations and field staff (including the legislative program and referendum [checkoff]). The task confronting us all.

Concerning state soybean associations and financing: The Minnesota Soybean Growers Association, the first affiliated association, was founded in 1962 [but did not affiliate with ASA until Jan. 1965]. Since then, 16 other state associations have been formed, and a field staff has



been established to service them. There are presently 1,900 directors of county committees, state associations, and ASA itself. A Mid-South office was opened in Memphis, Tennessee, a year ago. Financing of the soybean program is done in many ways. Many states are participating in Phase II, a voluntary checkoff at the first point of sale.

"The legislative program and referendum, Phase III, which enables an automatic deduction of ½ cent per bushel from all soybean sales in a state, was passed in North Carolina, South Carolina, and Louisiana, but was defeated in Minnesota and Missouri. The memory of the defeated checkoff in those two states is still painfully fresh. Texas and Ohio have passed enabling legislation for referendums this year.

"Funds for market development work have also been provided by the marketing boards or departments of agriculture in Iowa, Ohio, Mississippi, Missouri, Louisiana, and Tennessee."

Photos show: (1) Kent Pellett, soybean historian for 28 years, managing editor then editor of *Soybean Digest.* (2) ASA President D. Leslie Tindal, of Ten-Dale Farms, Pinewood, South Carolina. He raises 500-600 acres of soybeans annually, helped organize the South Carolina Soybean Assn., and has made 2 trips to Europe on behalf of ASA's marketing program. (3) Taylor Fouts, the first ASA president. He and his two brothers held the first meeting of the ASA on their Soyland Farm at Camden, Indiana, in 1920, when they had 150 acres in soybeans plus another 200 acres of soybeans interplanted with corn. Several soybean field days had been held at Soyland Farm in earlier years. (4) Panoramic photo (courtesy of George M. Briggs, of Wisconsin) of the more than 1,000 people who attended the "First Cornbelt Soybean Conference" at Soyland Farm in Sept. 1920. Note: As of March 1999, this photo is owned by Bill Fouts of Indiana. On page 26, from right to left, the people seated in the second row are: Unknown, Louanna Fouts (wife of Finis), Finis Fouts, Lillie May Fouts (wife

of Taylor), Taylor Fouts, Lillie Jane (wife of Noah), Noah Fouts. (5) Some ASA firsts: Paul C. Hughes, the first ASA fieldman, 1948-1951. He is now manager of the Farmers Soybean Corp., Blythville, Arkansas. David R. Farlow was the first executive assistant 1958-61. He is now manager of the Bunge Corp. vegetable oil division in New York. Shizuka Hayashi was managing director of the Japanese American Soybean Institute for ASA in Tokyo from its founding in 1956 until his retirement in 1968. (6) Dr. Steve Chen, director of the Taiwan office, with staff. (7) Scott Sawyers, Far East director, in Tokyo, with Karl Sera, Yoshiko Kojima, and his staff. Ms. Kojima, who has been with ASA since 1957 and is the longest serving overseas employee, is chief of the food section of ASI's Far East Office. (8) Dr. Karl-Wolfgang Fangauf, director of the German office in Hamburg, with staff. (9) Enoch Lachinian, director of the Iran office, with staff. (10-14) ASA staff in the United States, which started with one part-time person in 1940 and has grown to 45 in 1970, including regional offices and overseas staff of 19 in 4 foreign offices. Incl. Chet Randolph, Howard E. Grow, George McCully, Merv Syverson, Larry Krueger. (15) Princesses and queens: Mary Ellen Laatz of Illinois and Julie Carlson of Minnesota were the first to be named national "Princess Soya" in 1968 and 1969. But "soybean queens" were being named as long ago as 1948, when Edith Harris of Dyersburg, Tennessee, was given that title at Portageville, Missouri.

On the cover of this issue are two oval photos: (1) A man [probably Taylor Fouts] seated on a cultivator pulled by two horses. "Cultivating soybeans on farm of Taylor Fouts, first ASA president, in 1923." (2) A modern tractor with a cultivation attachment behind. "Cultivating soybeans on farm of Leslie Tindal, 33rd ASA president (left in picture) in 1970."

969. *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.

970. *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.

971. *Soybean Digest.* 1970. ASA convention sites 1920-1969. Aug. p. 40.

• ***Summary:*** 1920–Camden, Indiana [Fouts Bros. Farm]. 1921–Urbana, Tolono, Illinois. 1922–Columbia, Missouri. 1923–Madison, Wisconsin. 1924–Ames, Iowa. 1925–Washington, DC. 1926–Stoneville, Clarksdale, Greenville, Mississippi. 1927–Belhaven, Washington, Elizabeth City, North Carolina. 1928–Camden, Lafayette, Indiana. 1929–Guelph, Ontario, Canada.

1930–Urbana, Illinois. 1931–Columbia, Missouri. 1932–Washington, DC. 1933–Baton Rouge, Houma, Louisiana. 1934–Little Rock, Stuttgart, Marianna, Arkansas. 1935–Evansville, Lafayette, Indiana. 1936–Ames, Cedar Rapids, Hudson, Iowa. 1937–Urbana, Illinois. 1938–Columbus, Wooster, Ohio. 1939–Madison, Wisconsin.

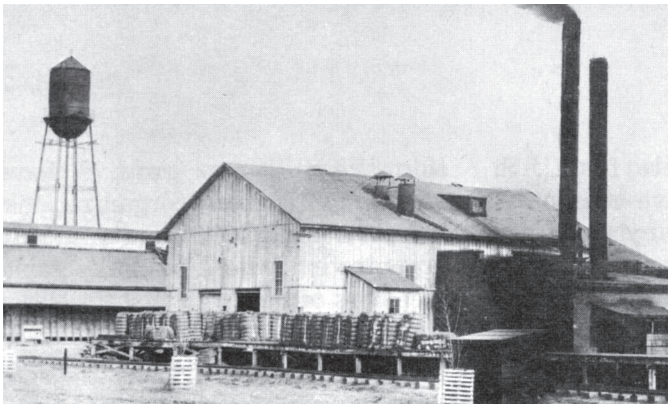
1940–Dearborn, Michigan. 1941–Ames, Des Moines, Iowa. 1942–Lafayette, Indiana. 1943–Cedar Rapids, Iowa. 1944–Urbana, Illinois. 1946–St. Louis, Missouri. 1947–Columbus, Ohio. 1948–Memphis, Tennessee. 1949–Minneapolis, Minnesota.

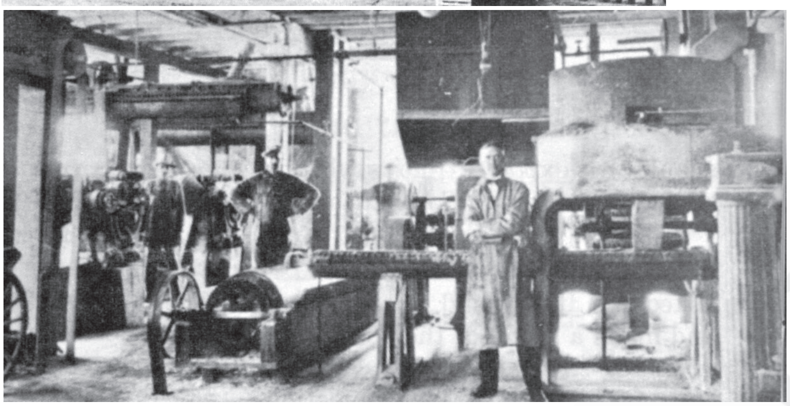
1950–Springfield, Illinois. 1951–Des Moines, Iowa. 1952–Lafayette, Indiana. 1953–St. Louis, Missouri. 1954–Memphis, Tennessee. 1955–Cincinnati, Ohio. 1956–Urbana, Illinois. 1957–Minneapolis, Minnesota. 1958–Des Moines, Iowa. 1959–St. Louis, Missouri.

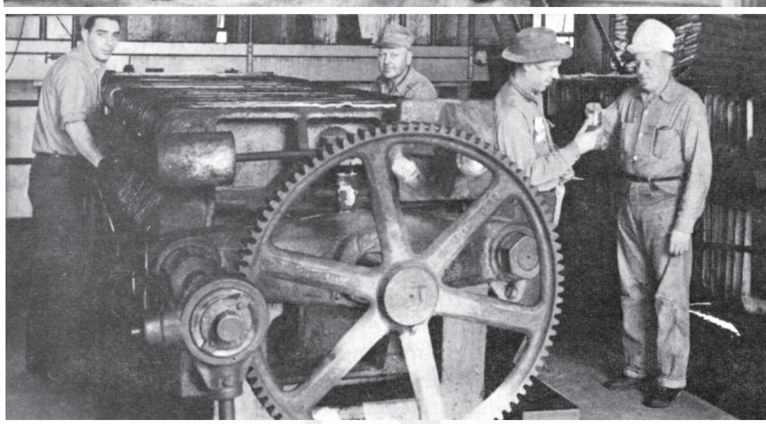
1960–Memphis, Tennessee. 1961–Indianapolis, Indiana. 1962–Minneapolis, Minnesota. 1963–Columbus, Ohio. 1964–Kansas City, Missouri. 1965–Memphis, Tennessee. 1966–Des Moines, Iowa. 1967–Peoria, Illinois. 1968–New Orleans, Louisiana. 1969–Myrtle Beach, South Carolina. 1970–Golden Anniversary, Minneapolis, Minnesota.

972. Weller, Paul. 1970. Birth of an industry. *Soybean Digest.* Aug. p. 58-59, 61.

• ***Summary:*** A fairly good, brief history of the soybean crushing industry in the USA, and the National Soybean Processors Association. Soybeans had been grown in America "since about 1804. Civil War soldiers carried them as 'coffee berries,' using them to brew 'coffee' when the real







product became scarce."

The first soybeans in America "were likely crushed as early as 1910, among the Chinese in California. Oriental emigrants were then importing soybeans from China and Manchuria, and crudely crushing them for cooking oil. These early efforts were followed by commercial activity among several North Carolina cottonseed mills. In 1915, when cottonseed became scarce, the mills substituted locally grown soybeans."

"On a warm fall day [Sept. 30] in 1922, A.E. Staley Sr. pulled a master switch on the nation's first commercial soybean processing plant. He helped inaugurate a new industry offering, for the first time, a key commercial market for America's soybean crop. The place was Decatur, Illinois..."

"Role of the processors: Several commercial leaders saw the promise of soybeans by 1920. They also saw a need for expanded markets, if farmers were to receive a fair return for their crop. Acreage was expanding fast–Illinois had 16,000 acres in 1919, with Indiana having only several hundred. But by 1922, this total had doubled, and farmers were rushing to plant more. A.E. Staley Sr. started with his processing mill at Decatur. The following year, Eugene D. Funk Sr. set up the nation's second commercial processing plant at Bloomington, Illinois. Funk, a pioneer seed producer and an organizer of the American Soybean Assn., recognized that domestic processing operations would be necessary to move the fast-growing soybean crop–by then estimated at over a half-million acres.

"These early processors faced seemingly insurmountable odds. It was nearly impossible to obtain a steady supply of soybeans to maintain their plants. It was just as difficult to dispose of soybean oil meal and flour. No one would buy it in 1924, and few persons would accept it as a gift. It was even difficult to sell the domestically produced soybean oil, because buyers considered it grossly inferior to imported oils.

"The answer lay in extensive programs of education, and the early processors accepted this responsibility. Working closely with state universities and extension services, they helped develop bulletins to help farmers produce more soybeans. Marketing teams fanned out to 'sell' U.S. soybean oil and meal products.

"One of the most unique projects ever attempted was a special Soybean Exhibit Train, supplied by the Illinois Central Railroad. Soybean processors and USDA extension personnel equipped and staffed the train to tell the soybean story to the nation. In 21 days [during 1927], the six-car soybean train traveled 2,478 miles, to 105 towns across America. Nearly 34,000 persons toured its varied soybean product exhibits.

"Formation of NSPA: The soybean processing industry was expanding enough by 1930 to warrant a national association of processing firms. A committee was set up under the leadership of Whitney H. Eastman of Archer Daniels Midland Co. Eastman called an organizational meeting for May 21, 1930, at Chicago's downtown City Club. Twelve processing firms were represented, including A.E. Staley Mfg. Co.; Archer Daniels Midland Co.; Allied Mills Inc.; Funk Bros. Seed Co.; and Spencer Kellogg & Sons.

"The meeting gave birth to the National Soybean Oil Manufacturers Assn., forerunner of today's National Soybean Processors Assn. Eastman, now retired in suburban Minneapolis, recalls the original Association objectives: "To promote in the industry a mutual confidence and a high standard of business ethics; to eliminate trade abuses; to

promote sound economic business customs and practices; to foster wholesome competition; to provide ultimately for individual efficient business management operating independently and thus generally to promote the service of the industry in the public welfare."

"Other industry benefits came out of the formation of a processors' association. Prior to this time, prices for soybeans were largely determined by demand and supply for soybean seed. Establishment of new markets for processed products and the rapid expansion of soybean acreage due to new demand changed this structure. During the early 1930's, prices were based on demand for oil and meal, and generally improved as demand increased. At one point, the price per bushel increased from 60¢ to $1.23.

"NSPA formed a variety of committees to service the burgeoning industry. There was a research and trade promotion group, a soybean grades and contract group, traffic and transportation group, as well as committees on statistics and industry liaison. These formed the nucleus of NSPA's current slate of 13 specialized committees.

During NSPA's first 25 years, U.S. soybean acreage jumped from 3,473,000 acres yielding 13,929,000 bushels– to 21 million acres yielding a crop of 457 million bushels. By 1956, soybeans were second only to corn in cash farm income on the nation's farms.

"It was during this first 25 years that most of today's major soybean processors entered the business. Central Soya Co. shipped its first load of soybean oil on December 8, 1934, from its plant at Decatur, Indiana. Swift & Co. built its first expeller soybean mill at Champaign, Illinois, in 1937, followed by a second mill at Des Moines, Iowa in 1939. At about the same time, Quincy Soybean Co. was formed at Quincy, Illinois, Cargill Inc. entered the field in 1943 at Minneapolis [Minnesota], and other major processors followed quickly the industry's challenge."

Photos show: (1) The Elizabeth City Oil & Fertilizer Co. in North Carolina, generally believed to have been the first to process U.S. grown soybeans. A test run was made on 10,000 bushels in Dec. 1915. (2) The soybean crushing plant in the Funk Bros. Seed Co., Bloomington, Illinois, installed in 1924. (3) The Archer Daniels Midland Co. solvent extraction plant in Chicago, Illinois, in about 1946. (4) One group of the nearly 34,000 people visiting the "Soybean Special" train in 1927. Inside its six cars was the story of the soybean industry as it existed at that time. Address: National Soybean Processors Assn.

973. **Product Name:** Golden Soya (Salted Roasted Soybeans; Soynuts).
Manufacturer's Name: United Roasters Inc.
Manufacturer's Address: Clayton, North Carolina.
Date of Introduction: 1970 September.
Ingredients: Soybeans, vegetable oil, salt.
How Stored: Shelf stable.
New Product–Documentation: Humphries, Bill. 1970. "Soybeans feel effect of bill." *News and Observer* (Raleigh, North Carolina). Nov. 26. Roasted soybeans are delicious. Jessie Austin (of Raleigh), is president of United Roasters, Inc., which has a plant at Clayton, North Carolina. Austin believes this is "the only facility in the United States devoted exclusively to production of roasted soybeans for human consumption." It began operation on 1 Sept. 1970.

After 18 months research, this company has applied for a patent on a 34-step roasting process which takes "out the bean flavor and puts in a nut flavor."

The company, which is owned by nine stockholders, has installed about $150,000 dollars worth of equipment so that the plant now has a capacity of about 300,000 pounds a month. The process is automated. Roasting and packaging a container of beans takes only about 15 minutes.

Austin says that roasted soybeans have several advantages over other snack foods. They keep nearly twice as long as typical roasted nuts. They contain fewer calories than most nuts and are much higher in protein.

The company is shooting for four markets–overseas, institutional (school lunch programs, bars, motels), food processors (mainly candy companies), and retail stores.

For the retail trade, the company has a 3/4-ounce package for vending machines and a 6-ounce package for home or family use.

"Half-ounce packages are available for airlines to serve as snacks."

Humphries, Bill. 1973. "N.C. first to plant it in U.S." [the soybean in North Carolina] *News and Observer* (Raleigh, North Carolina). Sept. 16. Repeats some of the information above. This firm has offices in Raleigh.

974. *Soybean Digest.* 1970. Honorary life members [American Soybean Assoc.]: Harris H. Barnes, Yukio Sakaguchi, Dr. Jean W. Lambert, John Reiser Jr., and Dr. Richard L. Bernard. Sept. p. 20-21.
• ***Summary:*** "Yukio Sakaguchi is president of Nisshin Oil Mills Co. and president of the Japan Oilseed Processors Association. He has been associated with this leading Japanese oilseed processing firm since 1924 and president since 1955. And he has been president or vice president of the Japan Processor Association continuously for 21 years.

"Mr. Sakaguchi was most instrumental in establishing the joint U.S. Department of Agriculture-American Soybean Association market development project for soybeans in Japan in 1956. The program has had the complete support of Mr. Sakaguchi and of JOPA. His help is undoubtedly a reason the Japan project for soybeans has become one of the most important market development projects for farm products."

Mr. Sakaguchi "helped to found the new Japan Protein Food Institute and is president of the Institute."

Dr. Jean W. Lambert has long been known as "Mr.

Soybean" in Minnesota. He is currently a professor agronomy and plant genetics at the University of Minnesota. He made a trip to Japan in 1963 to obtain an agronomist's view of the Japanese food market for soybeans, for the American Soybean Association. He is a native of Nebraska.

John Reiser is a farmer who is the most consistent winner in the history of the Illinois 5-acre Soybean Yield Contest. Since the contest began in 1964, he set the all-time contest record of 82.7 bushels per acre and holds a 6-year average of 73.6 bushels. He is a native of Ashland, Illinois.

Dr. Richard L. Bernard is "one of the world's leading soybean geneticists... Probably his greatest contribution has been through his breeding work and development of new varieties.

"Since 1954 he has released the varieties Shelby, Harosoy 63, Hawkeye 63, Clark 63, Chippewa 64, and Wayne, which was the leading U.S. soybean variety in 1968.

"He took the leadership in adding phytophthora root rot resistance to varieties adapted for production in the more humid part of the Corn-belt.

"Dr. Bernard obtained his Ph.D. from North Carolina State University. He has been associated with the U.S. Regional Soybean Laboratory at Urbana, Illinois since 1954. He is new soybean geneticist and breeder at the laboratory and associate professor in the department of agronomy at the University of Illinois."

Photos show Harris H. Barnes, Yukio Sakaguchi, Dr. Jean W. Lambert, John Reiser Jr., and Dr. Richard L. Bernard.

975. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). 1970. The soybean and ASA–Fifty years of growing up together. Nov. 16. p. 2-3.
• ***Summary:*** Soybeans had been known in America since 1804 when a few bags were brought from China as a reserve food supply in the hold of a Yankee Clipper. Civil War soldiers carried them as "coffee berries," using them to brew coffee when the real thing became scarce. The USDA recorded the first soybean statistics in 1919 with a report that there had been 99,000 acres of U.S. farmland planted in beans during that year. In 1956 the American Soybean Assoc. signed a contract with USDA's Foreign Agricultural Service to cooperate in soybean market development work in Europe and Japan. This was the first such contract for overseas promotion of any U.S. farm commodity. Out of the effort came the Japanese-American Soybean Institute and the Soybean Council of America (a joint effort of ASA and the National Soybean Processors Association). Last year soybeans ranked as the nation's #1 agricultural export with a total value of over $1,400 million. Photos show: The first plant [Elizabeth City Oil & Fertilizer Co.] to process U.S. soybeans, located in Elizabeth City, North Carolina. Farmers harvesting Laredo soybeans at Mississippi State University in about 1920.

976. Humphries, Bill. 1970. Soybeans feel effect of bill. *News and Observer* (*Raleigh, North Carolina*). Nov. 26.
• ***Summary:*** A trade bill now before Congress could affect soybean farmers. The bill, which would put import quotas on textiles and shoes, sent soybean prices on the futures down 10 cents a bushel–the maximum decline allowed in one day.

Jim S. Gardner of Raleigh, executive vice president of the North Carolina Soybean Producers Association (which has 150,000 members) said he and his association are working to defeat the bill; they believe other nations will retaliate if the bill is passed.

Roasted soybeans are delicious. Jessie Austin (of Raleigh), is president of United Roasters, Inc., which has a plant at Clayton, North Carolina. Austin believes this is "the only facility in the United States devoted exclusively to production of roasted soybeans for human consumption." It began operation on 1 Sept. 1970.

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Austin says that roasted soybeans have several advantages over other snack foods. They keep nearly twice as long as typical roasted nuts. They contain fewer calories than most nuts and are much higher in protein.

The company is shooting for four markets–overseas, institutional (school lunch programs, bars, motels), food processors (mainly candy companies), and retail stores.

For the retail trade, the company has a 3/4-ounce package for vending machines and a 6-ounce package for home or family use.

"Half-ounce packages are available for airlines to serve as snacks. An airline owned by Howard Hughes has placed an order for one million packs."

"The trade name for United Roasters products is 'Golden Nuggets." They are available in barbecue and plain flavors; an imitation butter flavor is being added. Flavors for candy makers include walnut, coconut, and imitation peanut.

Note: These roasted soybeans became available in 1970, the same year Malt-O-Meal Co. (Minneapolis, Minnesota) introduced its line of Cocktail Party, Soy Ahoy, and Soy Town (Oil-Roasted Soynuts) in salted, unsalted, barbecue, and garlic flavors; could United Roasters have been the manufacturer and Malt-O-Meal Co. the marketer? Address: Farm editor.

977. Ross, J.P.; Harper, J.A. 1970. Effect of *Endogone* mycorrhiza on soybean yields. *Phytopathology* 60(11):1552-56. Nov. [12 ref]

• ***Summary:*** Growth and yield of soybean plants growing in small isolated plots previously fumigated with methyl bromide (to kill nematodes) were increased by 34-40% in the presence of a chlamydosporic species of the vesicular-arbuscular mycorrhizal fungus *Endogone.* Mycorrhizal plants accumulated greater amounts of minerals (phosphorus, carbon, copper, and manganese) and nitrogen in their foliage than nonmycorrhizal plants. In previously fumigated field plots, soybean yield was increased 29% by inoculating with the endomycorrhizal fungus *Endogone macrocarpa* (Tul.) Tul. var. *geospora.* Address: 1. Plant Pathologist; 2. Agricultural Research Technician. Both: Crops Research Div., ARS, USDA, P.O. Box 5397, Raleigh, North Carolina 27607.

978. *Soybean Digest.* 1970. "Princess Soya" Adair Rountree presented Governor Bob Scott of North Carolina... (Photo caption). Dec. p. 3.
• ***Summary:*** "... with a membership plaque to the North Carolina Soybean Producers Assn. and the American Soybean Assn. on a visit to his office."

979. **Product Name:** Soybean Oil, and Soybean Meal.
Manufacturer's Name: Cargill, Inc.
Manufacturer's Address: Fayetteville, North Carolina.
Date of Introduction: 1970.
Ingredients: Soybeans.
New Product–Documentation: *J. of the American Oil Chemists' Soc.* 1985. "Soy pioneer bows out, others grow bigger." March. p. 474, 476. Cargill has a soybean crushing plant in Fayetteville, North Carolina.

Lauser, Greg C. 1982. "History of Cargill's involvement in the soybean processing industry." Minneapolis, Minnesota. 5 p. Unpublished typescript. March 15. Courtesy Cargill, Inc. In 1970 Cargill built the Fayetteville, North Carolina, crushing plant; a refinery was added in 1976.

980. Harris, Jean. 1971. Engineered food is on the way! *News and Observer* (*Raleigh, North Carolina*). Jan. 17.
• ***Summary:*** Henry Ford's desire to make cloth from soy protein started the original research on "meat analogues." The technology for producing spun soy protein products developed from a process to produce casein fibers in Italy in the mid-1920s. A second group of "soy meats," called textured meat analogues, is made by an extrusion process applied to textured vegetable proteins made from soy protein isolates; one example is Bac-Os.

"Most of these soy meats are available only to the institutional trade. They are now in use in prisons, hospitals, and orphanages." Two manufacturers of such products are Loma Linda Foods and El Molino Mills.

In North Carolina a full soybean product, made from toasted soybeans, is sold under the name of Golden Nuggets; all Raleigh seems to be eating them.

Recipes are given for: Soya cake (with sifted soya flour). Soyanaise (with Soyamel soymilk). Golden nut pie crust (with soya flour). Soya cookies (with soya flour). Roasted soybeans (made from canned soybeans, either dry roasted at 350 degrees or deep fat fried). Puree of soybean soup (with sieved soybean pulp). Address: Food editor.

981. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1971. The Uniform Soybean Tests: Southern States, 1970. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 247. Feb. 131 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/70soybook.pdf
• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page: "United States Department of Agriculture.

"Agricultural Research Service.

"Crops Research Division.

"Cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Strain identification. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII.

Page 1: Compiled: "From data supplied by:
"John Schillinger, Maryland.
"B.E. Caldwell, Maryland
"E.L. Wisk, Georgetown, Delaware
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"H.L. Musen, Blackville, South Carolina
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"W.W. Kilby, Poplarville, Mississippi.
"J.W. McMillan, Newton, Mississippi
"D.B. Egli, Kentucky
"C.R. Tutt, Princeton, Kentucky
"R.L. Bernard, Urbana, Illinois

“D.R. Browning, Carbondale, Illinois
“V.D. Luedders, Columbia, Missouri
“Elmer Counce, Martin, Tennessee
“J.R. Overton, Jackson, Tennessee
“E.E. Hartwig, Stoneville, Mississippi
“L.A. Duclos, Portageville, Missouri
“C.E. Caviness, Arkansas
“Curtis Williams, Baton Rouge, Louisiana
“R.N. Flint, St. Joseph, Louisiana
“J.L. Rabb, Curtis, Louisiana
“J.H. Davis, Crowley, Louisiana
“G.L. Kilgore, Columbus, Kansas
“J.S. Kirby, Oklahoma
“K.B. Porter, Bushland, Texas
“D.F. Owen, Halfway, Texas
“R.D. Brigham, Lubbock, Texas
“J.P. Craigmiles, Beaumont, Texas.”

“Strain identification: The strains designated by number carry a letter prefix [in this report]. This letter identifies where each strain was selected

“Co–Coker’s Pedigreed Seed Co., Hartsville, South Carolina

“D–Delta Branch Exp. Station and U.S. Regional Soybean Laboratory

“F–Florida Agric. Exp. Station and U.S. Regional Soybean Laboratory

“Ga–Georgia Agricultural Experiment Station

“L–Illinois Agric. Exp. Station and U.S. Regional Soybean Laboratory

“La–Louisiana Agricultural Experiment Station

“Md–Maryland Agric. Exp. Station and U.S. Regional Soybean Laboratory

“N–North Carolina Agric. Exp. Station and U.S. Regional Soybean Laboratory

“R–Arkansas Agricultural Experiment Station

“S–Missouri Agric. Exp. Station and U.S. Regional Soybean Laboratory

“UD–Delaware Agricultural Experiment Station

“V–Virginia Agricultural Experiment Station.” Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

982. *Soybean Digest.* 1971. Seed directory (Ad). Feb. p. 34-35.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Tennessee.

For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

983. *Soybean Digest.* 1971. Final estimate [of U.S. soybean acreage, yield, and production] was up slightly: Crop report. Feb. p. 35.
• ***Summary:*** USDA’s final crop report issued Dec. 18 was slightly above earlier estimated of 10 million bu. and was a new U.S. record. A large graph, titled “Soybeans for beans” gives acreage harvested (in 1,000 acres), yield per acre, and production (in 1,000 bushels), by states, for the years 1968, 1969, and 1970. The states (arranged geographically) included are: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas, Total USA.

The top three states in production in 1970 were Illinois (2.12 million bu), Iowa (1.86 million), Indiana (1.04 million). Total U.S. production in 1968 was 11.03 million bu, in 1969 was 11.26 million, and in 1970 was 11.36 million.

984. Gurley’s Inc. 1971. World’s Best brand edible soybeans: Finest money can buy (Ad). *Soybean Digest Blue Book Issue.* Inside front cover. March.
• ***Summary:*** “Specializing. Food & seed soybeans. Bulk or bagged. Export or domestic. Ship or carload.” Varieties: Dare, Hampton 266 & 266A, Hill, Hood, York, CNS 4’s, Bragg, Davis, Pickett, Otootan, Laredo, Ransom, Black Wilson, Lee, Lee 68.

Also sells: 44% Selsoy [soy flour]. 49% Hy-Protene Soybean Meal. Soybean oil.

Also: Rye, oats, wheat, barley, and lespedeza. Address: P.O. Box 388, Selma, North Carolina 27576. Phone: 919-965-2303.

985. Oster, Merril J. 1971. Breeders uncover male sterile lines: Progress in hybrid soybeans. *Soybean Digest.* March. p. 10-11, 27.
• ***Summary:*** Editor’s introduction: “Soybean breeding has been given a big shot in the arm with a breakthrough in production of two different types of male sterile lines. A university researcher in North Carolina and a private researcher in Milwaukee, Wisconsin, are responsible for this major milestone in soybeans.

“The recent announcements that a male sterile line has been developed at two widely separated locations are by far the biggest news in soybean breeding in the past year.

“The male sterile lines announced by USDA researcher, Dr. Charles Brim of North Carolina State University, and by Teweles Seed Co., Milwaukee, Wisconsin, could result in the development of high-producing crosses that might revolutionize soybean yields as hybrids have in some other grains.

“Yield increases of 10% to 50% have been predicted with hybrid soybeans.

"'But hybrid soybeans are still a long, long way away,' said Robert Teweles of the L. Teweles Seed Co., a leader in the development of hybrid soybeans. 'We don't want to mislead anybody into thinking that hybrids are right around the corner.'

"Dr. Brim goes further and says that even with the most easily managed sterility system we know of, hybrid soybean seed producers face the same problems encountered by the producers of hybrid wheat seed. Until we can find ways to obtain good seed production on sterile plants hybrid soybeans will not be economically feasible.

"Nevertheless, he says, use of male sterility opens the door to breeding approaches assumed to be closed to soybean breeders. In a limited way, they can change the natural self-pollinator into a cross-pollinator.

"The more immediate value of the sterility system rests in the increased control that breeders will be able to exercise in breeding programs–programs that will allow many more crosses to be tried and thus give researchers many more chances to discover high-yielding varieties, according to Dr. Brim, who first announced a recessive or genetic male sterile soybean line had been developed at the station.

"'It is a great research tool,' Teweles agreed. 'Rather than making 200 crosses a year, we can make 2,000.'

"There are some special problems with the soybean that make it most difficult to develop a hybrid, however. Some agronomists feel that the soybean plant is just not designed to be a hybrid.

"While the inbreeding and crossbreeding necessary to produce a corn hybrid are relatively simple, it's nearly impossible with soybeans. The male and female parts are located on different sections of the plant in corn, but in soybeans the small, tightly encased flower contains both male and female parts. Moreover, the soybeans are almost completely self-pollinated because the flower is fertilized even before it opens.

"The genetic male sterile found by Dr. Brim has two serious drawbacks for use in producing hybrid seed.

"1–Roguing fertile plants from the male sterile maintainer is necessary–and this is far from practical for a seed producer.

"2–But even more important is the scanty seed set on male steriles. These plants in his tests averaged less than 20 seeds each even when given plenty of space. This is due probably to the lack of efficient pollen transfer agents in soybeans.

"As a result, the process of the genetic male sterile so far is not very practical for the commercial seed producer. With a cytoplasm male sterile system a major problem to be overcome to develop hybrids commercially is development of a maintainer line, or a plant that can be crossed with the sterile plant to produce the sterile offspring. This offspring would then be crossed with a male-fertile plant called the restorer to produce economical hybrid seed that could be sold to farmers.

"Some agronomists say that the development of a restorer gene would be one of the biggest obstacles to hybrid soybeans.

"But there are indications that Dr. William Davis, soybean research director at Teweles, may be close or may have the answer already. 'The restorer is not hard,' Teweles hinted. 'The restorer is an easy part in our opinion. Other people will disagree. The tough part is to find the insects to cross one plant to another.'

"There is no insect that can be depended on to naturally pollinate the soybean plant–thus the problem of transferring pollen from the restorer plant to the sterile plant.

"'We are trying to use hybrid bees that will pollinate soybeans,' Davis' assistant, Gene Shepherd, said. 'We will use a hybrid honey bee to pollinate the soybean plant in our hybrid system.'

"Dr. Brim and Teweles both said they had been working on the male sterile line for some time but hadn't released information previously because, as Dr. Brim also states it, they didn't want to yell about something they weren't sure they really had yet.

"Dr. Brim said the first inkling of what they had came in 1966 and has been developed by hand pollination since then to the point where enough seeds of a male sterile maintainer line are available for further study.

"'I am very optimistic about the significance of our developments and, as far as we are concerned, we are not going to get into an argument with the university about who is first,' Teweles said.

"'There is no insect that naturally pollinates soybeans, thus the problem of transferring pollen or transferring from the maintainer and the restorer to the sterile lines. This means it will be a costly research process to either develop a new bee or a plant that is more attractive to existing bees.'

"What effect will hybrid soybeans have on yields? Davis says they could be increased 40% to 50% and expects the top 10% of soybean farmers to have yields of 80 bu/a in 10 years. Others aren't quite so optimistic and see only about a 10% to 20% increase.

"Some expect that hybrid soybeans could provide the next agricultural revolution just as the development of corn hybrids in the 1930's did. They point out that in 1950 the average U.S. corn yield was 39.4 bu/a and in 1969 the yield was 83.9 bu/a before dropping back last year because of the blight.

"During the same time the soybean average yield was only going up from 20.3 bu/a to 27.3 bu/a.

"Teweles emphasized that it will take some time to come up with the right combiners and the right crosses to get the best hybrids. 'But I would think that it would, from a farmer's viewpoint, be a light at the end of the tunnel toward making the kind of breakthroughs yieldwise that have happened to the other crops.'

"'It is my feeling that no one company or group possesses today sufficient funds or know-how to accomplish this task,' Davis commented. 'If a joint approach could be launched by industrywide cooperation, that is, private companies, USDA and state experiment stations, and the American Soybean Assn., we could solve and surmount the obstacles to hybrid soybeans in 10 years or at least know if it is possible.'

"Other soybean developments of the past year include the certification of several more blends, among them Morton 333, the first blend certified in Illinois. It was developed by Roy A. Morton & Sons Inc. of Bowen, Illinois. Some of the most interesting soybean breeding ideas for the future being watched by soybean breeders, according to a recent survey, include: C.R. Weber, Peterson Seed Co., Waterloo, Iowa: 'Changing plant habit and plant structure to permit more light penetration and probably higher plant populations.'

"Douglas Owen, High Plains Research Foundation, Plainview, Texas: 'The search for less photoperiodic germ plasm that might permit wider adaptation. I think the soybean breeders are way out front of the production people as evidenced by the varieties on the market that have the genetic potential of over 100 bu/a.

"A Wider Germplasm Base Needed: 'One area I think we need to improve is the introduction of new germ plasm in our varieties. Most of our commercial varieties trace their ancestry back to less than 10 original soybean introductions or selections. With a wider germ plasm base, we might be able to increase the genetic potential.'

"Arnold L. Matson, director of soybean breeding at the Soybean Research Foundation Inc. at Mason City, Illinois: 'Types which will take increased stands without lodging and with the possibility of being able to respond to fertilizer.'

"William Davis, L. Teweles Seed Co., Clinton, Wisconsin: '(a) Selection and testing under high (100-200 lb/a) nitrogen conditions and selections of varieties responding to these conditions; (b) development of determinate varieties capable of maintaining increased plant populations under nitrogen stress. The advent of shorter, stocky determinate varieties capable of standing up or not lodging at high plant populations (200,000 plants per acre) will be a key factor in increasing soybean yields.'

"Teweles is also doing some research with an exceptionally thin planting rate of 4 or 5 plants per foot in 30-inch rows."

A photo shows: "Dr. Charles Brimm, North Carolina State University-USDA plant breeder (foreground), explains his soybean breeding programs to the executive committee of the N.C. Soybean Producers Assn. who visited him last fall. From left Dr. Paul Harvey, head, N.C. crop science; L.M. Delday, W.B. Sutton, and Joe Moss, all of NCSPA; Foil McLaughlin, N.C. Crop Improvement Assn.; E.L. Rivenbark, F.C. Laughinghouse, Bill Griffin, president, and Stan Dilda, all of NCSPA."

986. *SoyaScan Notes.* 1971. Chronology of Laurelbrook in Maryland. 16 March 1992. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** 1971 Aug. 23–Laurelbrook Foods begins as a macrobiotic natural foods wholesale distributor in Forest Hill, Harford County, Maryland (about 25 miles northeast of Baltimore). The company started as a division of Cycle Parts & Accessories, Inc., a motorcycle parts company that Rod was planning to start in late 1970 shortly before the idea of starting a natural foods distribution company took form. Laurelbrook company never moved from its original location, but they kept a post office box (P.O. Box 47) in nearby Bel Air. Their original price list shows that they carried 11 products, mostly bulk organic grains and beans (including soybeans) purchased from Arrowhead Mills. Erewhon was their other major supplier from the outset. The company was founded by Rod and Margy Coates, the parents of five daughters (including Sally, Judy, Marion [Ronnie], and Dora Coates) and one son (Dan). Dora was Paul Hawken's first wife; they were married in June 1971 in Maryland. Judy was John Deming's first wife; they were married in Aug. 1972. Both Paul and John worked with Erewhon. Rod and Margy decided to call the company Laurelbrook since they lived on Laurelbrook Road in Fallston, Maryland. Rod and Margy first got interested in natural foods in 1967 when their next to oldest daughter, Judy, who had been studying macrobiotics with Michio and Aveline Kushi in Boston, Massachusetts, and had worked for Erewhon, offered to come home and cook for her parents for two weeks and let them try out the diet.

1971 Sept. 30–Laurelbrook is still considered by Rod Coates to be a division of his Cycle Parts & Accessories, Inc.

1973 Dec.–Laurelbrook opens a new, second warehouse in Raleigh, North Carolina (at 330 West Davie St.). Four people start and run the operation.

1974–Laurelbrook, which now employs 24 people, enlarges its warehouse.

1975–Feb.–Laurelbrook publishes a 6-page booklet showing that the company now distributes about 43 different food products–including soy flour, tamari, and miso.

1976 Nov.–One of Laurelbrook's employees is trying to start a labor union. Management vigorously opposes it. Laurelbrook now employees 32 people and has a fleet of 12 trucks that delivers to 350 stores. It is still a family operation, with Rod and Margy Coates, their 3 children, a son-in-law, a niece, and a nephew working at Laurelbrook.

1977–Laurelbrook outgrows its warehouse at 330 West Davie St. in Raleigh, North Carolina, so they move into a larger warehouse facility at 2319 Laurelbrook Street in Raleigh.

1977 Nov.–Laurelbrook has 44 employees. Sales last year were about $3 million.

1978 June–Laurelbrook is now importing foods from

Mitoku in Japan.

1979 May–Rod Coates hires Richard Curry as accountant and general manager.

1980 March 17–At a special meeting of the board of directors, Rod informs the board that he will be retiring in one week, on 23 March 1980, his 65th birthday. He recommends that he be replaced as president by Richard Curry and that his (Rod's) official position be chairman of the board.

1981 March–Things are not going well at Laurelbrook. Rod and Marge feel that Richard is not doing a good job in running the company. Employee morale is down. But Richard blames the problems on Rod, and wants Rod to be less actively involved with Laurelbrook on a daily basis.

1981 March–Dora Hawken is fired from her position in the Laurelbrook office.

1981 July 21–Rod, Margy, and Dan Coates, constituting all the board of directors of Laurelbrook, resign, effective immediately. They are upset with the way Richard Curry is running the company.

1981 Aug.–Richard Curry offers to buy out the Coates' interest in Laurelbrook foods. They accept the offer. Rod and Margy keep ownership of the property and Richard was to pay them rent for using it.

1981 Nov. 21–Over the next 30 days Richard Curry places five large orders with Hain Pure Foods in the amount of $35,577.

1982 Feb. 15–Laurelbrook Foods files for Chapter 11 bankruptcy protection and does business under Chapter 11 for about 18 months. Richard Curry is president.

1982 Dec. 22–Rod Coates presents a list of items that he alleges Richard Curry sold illegally after the bankruptcy of Laurelbrook, and before the auction of the company's assets. Attached to this are letters between attorneys.

1983 Oct-Dec.–Rod and Margy Coates have to pay off the debt of $35,577 to Hain–even though they no longer own the company. In Dec. 1983 the last of the equipment in the warehouse was auctioned off.

1990 March 4–Rod Coates dies of Alzheimer's disease. As of early 1992, Judy Coates lives in Ross, California, and Dora lives in Marin, California. Address: 505 Granary Rd., Forest Hill, Maryland 21050.

987. Brim, C.A.; Young, M.F. 1971. Inheritance of a male-sterile character in soybeans. *Crop Science* 11(4):564-66. July/Aug. [5 ref]

• ***Summary:*** An innovative approach to the development of new varieties is the current use of male-sterile lines to promote natural hybridization. This paper reports that 99% of seeds set on male sterile plants was the result of natural crossing. The method is greatly superior to the hand emasculation method and should be extremely useful in recurrent selection programs. Because soybeans are primarily self-pollinated, population improvement programs in soybeans were not possible in the past, but it will now be possible to undertake such programs. Address: 1. Research Agronomist, Plant Science Research Div., ARS, USDA & Prof. of Crop Science, North Carolina State Univ., Raleigh, NC 27607; 2. Agricultural Research Technician.

988. *Soybean Digest.* 1971. Kristie Roach is "Princess Soya." Sept. p. 6. Cover story.

• ***Summary:*** "A petite Louisiana girl, Kristie Roach, of Natchitoches, will reign as 'Princess Soya' for 1972. Miss Roach is a 19-year-old student at Northwestern (La.) State University. Kristie is the daughter of Mr. and Mrs. Robert M. Roach. She was crowned by Princess Soya of 1971, Margaret Adair Rountree, of Gatesville, North Carolina.

"Highlight of her reign as 'Princess Soya' will be a trip to the Mediterranean sponsored by Elanco when she accompanies this year's soybean yield contest winners.

"Miss Roach plans to become a sociologist, but also would like to get married and have a family of two boys and two girls.

"First runner-up was Teresa Ludwig, 18, of Kenton, Ohio. Miss Ludwig is a freshman at Ohio State University.

"Second runner-up was Patricia Roberts, 21, of Madelia, Minnesota. Miss Roberts is a home economics student at Mankato State College."

Two photos on this page show Kristie Roach, and one photo shows each of the runners-up. Also on the cover is a small photo of "1971-72 'Princess Soya' Kristie Roach."

989. Ross, J.P. 1971. Effect of phosphate fertilization on the yield of mycorrhizal and nonmycorrhizal soybeans. *Phytopathology* 61(11):1400-03. Nov. [11 ref]

• ***Summary:*** "Abstract: Yields of soybeans grown in fumigated soil were not related to phosphate fertilization levels when plants were infected with the mycorrhizal fungus, *Endogone;..."* Address: Plant Pathologist, Crops Research Div., ARS, USDA, P.O. Box 5397, Raleigh, North Carolina 27607.

990. Hartwig, E.E.; Epps, J.M. 1972. Breeding soybeans with resistance to nematodes. *Soybean News* (*NSCIC*) 23(2):2-3. Jan.

• ***Summary:*** "'Nematodes are interesting and remarkable creatures that escape the average eye and mind because of their hidden existence beneath the hide of man and beast and sheltering cloak of mother earth. They make themselves known to us in the itch we scratch, the plant that declines and dies. Yet to really know them we must use a magnifier or microscope to see them, because most nematodes are very small and to make things more difficult nearly transparent.'

"Soybeans have nematode problems. Several different types are known to cause yield reduction. Two types which have received most attention in our research program are the root-knot nematode and the soybean cyst nematode. We

have recognized the root-knot nematode as being injurious to soybeans for many years, but the soybean cyst nematode was first recognized as a problem in the U.S. in 1954. Each of these nematodes is more likely to cause problems on coarse textured soils than on fine textured clays.

"The root-knot nematode is given the name *Meloidogyne incognita* while the soybean cyst nematode is *Heterodera glycines.* Soybean varieties and strains differ in their reaction to nematode feeding and reproduction. Similarly we have biological differences among nematodes. For example, the root-knot nematodes in a field in South Carolina may not reproduce on the variety Bragg, but those in a field in Louisiana may reproduce and cause injury. Our objective in the development of improved varieties is to recognize these differences and incorporate levels of resistance that will protect a variety from as many strains of the nematode as possible.

"Jackson, released in 1953, was the first soybean variety for which resistance to root-knot nematodes was an objective in its development. Jackson derived its resistance from Palmetto–an introduction from Nanking, China. Other varieties with resistance to root-knot nematodes are Bethel, Delmar, Hill, and Bragg. Bethel and Delmar derived their genes for resistance from the breeding line FC33243. Bragg derived its resistance from Jackson, while the resistance of Hill resulted from a recombination of genes which gave it a higher level of resistance than any of its parents. Laredo, an old hay type variety, was recognized as having a high level of root-knot nematode resistance many years before our current breeding program was initiated.

"One of our earlier attempts to determine whether strains of root-knot nematodes behaved differently on soybean varieties which we considered to be resistant was made in 1957. We arranged to have plantings made on soils known to be infested with root-knot nematodes in the Eastern Coastal areas. These plantings were made at two locations in Delaware, two in South Carolina, and at one location in North Carolina and Florida. The resistant varieties included were rated as resistant in each of the six plantings.

"More recently we have obtained reports that varieties reported to be resistant were not resistant in all areas. Dyer, rated resistant in west Tennessee, was not resistant when grown in a field in northeast Arkansas. Similarly Bragg was injured by root-knot nematodes in areas of fields in west Florida.

"Isolates of root-knot nematodes from several of these problem areas have been assembled at the West Tennessee Experiment Station at Jackson for further studies. A series of small field plots have been established for evaluating breeding lines of soybeans with each of these root-knot isolates. Studies are also conducted in the greenhouse.

"Preliminary results are encouraging that we do have breeding lines that have a wider range root-knot resistance than do the varieties now in production. One of the more promising strains, D68-6344, has genes for resistance from Laredo and Hill which appear to give it a wider range of resistance than either parent. D69-9801 also appears to have a higher level of resistance than Laredo. Strains such as this also have resistance to the major leaf diseases as well as resistance to phytophthora rot.

"It is only by testing against nematodes from the various problem areas that we can determine whether we have an adequate level of resistance. In adding resistance to a newly recognized type, we must guard against losing resistance to a previously recognized type.

"The cyst nematodes was recognized as a problem in 1954 and resistant types were identified in 1957. The resistant variety Pickett was made available for seed producers in 1966. Two additional varieties, Custer and Dyer, were planted for increase in 1967. By 1970, Pickett was the major variety grown in west Tennessee. The varieties Pickett, Custer, and Dyer derived their resistance from the black-seeded hay type variety Peking. The resistance of Peking had been established by testing against soybean cyst nematodes from fields in North Carolina, Tennessee, Missouri, and Arkansas. The varieties Pickett, Custer, and Dyer were evaluated against nematodes from these same areas.

"More recently, as resistant varieties are being widely grown, damage to the resistant varieties has been observed. We had previously recognized some differences among isolates of the soybean cyst nematode in their behavior on different soybean strains. On the basis of these differences, the isolate from North Carolina was designated as race 1, the isolate from Virginia as race 2, and the original isolate from the Mississippi Valley area as race 3. The new isolate which reproduces on our resistant varieties such as Pickett has been designated as race 4. Lespedeza has been identified as a host for the soybean cyst nematode. Field observations lead us to believe that soybean cyst nematodes were present on lespedeza in many fields before soybean production became a common practice. Race 4 could have been present in these fields on lespedeza in much slower numbers than race 3.

"With race 4 as a problem, it was again necessary to survey our soybean germplasm collection in search of an adequate level of resistance. Several types previously identified as resistant to races 1 and 3 had plants with a high level of resistance to race 4. Crosses were made in 1970 and F2 populations grown in 1971 to add race 4 resistance to our better strains having the Pickett type of resistance.

"Resistance to root-knot nematodes or cyst nematodes alone is not sufficient. For example, nematodes are more likely to be a serious problem on coarser textured soils, while phytophthora rot is more likely to be a problem on slowly drained, fine textured soils. Yet both soil types may occur in the same field. Pickett, resistant to cyst nematodes, was susceptible to phytophthora rot and growers suffered losses from phytophthora rot on the more slowly drained portions of their farms. Pickett 71 combines resistance to

cyst nematodes (not race 4) and phytophthora rot. We have promising strains that also combine resistance to root-knot nematodes along with resistance to cyst nematodes and phytophthora rot and to which we hope to add resistance to race 4 of the cyst nematode.

"Disease and nematode resistance will reduce the hazards to production on many soils. However, these resistant varieties must also be highly productive on soils that do not have problems. Our goal is to attain maximum yields with a minimum of risk." Address: 1. Research Agronomist, Plant Science Research Div., Agricultural Research Service, USDA, working in cooperation with the Delta Branch Mississippi Agric. Exp. Station, Stoneville, Mississippi; 2. Nematologist, Plant Science Research Div., ARS. USDA, West Tennessee Experiment Station, Jackson, Tennessee.

991. Hartwig, Edgar E.; Jamison, Kathryn W. comps. 1972. The Uniform Soybean Tests: Southern States, 1971. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 249. Feb. 131 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/70soybook.pdf

• ***Summary:*** Except for the cover, this document is typewritten.

Near bottom of title page:

"United States Department of Agriculture.

"Agricultural Research Service.

"Plant Science Research Division.

"Cooperating with State Agricultural Experiment Stations."

Contents: Cooperating personnel. Introduction. Strain identification. Location of nurseries. Methods. Uniform test, Group IV. Preliminary Group IV. Uniform test, Group V. Preliminary Group V. Uniform test, Group VI. Preliminary Group VI. Uniform test, Group VII. Preliminary Group VII. Uniform test, Group VIII. Preliminary Group VIII. Address: 1. Agronomist; 2. Statistical Clerk [Stoneville, Mississippi].

992. *Soybean Digest.* 1972. Seed directory (Ad). Feb. p. 24-25.

• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, Tennessee, Wisconsin.

For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

993. Farmilant, Eunice. 1972. Macrobiotic cooking. New York, NY: New American Library. 224 p. Foreword by Herman Aihara. May. Index. 18 cm. [31 ref]

• ***Summary:*** This pocketbook has a color (beige) photo on the cover of ears of wheat, one wooden spoon filled with soybeans and one filled with unpolished rice. It is "A basic introductory guide to cooking and eating the macrobiotic way." The author's interest in macrobiotics began in April 1968. Basic information on soyfoods (especially miso, tamari, and tofu) is given on pages 29, 33-38, 213-14. Soy-related recipes include: Wheat berries and black beans (i.e. black soybeans, p. 78). Sprouts (incl. soy sprouts, p. 82-83). Miso pickles (p. 124-25). Miso soup (p. 128-29). Cream of miso soup (p. 135). Black beans and wheat berries (p. 139).

There is an entire chapter on miso and tofu (p. 142-46) including: What makes miso so beneficial? Barley miso (nutritional analysis). Miso-vegetable stew. Miso-rice. Miso stew with vegetables. Miso-vegetable spoon bread. Homemade tofu (curded with fresh lemon juice).

Pizza–Macrobiotic style (with miso, p. 149). Chop suey (with tofu and miso, p. 151-52). Miso bechamel sauce (p. 159). Miso gravy. Simple tahini and tamari sauces (p. 160). Tempura dip (with tamari). Simple miso spreads (p. 161). Miso-vegetable spread. Miso-watercress spread.

There is a directory of macrobiotic stores and restaurants in the U.S. (p. 191-203, subdivided alphabetically by state, and within each state alphabetically by city). The following states have the following number of stores and restaurants: Alaska 1, Arizona 4, Arkansas 1, California 32, Colorado 4, Connecticut 18, District of Columbia 3, Florida 14, Georgia 7, Hawaii 2, Illinois 7, Indiana 2, Iowa 5, Louisiana 4, Maine 14, Maryland 7, Massachusetts 51, Michigan 12, Minnesota 3, Mississippi 2, Missouri 3, Nevada 1, New Hampshire 20, New Jersey 9, New Mexico 3, New York 61, North Carolina 5, Ohio 14, Oklahoma 3, Oregon 2, Pennsylvania 8, Rhode Island 5, South Carolina 1, Texas 4, Utah 1, Vermont 26, Virginia 4, Washington 3, Wisconsin 2.

There is also a directory of stores, restaurants, and centers outside the U.S. (p. 204-07, subdivided by country). The following countries have the following number of stores, restaurants, or centers: Australia 1, Belgium 2, Brazil 2, Canada 15, Denmark 4, France 29, Germany 1, Holland (Netherlands) 2, India 1, Italy 1, Japan 3, Portugal 1, Puerto Rico 1, Spain 1, Sweden 1, Switzerland 2, United Kingdom: England 13, Scotland 1, Vietnam 2.

A list of wholesale distributors in the U.S. (p. 208-09) includes Shiloh Farms (Route 59, Sulfur Springs, Arkansas; [Warren Clough]), Erewhon Trading Co. (8003 W. Beverly Blvd., Los Angeles, California 90048), Chico San Foods (1262 Humboldt Ave., Chico, California 95926), Erewhon Trading Co. (33 Farnsworth St., Boston, Massachusetts 02210), Deer Valley Farms (Guilford, New York 13780), Infinity Food Co. (171 Duane, New York, NY 10013), Mottel Foods (451 Washington, New York, NY 10013), Juniper Farms (Box 100, Sugar Loaf, NY 10981), Pioneer Specialty Foods (Fargo, North Dakota 58100), Merit Food Co. (Pill Hill Lane, Box 177, Bally, Pennsylvania 19503), Essene (58th & Grays Ave., Philadelphia, PA 19143).

994. Ramsey, H.A.; Witaszek, P. 1972. Effect of chlorotetracycline on the performance of calves fed soy flour milk replacers (Abstract). *J. of Dairy Science* 55(5):705 (Abst. #P117). May.
• ***Summary:*** Chlortetracycline increased growth only slightly when added to the diet. Therefore it is unlikely that intestinal fermentation of oligosaccharides is a primary cause of poor growth in calves fed soy flour replacers for milk. Address: North Carolina State Univ., Raleigh, North Carolina.

995. Willard, T.R.; Ramsey, H.A. 1972. Effect of treating soy flour with anhydrous hydrogen chloride on its value as a milk replacer ingredient for calves (Abstract). *J. of Dairy Science* 55(5):704 (Abst. #P115). May.
• ***Summary:*** Treatment of dry soy flour with anhydrous HCl (hydrogen chloride) improved its nutritional value for the calf. Address: North Carolina State Univ., Raleigh, North Carolina.

996. *Soybean Digest.* 1972. Soybean research: Funded by farmer checkoff. Aug. p. 16-20, 22-23.
• ***Summary:*** "Soybeans are one crop free of government control–and also free of payments for not planting. The prime reason soybeans are free of control is that soybean people have always been market oriented, and willing to put up their own funds in support of that philosophy. For 15 years farmers and processors have been financing worldwide market development activities for soybeans, as American Soybean Assn. President Harold Kuehn pointed out to the House appropriations subcommittee last April.

"The results of this do-it-yourself approach have been nothing short of tremendous. As U.S. farmers were forced to reduce their corn and cotton acres during the 1960's, they could turn to soybeans because of their growing markets. And soybeans, beginning as a little-known crop, moved up the ladder with astonishing rapidity to the nation's No. 1 export crop, then No. 1 cash crop.

"And soybean producers have begun to take the same route with regard to soybean research in various states... ASA Executive Vice President Ralph Jackson stressed to the National Soybean Research Coordinating Committee the need to plan now to solve future problems."

"The funding of production research on soybeans is now being done by state checkoff funds, and there will be more such funding in the future. U.S. soybean producers are spending $400,000 this year for such research, and will contribute about $500,000 of their own money next year, all raised through checkoffs.

"In addition, the National Soybean Processors Assn. is contributing $500,000 annually for soybean production research. NSPA has provided funds in the past to support the research work of five full-time scientists. Now the policy is to provide additional funds to undergird the work of current researchers.

"In addition to grower and processor funding, there is funding of research by state and federal governments.

"The concept of using the checkoff for funding both market development and research originated at the ASA convention in 1968. In 1969, North Carolina, South Carolina, and Louisiana passed the necessary enabling acts, followed by Mississippi and Texas in 1970; Arkansas, Florida, Virginia, and Georgia in 1971; and Iowa in 1972.

"Now the checkoff is operating in ten states and Illinois is in the process of establishing constitutional authority for a checkoff system.

"As outlined by the National Soybean Research Coordinating Committee [established in March 1972 under the sponsorship of the agricultural Research Policy Advisory Committee], checkoff funds in general should be used for short-term, quick-payoff types of research that show concrete results. Federal and state funds can be best used for basic research where the results may be less tangible and longer in coming."

Details on research projects and current checkoff funding for research in the following states are given: Mississippi ($58,000), Georgia ($40,000), Texas ($2,250), Arkansas ($117,766, the leader in funding), South Carolina ($22,500), Louisiana ($70.945), Iowa ($26,000), Virginia ($10,000), Florida ($10,000), and North Carolina ($40,273). Research Foundation funding: The Iowa Soybean Promotion Board has two unique concepts in mind when it allocates funds for market development and research. First, it tries to involve the state soybean association in decisionmaking. Second, it tries to induce the state association and its members to think of research as a national effort, rather than just an individual state effort. Photos show William Colville, Harold Musen, Edgar Hartwig.

997. Huff, John. 1972. 'Tar Heel Pearls' become No. 2 crop: Soybeans worth $80-$90 million a year to growers. *Morning Herald* (*Durham, North Carolina*). Nov. 20.
• ***Summary:*** According to Jim Wilder, executive vice president of the North Carolina Soybean Growers Association, soybeans have moved into second place behind golden leaf tobacco as the farmer's money maker in North Carolina. Address: Herald staff writer.

998. Brim, Charles A. 1972. Hybrid soybeans. How soon are they coming or will they ever get here? *Crops and Soils Magazine* 25(2):12-13. Nov. Reprinted in World Farming (1976) 18(2):18, 30. Feb.
• ***Summary:*** The discovery of male sterility in soybeans set off speculation that hybrid soybeans would soon be developed. "Sterility" is the key word since it is associated with the well-known hybrid corn and hybrid sorghum breeding programs. But the sterility system discovered in soybeans is fundamentally different from that found in corn

or sorghum. And there are more "ifs" to hybrid soybeans. Address: USDA research agronomist working at North Carolina State Univ.

999. *News and Observer* (*Raleigh, North Carolina*). 1972. Plans made for soybean convention. Dec. 8.
• ***Summary:*** The sixth annual membership meeting of the North Carolina Soybean Producers Association will be held on 19 Jan. 1973 at the Hilton Inn, at Raleigh–starting at 1:00 p.m. The theme will be "Soybeans opportunities and you" and the keynote speaker will be Assistant Secretary of Agriculture Carroll G. Brunthaver–according to E.L. Rivenbark of Tabor City, president of the Association.

Climaxing the day's events will be the annual banquet and the Princess Soya pageant to select a successor to Paula Jean Mitchell of Harrellsville. The winner of the pageant will represent North Carolina in the National Princess Soya contest next August in Des Moines, Iowa.

Some Tar Heel growers produce 50 to 60 bushels of soybeans to the acre, though the state average is 25-30 bushels. Over the past four years, demand for soybeans has grown at the rate of over 9% a year.

1000. Clapp, B.N., Jr.; Wells, J.C.; Sullivan, G.A.; Baird, J.V. 1972. 1971 soybean on farm test report. *North Carolina Agricultural Extension Service, Miscellaneous Publication* No. 82. 20 p. *
Address: North Carolina State Univ., Raleigh.

1001. 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.

1002. Humphries, Bill. 1973. Soybeans boom seen. *News and Observer* (*Raleigh, North Carolina*). Jan. 20.
• ***Summary:*** "No segment of world agriculture has a brighter future than the U.S. soybean industry," said Assistant Secretary of Agriculture Carroll G. Brunthaver.

The USA is producing twice as many soybeans as 10 years ago and, most important, we have markets for all the soybeans we produce. Traditional markets continue to grow, and now Russia has entered the market with a purchase of 40 million bushels.

One contributing factor is the failure of Peru's fishmeal industry, which normally supplies the equivalent of 78 million bushels of soybean meal. Address: Farm editor.

1003. Clapp, J.G., Jr.; Baird, J.V.; Sullivan, G.A.; Wells, J.C.; Hinnant, C.D. 1973. 1972 soybean on-farm test report. *North Carolina Agricultural Extension Service, Miscellaneous Extension Publication* No. 94. 29 p. Feb.
• ***Summary:*** Contents: Introduction. Method of Lime Application. Rotation and Rate of Fertilization. Method and Rate of Fertilization. Comparison of Fertilizer Grades. Micronutrients. Method of Weed Control. Nematode Control. Seed Treatment. Spacing Within the Row. Row Spacing. Seeding Rate for Drilled Soybeans. Yield Potential. Soybean On-Farm Test Cooperators–1972. Firms Supplying Materials for 1972 Soybean On-Farm Tests.

"Introduction: The soybean on-farm test program is designed to evaluate certain agronomic practices which may enable soybean producers to become more efficient in producing soybeans. The program is coordinated between North Carolina State University, local extension personnel and the local producer. The program is designed to extend the University's role through applied research in order to provide producers with new information which will be more applicable to local conditions. A list of all cooperators can be found on pages 27-29. Appreciation is extended to these individuals for their cooperation in helping to conduct the on-farm tests and to obtain the information contained in this report. Appreciation is also extended to the Soil Testing Division, North Carolina Department of Agriculture and Nematode Research Laboratory, North Carolina State University, for soil test and nematode assay analysis, respectively. Many agri-business firms (page 30) were responsible for supplying materials for use in conducting these tests and appreciation is also extended to these organizations." Address: North Carolina State Univ., Raleigh.

1004. Hartwig, Edgar E.; Jamisen, Kathryn W. comps. 1973. The Uniform Soybean Tests: Southern States–1972. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 251. Feb. 123 p. Not for publication. https://www.ars.usda.gov/ARSUserFiles/60661000/

UniformSoybeanTests/72soybook.pdf
• ***Summary:*** This document, which is typewritten, is the last in the series "The Uniform Soybean Tests: Southern States" with an RSLM number. On the cover, in the bottom half: United States Department of Agriculture, Agricultural Research Service cooperating with state agricultural experiment stations.

On the first page, which is unnumbered, is an outline map of the southern part of the United States, from Texas on the west to the East Coast from Maryland down to Florida. The title: "Locations of Cooperative Uniform Soybean Tests, Southern States, 1973." A small black circle is used to indicate the location of each test. The map is divided by broken lines into five broad areas based mainly on soil type, as explained in the Introduction.

Page 1: In the top half is a list of the names of the people who supplied the data, each with a city and state. On the bottom half is the "Table of Contents" as follows: Cooperating personnel. Introduction. Location of nurseries. Methods. Group IV-S test: Uniform. Group V test: Uniform, preliminary. Group VI test: Uniform, preliminary. Group VII test: Uniform, preliminary. Group VIII test: Uniform, preliminary.

Pages 4-5: "Introduction: "Introduction: The Soybean Production Research Program has been directed toward the development of improved strains of soybeans and the obtaining of fundamental information necessary to the efficient breeding of strains to meet specific needs. In the Southern Region, fundamental studies and breeding programs are conducted at three locations, Stoneville, Mississippi; Raleigh, North Carolina; and Gainesville, Florida. After promising new strains are developed at these breeding centers, or by any other cooperating agency, they are advanced to the preliminary and uniform regional tests, conducted in cooperation with research workers in the Southeastern States. This testing program enables the breeder to evaluate new strains under a wide variety of conditions, and permits new strains to be put into production in a minimum amount of time.

"Ten uniform test groups have been established to evaluate the better strains developed in the breeding programs. The groups 00 through IV are adapted in the northern part of the United States, and the groups IV-S through VIII are grown in the southern part. Within their area of adaptation, there is a maturity range of 12 to 18 days within each maturity class. The best standard varieties available of each maturity class are used as check varieties with which to compare new strains as to seed yield, chemical composition, maturity, height, lodging, seed quality, and reaction to diseases. For the groups grown in the southern area, the major check varieties are: Kent, Hill, Dare, D64-4636, Lee 68, Bragg, Hampton 266A and Hardee. At Stoneville, Mississippi, where all maturity classes will mature, the approximate maturity dates of these varieties, when planted during the first half of May, are: Kent, September 8; Hill, September 20; Dare, October 1; D-64-4636, Oct. 6; Lee 68, October 16; Bragg, October 22; Hampton 266A, November 1; and Hardee, November 6.

"A wide range of soil and climatic conditions exist in the regions. As an aid in recognizing regional adaptation, the region has been subdivided into five rather broad areas which still represent a wide range of soil types. These are: (1) the East Coast, consisting of the Coastal Plain and Tidewater areas of the eastern shore of Maryland, Virginia, North Carolina, and the upper half of South Carolina; (2) the Southeast, consisting primarily of the Coastal Plain soils of the Gulf Coast area, but also including similar soil from South Carolina southward; (3) the Upper and Central South, including the Piedmont and loessal hill soils east of the Mississippi River; (4) the Delta area, composed of the alluvial soils along the Mississippi River from southern Missouri, southward; and (5) the Southwest, comprising Arkansas and Louisiana (outside the Delta), and Oklahoma and Texas. In the Southwest area, the potential soybean-growing areas would include the alluvial river soils, the gulf coast of Louisiana and Texas, and the high plains of Texas. In this area, several of the tests receive supplemental irrigation. A map is included to illustrate the five production areas. On nearly all of the soils other than the alluvial soils along the Mississippi River, Fertilization is essential for satisfactory soybean production. In the Western area, irrigation is necessary for successful production. A table showing soil types, soil test information, and rate of fertilization is included.

"The soil test information is based upon analyses run by laboratories within the states. Different methods are used for extraction and reporting by the various laboratories. An attempt is being made to report phosphorus and potash on a high, medium, and low basis, since pounds per acre may have different meanings in accordance with the methods used. In most cases, soil samples were taken after the soybeans were mature."

Pages 5-7: A table with 12 columns titled "Location of soybean nurseries along with soil type, soil analysis, and fertilization.

Pages 8-9: Methods: Tells how the following are measured: Planting rate. Yields. Shattering. Chemical composition. Seed size. Lodging. Height (of plants). Maturity. Seed quality (rated from 1 to 5). Disease ratings (given on a scale of 1 to 5) for Foliar, root and stem, root knot [nematode], purple stain. Statistical analyses (by analysis of variance). Address: Delta Branch Experiment Station, Stoneville, Mississippi 38776.

1005. *Soybean Digest.* 1973. Seed directory (Ad). Feb. p. 37.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Arkansas,

Illinois, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, New York, North Carolina, Ohio, Oklahoma, South Dakota, Tennessee, Virginia.

For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

1006. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*). 1973. Report of the second national soybean research conference: Memphis, Tennessee, March 5-8, 1973. No. 775. March 5. xvii + 51 p.

• ***Summary:*** The title page states: "This is a progress report of cooperative investigations containing data the interpretation of which may be modified with additional experimentation."

Contents: Preface by Richard L. Cooper, conference chairman. List of conference participants. March 6, morning. Plant breeding and genetics division: Germplasm old and new (Germplasm sources of southern varieties, germplasm sources of northern varieties, new additions to the germplasm collection, tropical germplasm in breeding programs), new tools in breeding and genetics. March 6, afternoon. Crop production division. March 6, evening. Committee meetings of the Uniform Regional Test participants (Northern, Southern).

March 7, morning. Plant physiology and biochemistry division. March 7, afternoon. Plant pathology, nematology, entomology division. Current status of soybean diseases. Past and present status of brown stem rot. Impact of insects on soybean production. Breeding and genetics division. Photoperiodism and day neutrality. Plant physiology and biochemistry division. Plant pathology, nematology, entomology division. Contains a 1/3 page abstract of 62 papers within the above divisions. Research activities of conference participants (p. 40-51).

Note: Lindsy Ribble, reference librarian at the University of Illinois ACES library, who found this document, states: "This is the only report on a National Soybean Research Conference that we have. I searched the WorldCat database for similar proceedings and this was the only one that came up... So it appears as though the National Soybean Research Conferences did not continue, and if there was a first one, there were no published proceedings."

"List of Conference Participants:

"Ahlrichs, L. Monsanto Co., 800 N. Lindbergh, St. Louis, MO 63131.

"* Albritton, D.J. Prof., Agronomy & Agr. Chem., A&M Normal College, Pine Bluff AR 71601.

"* Aldrich, R.J. Associate Dean, College of Agriculture, Univ. of Missouri, Columbia, MO 65201.

"Alexander, L.M. University of Florida, Gainesville, Florida 32601.

"Anderson, I.C. Iowa State University, Ames, IA 50010.

"Aslin, W.E. Missouri Seed Improvement Association, Univ. of Missouri, South Farm, P.O. Box 852, Columbia, MO 65201,

"Athow, K.L. ARS, Dept. of Botany & Plant Path., Purdue Univ., Lafayette, IN 47907.

"* Baker, S.H. Georgia Coastal Plain Experiment Station, Tifton, GA 31794.

"Baldwin, C.H. University of Missouri, Delta Center, P.O. Box 160, Portageville, MO 63873.

"Batt, A.J. FFR Coop., 1600 W. Darlington St., Florence, SC 29501.

"Becker, R. Ohio Seed Improvement Association, 1001 W. Lane Ave., Columbus, OH 43221.

"Belledin, F.W. Rohm & Hass Co., 2049 McPherson Rd., Memphis, TN 38116.

"Berger, G. Arkansas State University, State University, AR 72467.

"Bernard, R.L. U.S. Regional Soybean Lab., Univ. of Illinois, Urbana, IL 61801.

"Bhangoo, M.S. Univ. of Arkansas, Pine Bluff, AR 71601.

"Bingham, T. University of Wisconsin, Madison, WI 53706.

"Blackmon, C.W. Clemson Univ., Edisto Experiment Station, Blackville, SC 29817.

"Boerma, H.R. University of Georgia, Plant Sciences Bldg., Athens GA 30601.

"Boone, L.V. University of Illinois, Urbana, IL 61801.

"Brandsberg, G. Creative Services, Inc., 3612 S. W. 9th, Des Moines, IA 50318.

"Brigham, R.D. Texas Agricultural Experiment Station, Lubbock, TX 79401.

"Brim, C.A. USDA, North Carolina State, Raleigh, NC 27607.

"Bromfield, K.R. USDA, Ephiphytology Research Lab., Box 1209, Frederick, MD 21701.

"Brown, J.R. University of Missouri, Columbia, MO 65201.

"Browne, E.B. University of Georgia, Athens, GA 30602.

"Brun, W.A. University of Minnesota, St. Paul, MN 55100.

"Buhr, K. Iowa State University, Ames, IA 50010.

"Burleigh, G. University of Arkansas, Pine Bluff, AR 71601.

"* Burnett, J. University of Missouri, Columbia, MO 65201.

"Burns, D.L. McNair Seed Co., P.O. Box 706, Laurinburg, NC 28352.

"Burns, G.R. USDA, N. C. State University, P.O. Box 5120, Raleigh, NC 27607.

"Burris, J. Iowa State University, Dept. of Botany & Plant Path., Ames, IA 50010.

"Burton, J.C. Vice Pres., Research & Development, Nitragin Co., Inc., 3101 W. Custer Ave., Milwaukee, WI

53209.

"Butt, C.K. Indiana Crop Improvement Association, Lafayette, IN 47905.

"Butzow, M. Seedmakers, Inc., Sidney, IL 61877.

"Caldwell, B.E. USDA-ARS, Beltsville, MD 20705.

"Caviness, C.E. Dept. of Agronomy, University of Arkansas, Fayetteville, AR 72701.

"Chamberlain, D.W. U.S. Regional Soybean Lab., Urbana, IL 61801.

"Chambers, A.Y. University of Tennessee, W. Tennessee Experiment Station, 605 Airways Blvd., Jackson, TN 38301.

"Clapp, J.G. North Carolina State University, Raleigh, NC 27607.

"Cole, R.H. Pennsylvania State University, Dept. of Agronomy, University Park, PA 16802.

"Collins, K.L. Agronomy Dept., Purdue University, W. Lafayette, IN 47907.

"Colville, W.L. University of Georgia, Dept. of Agronomy, Athens, GA 30602.

"Cothren, T. University of Arkansas, Fayetteville, AR 72701.

"Cooper, R.L. U.S. Regional Soybean Lab, Urbana, IL 61801.

"Cottingham, C. South Carolina State College, Orangeburg, SC 29115.

"Cowan, J.C. Northern Regional Research Lab., Peoria, IL 61604.

"Creech, R.G. Mississippi State Univ., Dept. of Agronomy, Mississippi State, MS 39762.

"Criswell, J.G. University of Guelph, Guelph, Ontario, CANADA.

"Crittenden, H.W. University of Delaware, Newark, DE 19711.

"Curley, R.L. The Nitragin Co., 3101 W. Custer Ave., Milwaukee, WI 53209.

"Curry, R.B. Dept. of Agricultural Eng., Ohio Agric. Research & Dev. Center, Wooster, OH 44691.

"Davis, M.F. International Harvester Co., Memphis, TN 38116.

"Davis, W.H. Teweles Seed Co., Box 900, 1600 Oregon St., Muscatine, IA 52761.

"Demski, J.W. Dept. of Plant Path., Georgia Experiment Station, Experiment GA 30212.

"Dornhoff, G. University of Nebraska, Box 66, Clay Center, NB 68901.

"Douglas, C. Georgia Coastal Plain Experiment Station, Tifton, GA 31794.

"Duclos, L.A. University of Missouri, Portageville, MO 63873.

"Dunleavy, J.M. USDA, ARS, 417 Bessey Hall, Ames, IA 50010.

"Eby, W. Stine Seed Farm, Adel, IA 50003.

"* Edwards, C.R. Purdue University, W. Lafayette, IN 47907.

"Edwards, C.J. ARS, Delta Branch Experiment Station, Stoneville, MS 38776.

"Edwards, D.I. USDA, ARS, University of Illinois, Urbana, IL 61801.

"Egli, D. University of Kentucky, Lexington, KY 40506.

"Ennis, W.B. NPS, ARS, USDA, Beltsville, MD 20782.

"Epps, J.M. USDA, ARS, PSRD, 605 Airways Blvd, Jackson, TN 38301.

"Evans, A.W. Dupont Co., 1332 Glen Oaks Drive, Memphis, TN 38117.

"Evans, C.L. Oklahoma State University, Stillwater, OK 74074.

"Ewing, E.C., Jr. Delta & Pine Land Co., Scott, MS 38772.

"Fennell, J. DuPont Co., 1620 Post Oak Tower, Houston, TX 77027.

"Freed, J. Iowa State University, Ames, IA 50010.

"Fehr, W.R. Iowa State University, Ames, IA 50010.

"Foels, T. Northrup King S Co., Washington, IA 52353.

"Ford, J.D. University of Missouri, Delta Research Center, Portageville, MO 63873.

"Ford, R.E. University of Illinois, Plant Pathology Dept., Urbana, IL 61801.

"Gerard, J. Syler Inc., Plymouth, IN 46563.

"Gillham, L.B. E.I. DuPont, 142 Lilac Lane, Greenville, MS 38701.

"Gordon, D.T. Ohio Agri. Research & Development Center, Wooster, OH 44691.

"Gorman, J.P. ASA Tennessee Soybean Association, Brownsville, TN 38013.

"Graham, J.C. Monsanto, 800 N. Lindbergh Blvd., St. Louis, MO 63066.

"Green, D.E. Iowa State University, Ames, IA 50010.

"Green, J.M. McNair Seed Co., Laurinburg, NC 28352.

"Green, L.A., Jr. Green Bros. Seed Co., Nashville, TN 37202.

"Gross, H.D. North Carolina State University, Raleigh, NC 27607.

"Gossett, D.M. University of Tennessee, Knoxville, TN 38919.

"Gray, L.E. U.S. Regional Soybean Lab, Urbana, IL 61801.

"Guerry, W.W. Mississippi Seed Improvement Association, Box 275, State College, MS 39762.

"Hadley, H.H. University of Illinois, Department of Agronomy, Urbana, IL 61801.

"Ham, G. University of Minnesota, St. Paul, MN 55113.

"Hardy, R. W. F. DuPont, Wilmington, DE 19898.

"Harper, J.E. U.S. Regional Soybean Lab, USDA, Urbana, IL 61801.

"Hartwig, E.E. USDA-ARS, Stoneville, Mississippi 38776.

"Havelka, U.D. DuPont Experiment Station, Wilmington, DE 19898.

"Hendrix, C. Indiana Crop Improvement Association, Lafayette, IN 47907.

"Herbek, J. University of Kentucky, West Kentucky Substation, Princeton, KY 42445.

"Hexem, R.O. ASU, State University, AR 72467.

"Hill, J.H. Iowa State University, Ames, IA 50010.

"Hinson, K. USDA-ARS, University of Florida, 1303 N.W. 30th, Gainesville, FL 32601.

"Hittle, C.N. University of Illinois, Dept. of Agronomy, Urbana, IL 61801.

"Hoffman, C.H. USDA-ARS, Beltsville, MD 20705.

"Holmsen, T. Dow Chemical, 567 Woodcock Road, Midland, MI 48640.

"Horn, N.L. Louisiana State Univ., Baton Rouge, LA 70803.

"Howell, R.W. University of Illinois, Urbana, IL 61801." (Continued).

1007. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*). 1973. Report of the second national soybean research conference: Memphis, Tennessee, March 5-8, 1973 (Continued–Document part II). No. 775. March 5. xvii + 51 p.

• ***Summary:*** (Continued): "Huey, B. Seed Broker, Carthage, Illinois 62321.

"Huey, L.E. Mike Brayton Seeds, Inc., Box 308, Ames, IA 50010.

"Hymowitz, T. Department of Agronomy, University of Illinois, Urbana, Illinois 61801.

"Jaworski, E.G. Monsanto Co., 800 N. Lindbergh, St. Louis, MO 63166.

"Jeffers, D.L. Ohio Agricultural Research & Development Center, Wooster, OH 44691.

"Johnson, D. University of Missouri, Columbia, MO 65201.

"Johnson, H.W. University of Minnesota, St. Paul, MN 55112.

"Johnson, J.W. University of Illinois, Dept. of Agronomy, Urbana, Illinois 61801.

"Jordan, W. Mississippi Extension Service, P.O. Box 5425, Mississippi State, MS 39762.

"Judd, R.W. National Soybean Crop Improvement Council, Urbana, Illinois 61801.

"Judson, T. Delta & Pine Land Co., West Point, MS 39773.

"Kahn, R.P. APHIS-USDA, U.S. Plant Introduction Station, Glenn Dale, Maryland 20769.

"Kamprath, E.J. North Carolina State University, Raleigh, NC 27606.

"Keeling, B. USDA, Stoneville, MS 38776.

"Keith, G. Illinois Crop Improvement Association, Urbana, Illinois 61801.

"Kennedy, B.W. Soybean Research Corp., University of Minnesota, St. Paul, MN 55101.

"Keogh, J.L. University of Arkansas, Marianna, Arkansas 72360.

"Kerr, H. University of Missouri, Delta Center, Portageville, MO 63873.

"Kilen, T.C. USDA-ARS, Delta Branch Experiment Station, Stoneville, MS 38776.

"Kim, D.K. Green Bros. Seed Co., Nashville, TN 37202.

"Kingsolver, USDA, Frederick Maryland 21701.

"Kinloch, R.A. University of Florida, ARC, Jay, FL 32565.

"* Kinsell, R. Silver Lane Hybrids, Remington, Indiana 47977.

"Kirby, J.S. Agronomy Dept. Oklahoma State University, Stillwater, OK 74074.

"* Kogan, M. University of Illinois, Urbana, Illinois 61801.

"Koller, H.R. Dept. of Agronomy, Purdue University, Lafayette, Indiana 47907.

"Krober, O.A. ARS, U. S. Regional Soybean Lab., Urbana, Illinois 61801.

"Laible, C.A. Funk Seeds Int. Inc., Bloomington, Illinois 61701.

"Laing, W. University of Illinois, Urbana, Illinois 61801.

"Lambert, J.W. University of Minnesota, St. Paul, MN 55108.

"Lancaster, L. University of Missouri, Portageville, MO 63873.

"Laviolette, F.A. Purdue University, Dept. of Botany & Plant Path., W. Lafayette, Indiana 47907.

"Leffel, R.C. ARS-USDA, Plant Nutrition Lab. PPhI, Beltsville, Maryland 20705.

"Legg, J.O. USDA-ARS, Plant Nutrition Lab. PPhi, Beltsville, Maryland 20705.

"Leggett, E. University of Kentucky, Lexington, KY 40506.

"Lewis, C.F. ARS, Beltsville, Maryland 20705.

"Lewis, S.A. Clemson University, Clemson, SC 29631.

"Lindahl, D.A. U.S. Regional Soybean Lab., Urbana, Illinois 61801.

"Lipscomb, C. Northrup King & Co., Atmore, Alabama 36502.

"Littlejohns, D.A. Ridgetown College of Agr. Tech., Ridgetown, Ontario, Canada.

"Lockwood, J.L. Michigan State University, East Lansing, MI 48823.

"Luckman, W.H. Illinois Natural History Survey, University of Illinois, Urbana, Illinois 61801.

"Luedders, V.D. USDA, University of Missouri, Columbia, MO 65201.

"Maddox, J. Mississippi State University, Starkville, MS 39762.

"Mader, E.L. Kansas State University, Manhattan, KS 66502.

"Major, D. University of Missouri, Columbia, MO

65201.

"Marchant, W.H. Georgia Coastal Plain Experiment Station, Tifton, GA 31794.

"Marchetti, M.A. Plant Disease Research Lab., USDA, Frederick, Maryland 21701.

"Marley, S.J. Iowa State University, Ames, IA 50010.

"Marlow, J.L. Rudy Patrick Co., Box 404, Princeton, Illinois 61356.

"Matson, A.L. Soybean Research Foundation, Mason City, Illinois 62664.

"Maxwell, J.D. Clemson University, Clemson, SC 29631.

"Mies, D. FS Service, Inc., Piper City, Illinois 60959.

"Milbrath, G.M. Dept. of Plant Path., University of Illinois, Urbana, Illinois 61801.

"Miller, P. Crop Science Dept., North Carolina State University, Raleigh, NC 27607.

"Moraghan, B.J. Delta & Pine Land Co., Scott, MS 38772.

"Munson, R.D. Potash Inst., 2147 Doswell Ave., St. Paul, MN 55108.

"Musen, H.L. Clemson University, Edisto Experiment Station, Blackville, SC 29817.

"Myhre, D. USDA, Mississippi State University, Mississippi State, MS 39762.

"McCrate, A. University of Missouri, Delta Research Center, Portageville, MO 63873.

"McDaniel, M.C. Coop. Ext. Service, P.O. Box 391, Little Rock Arkansas 72205.

"McKibben, G.E. University of Illinois, Dixon Springs Ag. Center, Simpson, Illinois 62985.

"McKinney, L. USDA, P.O. Box 5677, Athens, GA 30604.

"McWhorter, C.G. ARS-USDA, Stoneville, MS 38776.

"McWilliams, J.W. USDA, Bio-Environmental Ins. Control Res. Lab., Greenville, MS 38701.

"Nave, W.R. USDA, U.S. Regional Soybean Lab., Urbana, Illinois 61801.

"Nester, R. Cooperative Extension Service, University of Arkansas, Little Rock, AR 72204.

"Newsom, L.D. L.S.U., Baton Rouge, LA 70803.

"Nickell, C.D. Agronomy Dept., Kansas State University, Manhattan, KS 66502.

"Nissly, C. University of Illinois, Urbana, Illinois 61801.

"Ogren, W.L. U.S. Regional Soybean Lab., Urbana, Illinois 61801.

"Ohlrogge, A.J. Purdue University, West Lafayette, Indiana 49706.

"Oliver, D. University of Arkansas, Fayetteville, AR 72701.

"Orellana, R.G. USDA, Beltsville, Maryland 20705.

"Owen, D. High Plains Research Foundation, Plainview, TX 79072.

"Palmer, J. Clemson University, Clemson, SC 29631.

"Palmer, R.G. USDA, Ames, IA 50010.

"Parker, M.B. Coastal Plain Experiment Station, Tifton, GA 31794.

"Paschal, E.H. Purdue University, W. Lafayette, Indiana 47906.

"Pauli, A.W. Deere & Co., Moline, Illinois 61265.

"Phillips, D.V. University of Georgia, Georgia Experiment Station, Experiment, GA 30212.

"Pitre, H.N. Mississippi State Univ., P.O. Drawer EM, Mississippi State, MS 39762.

"Pluenneke, R.H. Mississippi State University, Mississippi State, MS 39762.

"Polson, D.E. University of Minnesota, St. Paul, MN 55110.

"Pongsroypech, C. University of Missouri, Columbia, MO 65201.

"Porter, O.A. University of Arkansas, Pine Bluff, AR 71601.

"Probst, A.H. Purdue University, W. Lafayette, Indiana 47906.

"Quebedeaux, B.E. I. duPont de Nemours & Co., Experimental Station, Wilmington, DE 19898.

"Raney, H. University of Kentucky, Princeton, KY 42445.

"Regan, J.B. Dow Chemical Co., Geneseo, Illinois 61254.

"Riggs, R.D. University of Arkansas, Dept. of Plant Pathology, Fayetteville, AR 72701.

"Rinne, R.W. U.S. Regional Soybean Lab., Urbana, Illinois 61801.

"Robinson, C.W. First American Farms, Freeport, FL 32439.

"Rodda, E. University of Illinois, Agr. Eng. Dept., Urbana, Illinois 61801.

"Roth, J.A. University of Missouri, Delta Center, Portageville, MO 63873.

"Rouwenhorst, D. Rudy Patrick Co., Princeton, Illinois 61356.

"Royer, E.G. Chr. of Research Committee, American Soybean Assoc., Irwin, Ohio 43029.

"Royster, C.M. University of Missouri, Delta Center, Portageville, MO 63873.

"Rudolph, R. University of Arkansas, Agronomy Dept., Fayetteville, AR 72701.

"Russell, R.B. USDA, Athens, GA 30601.

"Ryan, R.F. Peterson Seed Co., Ames, IA 50010.

"Ryder, G.J. Ohio State University, Columbus, OH 43210.

"Schillinger, J. Univ. of Maryland, Agronomy Dept., College Park, Maryland 20740.

"Schmitthenner, A.F. OARDC, Wooster, Ohio 44691.

"Schneider, R. University of Illinois, Urbana, Illinois 61801.

"Scott, J.R. Kalo Lab's Inc., Quincy, Illinois 62301.

"Scott, J. University of Missouri, Dept. of Agronomy, Portageville, MO 63873.
"Scott, W.O. University of Illinois, Urbana, Illinois 61801.
"Seatz, L.F. University of Tennessee, Knoxville, TN 37901.
"Shibles, R. Iowa State University, Ames, IA 50010.
"Shipp, E. Chemagro, 1420 Union Ave. #317, Memphis, TN 38104.
"Sij, J.W. Texas A&M Univ., Agr. Research & Ext. Center, Rt. 5, Box 366, Beaumount, TX 77706.
"Sinclair, J.B. Univ. of Illinois, 107C Hort. Field Lab., Urbana, Illinois 61801.
"Singh, B. Fort Valley State College, Fort Valley, GA 31030.
"Sloger, C. USDA-ARS-ARC (W), Beltsville, Maryland 20705.
"Smith, N.A. Botany & Plant Path., Michigan State Univ., E. Lansing, MI 48823.
"Smith, R. Agric. Res. Center, University of Florida, Jay, FL 32565.
"* Smith, S. Agri-Laboratories, Columbus, Ohio 43210.
"Smith, T.J. Virginia Polytechnic Inst. & State Univ., Blacksburg, VA 24060.
"Stanton, J.J., Jr. Coker's Pedigreed Seed Co., Hartsville, SC 29550.
"Stivers, R.K. Agronomy Dept., Purdue University, W. Lafayette, Indiana 47907.
"Stoller, E. USDA-ARS, U.S. Regional Soybean Lab, Univ. of Illinois, Urbana, Illinois 61801.
"Streeter, J.G. Ohio Agr. Rec. & Development Center, Wooster, OH 44691.
"Stutte, C.A. University of Arkansas, Fayetteville, AR 72701.
"Swearingin, M.L. Purdue University, Agronomy Dept., W. Lafayette, Indiana 47907.
"Tanner, J.W. University of Guelph, Guelph, Ontario, Canada.
"Taylor, G.R. FFR Cooperative 4112 E. State Rd., W. Lafayette, Indiana 47906.
"Tester, C. USDA, North Carolina State University, Raleigh, NC 27607.
"* Thomas, C.A. USDA, Beltsville, Maryland 20705.
"Thompson, W. R., Jr. Potash Institute of NA, 810 Howard Rd., Starkville, MS 37959.
"Thorne, J.C. Northrup King & Co., Washington, IA 52353.
"Thurlow, D.L. Auburn Univ., Dept. of Agronomy & Soils, Auburn, AL 36830.
"Thorne, J.H. University of Wisconsin, Madison, WI 53706.
"Vidaver, A. University of Nebraska, Plant Path. Dept., Lincoln, NB 68503.
"Vineyard, M.L. Moews Seed Co., Granville, Illinois 61326.
"Voldeng, H. Canada Dept. of Agric., Ottawa Research Station, Ottawa, Ontario, Canada.
"Voris, M. Voris Seeds, Inc., Windfall, Indiana 46076.
"Voss, R. Iowa State University, Ames, IA 50010.
"Walters, H.J. University of Arkansas, Fayetteville, AR 72701.
"Wax, L. USDA, U. S. Regional Soybean Lab, Urbana, Illinois 61801.
"Weathers, R.E. Delta & Pine Land Co., Scott, MS 38772.
"Weber, C.R. Petersen Seed Co., P.O. Box 151, Ames, IA 50010.
"Weber, D.F. ARS-USDA, Beltsville, Maryland 20705.
"Whigham, D.K. University of Illinois, Urbana, Illinois 61801" (Continued).

1008. Humphries, Bill. 1973. Bean crop: How big? *News and Observer* (*Raleigh, North Carolina*). March 12. Address: Farm editor.

1009. *Soybean Digest Blue Book.* 1973. Soybean seed. p. 162-65. March.
• ***Summary:*** In the 1972 Blue Book, after passage of the landmark Plant Variety Protection Act of 1970, the section on "Soybean seed" has expanded to about 2 pages. It is listed in the index in two places: "Seed, soybean" and "Soybean breeders (private)"–the latter for the first time. 74 companies selling soybean seed are listed alphabetically by state.

At the end, under "Vegetable soybean seed" (p. 165), four companies are listed: Jacob Hartz (Stuttgart, Arkansas). Farmer City Grain (Farmer City, Illinois). Strayer Seed Farms (Hudson, Iowa), and Gurley's Inc. (Selma, North Carolina). The following vegetable varieties are sold: Disoy, Kanrich, Kim, Magna, Prize, Provar.

1010. *Soybean Digest Blue Book.* 1973. Organizations affiliated with the American Soybean Assn. p. 16-18.
• ***Summary:*** For each organization, this directory gives: Date organized. President (with address and phone number). Vice president(s) (with address and phone number). Secretary-treasurer (with address and phone number).

The organizations were organized on the following dates:

Alabama Soybean Producers Assn. (1968).
Arkansas Soybean Assn. (Aug. 1964).
Florida Soybean Producers Assn. (March 1969).
Georgia Soybean Assn. (1968).
Indiana Soybean Growers Assn. (Sept. 1966).
Iowa Soybean Assn. (Dec. 1964).
Kansas Soybean Assn. (Dec. 1972).
Kentucky Soybean Assn. (April 1970).
Land of Lincoln Soybean Assn. (Illinois) (Nov. 1964).
Louisiana Soybean Assn. (Jan. 1967).

Mid-Atlantic Soybean Assn. [Delaware, Maryland, New Jersey, Pennsylvania] (March 1970).
Minnesota Soybean Growers Assn. (1962).
Mississippi Soybean Assn. (Dec. 1963).
Missouri Soybean Assn. (Feb. 1966).
Nebraska Soybean Assn. (March 1969; affiliation pending).
North Carolina Soybean Producers Assn. (1966).
Ohio Soybean Assn. (March 1966).
South Carolina Soybean Assn. (Jan. 1966). Tennessee Soybean Assn. (Feb. 1966). Texas Soybean Assn. (Jan. 1967). Virginia Soybean Assn. (Feb. 1968). Address: Hudson, Iowa.

1011. *Dairy Record.* 1973. Soybean "milk" producer gets underway in Florida. 74(2):23. July.
• ***Summary:*** "Dairene of Florida, a manufacturer of a soybean 'milk,' has announced plans to construct Dairene plants in Charlotte, North Carolina; Springfield, Missouri; Woonsocket, Rhode Island; and El Paso, Houston, and Dallas, Texas.

"Dairene received a favorable ruling last December when a Circuit Court judge ruled that the Dairene firm should be classified as a food producer, and not subject to regulation by the state agriculture department's dairy division.

"President of Dairene of Florida is Eddie Goldstein, who was previously associated with Reddi-Whip and Fount-Wip, imitation whipped cream manufacturers. Goldstein says the soybean milk powder, called Pureblend, is manufactured from 35 ingredients in Newark, New Jersey. His processing operation is simple: 'Mix the powder with water, run it through a pasteurizer at 170º, cool it down to 36º and you have milk.'

"Goldstein says that Miami will become the big test market for his products. He notes that 'Imitation Vitamin D Milk' will retail for 59 cents a half gallon in Miami stores and will have the advantage of 'complete uniformity.'"

1012. *Soybean Digest.* 1973. Illinois pushes for soybean checkoff. Aug. p. 29.
• ***Summary:*** Later this year, Illinois farmers will be asked to vote on a statewide soybean checkoff program that will help fund soybean research and foreign market development beneficial to Illinois farmers, according to Wayne Fell, president of the Land of Lincoln Soybean Association. Approval of the referendum means that up to ½ cent per bushel would be collected at the first point of soybean sale. The bill contains a provision allowing a quick and easy refund if a farmer does not wish to participate in the program.

Illinois produces 20% of the soybeans grown in the USA but employs only one scientist as a plant breeder.

Ten other states have similar checkoff programs in effect: Iowa, Mississippi, Arkansas, Louisiana, Texas, Georgia, Florida, North Carolina, South Carolina, and Virginia. Minnesota and Ohio farmers are also preparing to vote on referendums.

1013. Humphries, Bill. 1973. N.C. first to plant it in U.S. [the soybean in North Carolina]. *News and Observer* (*Raleigh, North Carolina*). Sept. 16.
• ***Summary:*** During the late 1870s, "a North Carolinian named Christopher Wilson Hollowell, owner of Bayside Plantation near Elizabeth City, was growing soybeans as a farm crop.

"The first commercial processing of soybeans in America took place at Elizabeth City 61 years ago, in 1912" [sic, 1915]. By 1924 Illinois had edged out North Carolina as America's No. 1 soybean producing state; each grew about 1 million bushels.

Six soybean crushing plants in the Tar Heel state–including Cargill's at Fayetteville and Ralston Purina's at Raleigh–could handle all the soybeans grown in the state. But about 35% move out of the state for processing and for export overseas.

"One of the few plants in the United States devoted exclusively to processing soybeans for human consumption is the United Roasters Inc. facility at Clayton. This firm, with offices in Raleigh, markets roasted soybeans under the name "Golden Soya." A major U.S. concern currently is negotiating for acquisition of United Roasters and plans to make roasted soybeans a major snack food from coast to coast, utilizing up to 15 million pounds of beans annually."

Note: Soybeans were first grown in North America in 1765 by Samuel Bowen (Hymowitz & Harlan. 1983). Address: Farm editor.

1014. Humphries, Bill. 1973. Soybean stamp proposed. *News and Observer* (*Raleigh, North Carolina*). Sept. 20. Thursday.
• ***Summary:*** But the path from proposal to actual printing is a long one.

This article is mainly about a postage stamp to be issued on Aug. 5 commemorating the 100th anniversary of the importation of Angus beef cattle from Scotland to the USA. Address: Farm editor.

1015. *Soybean Digest.* 1973. ASA awards: Honorary life membership and certificates of meritorious service. Sept. p. 16-17.
• ***Summary:*** Honorary life memberships: (1) Dr. Charles A. Brim–Prof. at Agronomy at North Carolina State Univ. (2) Y.H. Chen, president of the Taiwan Vegetable Oil Manufacturers Assn. (TVOA) from 1969-1973, and a constant strong supporter of American Soybean Assoc. market development programs in Taiwan since ASA established its Taiwan branch office in 1969.

Certificates of meritorious service: (1) Education and

research: Dr. James Torrie, Prof. of Agronomy, Univ. of Wisconsin.

(2) Service within the organization: Miss Yoshiko Kojima, in Japan. "For her success in working out plans for and promoting U.S. soybeans and conducting market development programs in Japan since 1957. Her skill at creating and maintaining close relations with the Japan Nutrition Assn., the Agricultural Ministry Home Life Extension groups, and soy foods groups resulted in invaluable publicity for the promotion of the U.S. soybean and its products

"Miss Kojima joined the Japanese office of the American Soybean Association when it was established in 1956. She is now chief of the foods section in the Tokyo offices. Miss Koijma has led teams of government officials, nutritionists, magazine and newspaper food editors, and TV program directors in the study of various uses of soybeans. Her cheerfulness and enthusiasm have led to considerable good will between the Japanese public and ASA.

"She was also instrumental in setting up plans and making preparations for the 1972 International Association of Seed Crushers Congress held in Kyoto, Japan.

(3) Farm communications: E.W. "Buddy" Sanders. (4) Agribusiness: Illinois Crop Improvement Assn. (5) State achievement award: Arkansas Soybean Assn. Small portrait photos show each of the five people.

1016. Hartwig, Edgar E.; Jamisen, Kathryn W. comps. 1974. Uniform Soybean Tests: Southern States–1973. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/73soybook.pdf

• ***Summary:*** This is the first report of the Uniform Soybean Tests–Southern States that was not compiled by the U.S. Regional Soybean Lab. However at the bottom of page 2 ("Cooperating Agencies and Personnel") we read: "Oil and protein determinations were made at the U.S. Regional Soybean Laboratory, Urbana, Illinois, under the supervision of Mr. Stephen J. Gibbons."

On the first page, which is unnumbered, is an outline map of the southern part of the United States, from Texas on the west to the East Coast from Maryland down to Florida. The title: "Locations of Cooperative Uniform Soybean Tests, Southern States, 1973." A small black circle is used to indicate the location of each test. The map is divided by broken lines into five broad areas based mainly on soil type, as explained in the Introduction.

Page 1: In the top half is a list of the names of the people who supplied the data, each with a city and state. On the bottom half is the "Table of Contents" as follows: Cooperating personnel. Introduction. Location of nurseries. Methods. Group IV-S test: Uniform. Group V test: Uniform, preliminary. Group VI test: Uniform, preliminary. Group VII test: Uniform, preliminary. Group VIII test: Uniform, preliminary.

Pages 4-5: "Introduction: The Soybean Production Research Program has been directed toward the development of improved strains of soybeans and the obtaining of fundamental information necessary to the efficient breeding of strains to meet specific needs. In the Southern Region, fundamental studies and breeding programs are conducted at three locations, Stoneville, Mississippi; Raleigh, North Carolina; and Gainesville, Florida. After promising new strains are developed at these breeding centers, or by any other cooperating agency, they are advanced to the preliminary and uniform regional tests, conducted in cooperation with research workers in the Southeastern States. This testing program enables the breeder to evaluate new strains under a wide variety of conditions, and permits new strains to be put into production in a minimum amount of time.

"Ten uniform test groups have been established to evaluate the better strains developed in the breeding programs. The groups 00 through IV are adapted in the northern part of the United States, and the groups IV-S through VIII are grown in the southern part. Within their area of adaptation, there is a maturity range of 12 to 18 days within each maturity class. The best standard varieties available of each maturity class are used as check varieties with which to compare new strains as to seed yield, chemical composition, maturity, height, lodging, seed quality, and reaction to diseases. For the groups grown in the southern area, the major check varieties are: Kent, Essex, Mack, Forrest, Pickett 71, Lee 68, Bragg, Hutton, and Hardee. At Stoneville, Mississippi, where all maturity classes will mature, the approximate maturity dates of these varieties, when planted during the first half of May, are: Kent, September 8; Essex, September 25; Mack and Forrest, October 1; Pickett 71 and Lee 68, October 16; Bragg, October 22; Hutton, November 1; and Hardee, November 6.

"A wide range of soil and climatic conditions exist in the regions. As an aid in recognizing regional adaptation, the region has been subdivided into five rather broad areas which still represent a wide range of soil types. These are: (1) the East Coast, consisting of the Coastal Plain and Tidewater areas of the eastern shore of Maryland, Virginia, North Carolina, and the upper half of South Carolina; (2) the Southeast, consisting primarily of the Coastal Plain soils of the Gulf Coast area, but also including similar soil from South Carolina southward; (3) the Upper and Central South, including the Piedmont and loessal hill soils east of the Mississippi River; (4) the Delta area, composed of the alluvial soils along the Mississippi River from southern Missouri, southward; and (5) the Southwest, comprising Arkansas and Louisiana (outside the Delta), and Oklahoma and Texas. In the Southwest area, the potential soybean-growing areas would include the alluvial river soils, the gulf coast of Louisiana and Texas, and the high plains of Texas. In this area, several of the tests receive supplemental irrigation.

A map is included to illustrate the five production areas. On nearly all of the soils other than the alluvial soils along the Mississippi River, Fertilization is essential for satisfactory soybean production. In the Western area, irrigation is necessary for successful production. A table showing soil types, soil test information, and rate of fertilization is included.

"The soil test information is based upon analyses run by laboratories within the states. Different methods are used for extraction and reporting by the various laboratories. An attempt is being made to report phosphorus and potash on a high, medium, and low basis, since pounds per acre may have different meanings in accordance with the methods used. In most cases, soil samples were taken after the soybeans were mature." Address: Delta Branch Experiment Station, Stoneville, Mississippi 38776.

1017. *Soybean Digest.* 1974. Seed directory (Ad). Feb. p. 20-22.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, New York, North Carolina, North Dakota, Ohio, South Carolina, South Dakota, Tennessee, Wisconsin.

For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Most of the entries are for individual farmers.

1018. Brim, Charles A. 1974. Soybean varietal development. *Tennessee Valley Authority, Bulletin* Y-69. p. 39-42. March. Soybean: Production, Marketing, and Use.
• ***Summary:*** Contents: Introduction. New varieties for South. Genetic diversity suffers. Yield and quality goals. Variety groupings: All purpose varieties, specific varieties, multiple varieties, heterogeneous varieties. Use of mixtures. Hybrids still a question. Way to fight diseases.

Soybean varieties from maturity groups 00, 0, and I "are adapted to the long days of the northern latitudes... Varieties grown in the North flower relatively early and continue to increase in height and dry matter accumulation for several weeks after flowering. These varieties are indeterminate." Determinate types are found more in the South. Most of the soybean introduced initially to the southern states were used for forage. Arksoy was the first variety planted in the south which had satisfactory seed holding for combine harvesting. The release of Ogden in 1942 in Tennessee, and Roanoke in 1946 in North Carolina played a major role in placing soybean production in the South on a reasonably sound foundation. The introduction of Lee and Jackson varieties in the early 1950s further strengthened this foundation.

Concerning hybrids: "One of the questions confronting plant breeders working with self-pollinated species is whether effort should be exerted toward developing methods of producing hybrids for commercial production. The utilization of hybrid vigor in soybeans is unattractive at present because of the difficulty of obtaining cross seed on an economical scale. The discovery of male sterility in soybeans set off speculation that hybrid soybeans were just over the horizon." Address: Research Leader, Soybean Production Research, USDA-ARS–North Carolina State Univ.

1019. Kamprath, E.J. 1974. Nutrition in relation to soybean fertilization. *Tennessee Valley Authority, Bulletin* Y-69. p. 28-32. March. Soybean: Production, Marketing, and Use. [27 ref]
• ***Summary:*** Contents: Introduction. Soil characteristics of the major soybean producing areas in the south: Coastal plain, Mississippi delta, other areas. Lime responses: Neutralization of exchangeable Al, decrease of water-soluble Mn, increased Mo availability, nodulation and Rhizobium activity, supplying Ca and Mg, lime recommendations. Response to P and K fertilization: Phosphorus responses, responses to K fertilization. Nitrogen fertilization. Response to sulfur. Response to micronutrients. Summary and conclusions. Address: Prof. of Soil Science, North Carolina State Univ.

1020. Nichols, T. Everett, Jr. 1974. Pricing, futures market, and contracting. *Tennessee Valley Authority, Bulletin* Y-69. p. 140-48. March.
• ***Summary:*** Contents: Introduction. The pricing system: Price reflects supply and use changes, imperfect information. Price determination: Interactions determine farm price, meal and oil move independently, prices trigger key economic functions. Role of futures markets: Assures orderly marketing. Hedging in the futures market: Way to transfer risk, hedge to lock in known margin. Farmers use of futures markets: Lack of understanding, put marketing on par with production, set price on growing crop. Cash contracts: Contractor usually hedges immediately, move cautiously on contracts, legally binding agreement. Summary. Address: Extension Prof. and Grain Marketing Economist, Dep. of Economics, North Carolina State Univ.

1021. Reynolds, Gary. 1974. Let's break the soybean yield barrier. *Farm Journal* 98(3):21, 44. March.
• ***Summary:*** There is reason to believe that soybean yields can be doubled in the next 20 years–if you [American farmers] get the help you need from researchers and if you give soybeans the attention they deserve.

The 1973 national average was 27.8 bu/acre–a disgrace, up only 53% from 20 years ago, while corn yields are up 125% and grain sorghum yields have jumped a remarkable 220%.

But Wilbur A. Wassenburg (photo) and sons of Nemaha

Co., Kansas, made a remarkable 91.2 bu/acre last year on 5.2 acres of bottom land. "That's the highest yield ever recorded in a state contest." A yield of 80.1 bu/acre was recorded in Mississippi and 70.1 bu/acre in North Carolina. Other top yields for 1973 range from 44.3 to 67.6 bu/acre.

So how do they do it? Scientists know that soybeans give higher yields when the rows are much closer together (thicker stands), with 15 inches between rows rather than the typical 30 inches. Some record holders believe in shallow planting–no more than 1½ inches–if the moisture is there. And in inoculating seed at extra heavy rates. And in using "better drills and precision planting." Perhaps the quickest and easiest way to increase yields is to cut harvest losses by running your combine slowly and keeping the cutter bar low. Harvest losses run from 2-3 bushels/acre and about 80% of that occurs at the cutter bar. Of course, choosing the best variety is crucial, "but don't hold your breath waiting for hybrids." Even if breeders do manage to develop a hybrid, it may not be commercially viable "because of exorbitant seed production costs."

Laurel Meade, former head of USDA's Export Marketing Service, notes that U.S. markets for soybeans have grown by 600 million bushels since 1967 and he predicts they will grow that much again by 1980–if farmers focus on increasing their soybean yields. precision planting.

1022. Wilder, James F. 1974. Re: Proposes commemorative stamp for soybeans to be printed in North Carolina. Letter to U.S. Senator Jesse Helms in Washington, DC, May 30. 5 p. Typed, without signature (carbon copy). [1 ref]
• ***Summary:*** "Dear Senator Helms: You may recall that some time ago we exchanged correspondence proposing the preparation of a commemorative stamp for soybeans, and that the first issue be made at Elizabeth City, North Carolina. I have since learned that the gentleman who processed the first commercially grown soybeans in this country was Mr. W.T. Culpepper of Elizabeth City, who was manager of the Elizabeth City Cotton Oil and Fertilizer Company of the time (1915). Mr. Culpepper served as Elizabeth City Postmaster in 1938. With the foresight of Mr. Culpepper, North Carolina led all states in soybean production until 1924 when the 'soja bean' became a primary crop of the huge midwestern states.

"Still, the soybeans will account for $200 million to North Carolina farmers from the 1973 crop. Though far behind tobacco, it is now the second largest cash crop to our state's producers...

"Senator, the American Soybean Association is attempting to 'pirate' this idea and take the honors for such an undertaking. They would, no doubt, also have first issues made in some midwestern state. It was first the idea of ours here in this state. This is where the action first started relative to production and processing. This is where such an honor should originate." Includes detailed biographical information on William Thomas Culpepper (1884-1945), and his two sons Levin Butler Culpepper (1922-), and William Thomas Culpepper, Jr. (1916-1972). Levin Butler was mayor of Elizabeth City from 1957-1964, at which time he was appointed postmaster of the Elizabeth City Post Office, a post he now holds. "He says he would be thrilled to handle a first issue of such a stamp, with all the proper ceremonies." Address: Executive vice president, North Carolina Soybean Producers Assoc., P.O. Box 17514, Raleigh, NC, 27609. Phone: 919-787-6358.

1023. *Soybean Digest.* 1974. Certificates of meritorious service. Sept. p. 25.
• ***Summary:*** Contains a description and photo of the following people who have worked to help soybeans in America: (1) Service within the organization (American Soybean Assoc.): Mrs. Susan Rasmussen. (2) Agribusiness: Paul C. Hughes, manager of the Farmers Soybean Corp. and secretary-treasurer of the Midsouth Soybean and Grain Shippers Assn. Hughes was the first field service director for ASA from 1948 until 1952. He has been manager of the Farmers Soybean Corp. since 1952, and secretary-treasurer of the Midsouth Soybean and Grain Shippers Assn. since 1956.

(3) "State achievement award: To the North Carolina Soybean Producers Assn. for their extensive and successful work in promoting soybean research in North Carolina. Through the efforts of this Association, the state legislature appropriated $110,000 annually to N.C. State University for soybean research and extension programs. In addition to public monies, NCSPA funded $26,000 from the Association budget for projects at NCSU during 1974, contributing $5,000 to the ASA Research Foundation in 1973 and $12,000 to ASI [American Soybean Institute].

"Other activities included sponsorship of a 2-day soybean production and marketing tour into South Carolina; co-sponsorship of the first soybean field day in North Carolina; sponsoring a highly active Princess Soya; compiling an exhibit called 'Soybeans Benefit You Daily' which has been shown at the State Fair and other events and keeping their membership informed via 'The Soybean Scene,' a quarterly membership publication."

(4) Research and Education: Dr. John G. Clapp, Jr., North Carolina State University, Raleigh. (5) Farm Communications: E.D. (Ed) Wilborn, Memphis, Tennessee, vice-president and editor of *Progressive Farmer.* Photos show: Each of the four people. The certificate for 1973-1974, dated 11 Aug. 1974.

1024. Ford, Frank. 1974. Pack to nature: Nutrition made easy in the home or in the woods. Fort Worth, Texas: Harvest Press. vii + 157 p. Introduction by Roger Hillyard. Index. Oct. 18 cm. [13* ref]
• ***Summary:*** This book, containing over 250 recipes, describes how to use whole, natural food staples in quick,

easy to prepare dishes. By Sept. 1976 this book had become *The Simpler Life Cookbook from Arrowhead Mills.*

In the introduction, Roger Hillyard (writing in Oct. 1974 from Soquel, California) recalls that in late February of 1969, he and his wife and daughter were returning to Boston from California. They stopped in the small Texas town of Hereford to visit Deaf Smith County and the company that was supplying food to a growing number of natural foods followers and devotees–including Erewhon. Four years later they spent a year in Hereford working with Frank Ford and Arrowhead Mills. "During the five years I have worked with, lived with, and been friends with Frank, I have witnessed one of the most dramatic and beautiful personal unfoldings. Frank never wore that robe of self-righteousness, and he helped me to exchange mine for something more embracing."

Soy-related recipes include: Quick soy pancakes (with soy flour, p. 35). Soybean salad (with cooked soy flakes, p. 43). Quick tamari orange salad dressing (with tamari soy sauce, p. 47). Paul's salad dressing (with tamari, p. 47). Soybean chili (with dry soybeans and "tamari soysauce," p. 54). Sprout soup (with 2 cups fresh soybean sprouts, p. 54). Sprouted lentil soup (with soy flour, p. 55). Squash stew (with soy flakes, p. 55). Tamari bouillon (p. 56). Vegetable-soy-sesame soup (with soy flakes, p. 59). Basic soybeans (p. 74). Basic soy flakes (p. 75). Basic bulghur-soy grits (p. 75). Lentil soy loaf (with cooked soybeans or soybean flakes, p. 84). Soy & mushroom loaf (with soy flakes, p. 85). Soy patties (with soy flakes, p. 87). Stuffed peppers (with soy flakes, p. 87). Soyflake & tahini spread (with soy flakes, p. 106).

A 2-page directory titled "Some Natural Foods Sources" (p. 153-54) lists 30 of the natural food industry's pioneers, including Akin Distributors, Inc. (Tulsa, Oklahoma), Arrowhead Mills, Inc. (Hereford, Texas), Basic Needs (Grand Prairie, Texas), Cinagro Distributors, Inc. (Atlanta, Georgia), Cliffrose (Longmont, Colorado), Collegedale Distributors, (Collegedale, Tennessee), The Concord (Snowflake, Arizona), Deer Valley Farms (Guilford, New York), Eden Organic Foods (Ann Arbor, Michigan), Erewhon Trading Company (33 Farnsworth St., Boston, Massachusetts 02210, and 8454 Steller Dr., Culver City, California 90320), Food for Health (Phoenix, Arizona), Food for Life (Elmhurst, Illinois), Good Food People (Austin, Texas), Great Plains Distributors (Kansas City, Missouri), Happy Health Products (Miami, Florida), Janus (Seattle, Washington), Laurelbrook Foods (Bel Air, Maryland), Lifestream Natural Foods (Vancouver, BC, Canada; Ratana and Arran Stephens), Mottel Health Foods (New York, NY), Naturally Good Foods (Hereford, Texas), Nu-Vita Foods Inc. (Portland, Oregon), Organic Foods & Gardens (City of Commerce, California), Shadowfax (Binghamton, New York), Shiloh Farms (Sulphur Springs, Arkansas), Taiyo, Inc. (Honolulu, Hawaii), Tree of Life (St. Augustine, Florida), Vim & Vigor (Honolulu, Hawaii), The Well (San Jose, California), Walnut Acres Inc. (Penns Creek, Pennsylvania).

A small photo on the rear cover shows Frank Ford out hiking, wearing a backpack.

Note: This is the earliest published document seen (Feb. 2010) concerning Lifestream Natural Foods (Vancouver, BC, Canada). Address: Deaf Smith County, Texas.

1025. Clapp, B.N., Jr.; Baird, J.V.; Sullivan, G.A.; Wells, J.C.; Hinnant, C.D. 1974. 1973 soybean on farm test report. *North Carolina Agricultural Extension Service, Miscellaneous Publication* No. 120. 27 p. *
Address: North Carolina State Univ., Raleigh.

1026. Coker's Pedigreed Seed Co. 1974. Coker's soybean catalogue for Southern soybean growers. Hartsville, South Carolina. 8 p. 28 cm.
• ***Summary:*** Robert R. Coker is company president. Josh J. Stanton, Jr. was appointed director of Coker Soybean Research and head of the Soybean Division in 1972. Stanton graduated from North Carolina State University, joined Coker's small grain breeding staff in 1959, then served as plant breeder in the company's Cotton-Soybean Division from 1966-72.

"First hybridized U.S. varieties" (p. 3): "Our first efforts to evaluate [soybean] varieties, and then improve them through selection techniques, occurred in the 1920s. The 1937 USDA Yearbook (See: Morse, W.J.; Cartter, J.L. 1937. "Improvement in soybeans." *Yearbook of Agriculture* (*USDA*) p. 1154-89. For the year 1937. See p. 1188) refers to our development of Oloxi, PeeDee [Pee Dee], and Yelredo varieties from crosses. There is no known record of other varieties being developed in the U.S. by hybridization before that year."

A table (p. 3) shows soybean varieties developed by Coker's Pedigreed Seed Company: Oloxi–prior to 1940 [actually by 1937]. Pee Dee (Coker 31-15)–prior to 1940 [actually named Coker 31-15 by March 1934 and Pee Dee by 1937]. Yelredo (Coker 31-19)–prior to 1940 [actually named Coker 31-9 by March 1934 and Yelredo by 1937]. Majos–1946. Yelnando–1947. Hampton–1962 (Footnote: Original cross made for Coker's Pedigreed Seed Company by Dr. E.E. Hartwig, USDA). Stuart–1964. Coker Hampton 266–1964. Coker 240–1965. Coker 102–1967. Coker 208–1968. Coker 318–1970. Coker Hampton 266A–1970. Coker 136–1974. Coker 338–1974.

Pages 4-5–Coker 136–A new early maturing soybean for early planting.

Pages 6-7–Coker 338–A new high-yielding full-season soybean for the Lower South.

Page 8–Coker Hampton 266A–Southeast's most widely planted Group VII maturity soybean!

Coker now also has offices in Tunica, Mississippi, and Lubbock, Texas.

Photos show: (1) Josh Stanton standing in a field of soybeans holding a bunch of soybean plants (cover). (2) A breeding nursery with the plants just emerging. (3) A large New Holland combine harvesting a field of soybeans. (4) Portrait of Robert Coker, President (p. 2). (4) Portrait of Josh Stanton. (5) Stanton in the field talking about soybeans with visitors at a Coker Field Day near Tunica, Mississippi. (6) Coker's new Soybean Research Center at Hartsville (p. 3). (7) A small, self-propelled plot harvester used for soybean research plots and small increase blocks. It "can be cleaned out quickly, enabling us to handle many selections in a short time." (8) Equipment in a Coker laboratory that can screen many selections rapidly and efficiently for high protein. (9) Robert Coker, President, standing in a field of new Coker 338 soybeans. (10) Dr. J.W. Neely (former director of Coker research and now retired) and Bill Howle (production manager) standing in a field of Coker Hampton 266A soybeans. (11) A bag for soybeans "bearing Coker's familiar Red Heart Trademark."

Note: This catalog was received by the USDA National Agricultural Library on 27 Sept. 1974.

This catalog is owned by Special Collections, USDA National Agricultural Library, Beltsville, Maryland. Address: Hartsville, South Carolina.

1027. Hunter, William James. 1974. Soybean pectic and cellulolytic enzymes and their role in the rhizobium invasion mechanism. PhD thesis, North Carolina State University–Raleigh. 60 p. Page 4561 in volume 35/09-B of Dissertation Abstracts International. *
Address: North Carolina State Univ.–Raleigh.

1028. Laurelbrook Foods. 1975. A little bit about our food (Booklet). Bel Air, Maryland. 6 p. Feb. 28 cm.
• ***Summary:*** Laurelbrook now distributes about 43 different food products, plus 7 non-food products. Each of these is described, including wheat, brown rice, soy flour (ground from lightly toasted beans by arrowhead mills), granola, tamari ("High quality soy sauce from Japan, made from whole soybeans, wheat and sea salt..."), miso ("A thick soybean paste from Japan." Hacho miso, Mugi miso, and Kome miso are available), Deaf Smith peanut butter, vegetable oils (expeller pressed and unrefined), sea vegetables, kuzu, umeboshi (salt pickled plum with chiso [shiso, aojiso] leaf). Address: P.O. Box 47, Bel Air, Maryland 21014; Raleigh Branch: 330 W. Davie St., Raleigh, North Carolina 27601.

1029. *Soybean Digest.* 1975. Seed directory (Ad). Feb. p. 28-30.
• ***Summary:*** Soybean seedsmen and seed companies are listed alphabetically by state (and within each state alphabetically by city) in the following states: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, New Mexico, New York, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Virginia, Wisconsin.

For each listing is given the amount and varieties of seed available, and whether certified, uncertified, or registered. Many of the entries are for individual farmers.

1030. Ramsey, H.A.; Willard, T.R. 1975. Soy protein for milk replacers. *J. of Dairy Science* 58(3):436-41. March. [16 ref]
• ***Summary:*** Fully-cooked soy flour contains an inactive form of trypsin inhibitor that is converted to an active form at pH 7 to 9. This inhibitor can be destroyed by heating the soy flour in water. Address: Dep. of Animal Science, North Carolina State Univ., Raleigh, North Carolina 27607.

1031. *Soybean Digest Blue Book.* 1975. Soybean breeders (Private). p. 124, 126.
• ***Summary:*** The following companies are listed alphabetically by state: 1. Teweles Seed Co., Morton Seed Div., Bowen, Illinois. Dr. Jim Ford, soybean breeder. 2. Soybean Research Foundation Inc., Mason City, Illinois. Dr. Arnold Matson, breeder. 3. Louis Bellatti, Mt. Pulaski, Illinois. 4. Seedmakers Inc., Princeville, Illinois. Marshall Butzow and Louis Ballatti, breeders. 5. Midwest Oilseeds Inc., Adel, Iowa. Harry S. Stine, president. 6. Northrup, King and Co., Washington, Iowa. Other plants: Minneapolis, Minnesota; Waterloo, Iowa. Dr. John Thorne, soybean breeder. 7. Peterson Seed Co., div. of Pioneer, Waterloo, Iowa. Dr. Clark Jennings and Dr. C.R. Weber. 8. Asgrow Seed Co., subsidiary of Upjohn Co., Kalamazoo, Michigan. 9. McNair Seed Co., Laurinburg, North Carolina. David Burns, Breeder. 10. Coker's Pedigreed Seed Co., P.O. Box 340, Hartsville, South Carolina. Josh J. Stanton, soybean breeding. 11. Excel Hybrid Seeds Inc., subsidiary of Ring Around Products Inc., Plainview, Texas. Dr. William H. Davis. 12. Teweles Seed Co., Clinton, Wisconsin. Dr. Jim Ford.

Several soybean seed companies have ads in this issue: Jacob Hartz Seed Co. (Stuttgart, Arkansas, p. 19. Full-page ad). Agripro (Ames, Iowa, p. 125. Full-page ad). Asgrow Seed Co. (p. 127. Full-page ad). Address: Hudson, Iowa.

1032. Rinne, R.W.; Gibbons, S.; Bradley, J.; Seif, R.; Brim, C.A. 1975. Soybean protein and oil percentages determined by infrared analysis. *Agricultural Research Service, North Central Region* NC-26. 4 p. July. [8 ref]
• ***Summary:*** "Protein and oil percentages in soybean (Glycine max (L.) Merrill) seed meal were determined by an infrared light reflectance instrument (IR) and compared with standards for protein analysis by Kjeldahl and oil analysis by the Soxhlet pet[roleum] ether extraction method. Within the ranges for which the IR instrument is calibrated, it will do a satisfactory job. The correlation coefficient between

IR protein and Kjeldahl protein determinations of the soybean seed meal used in the calibration was 0.995, and the correlation coefficient between IR oil and Soxhlet pet ether extraction of oil was 0.983." Address: 1-2. ARS, Urbana, Illinois; 3-4. Dep. of Agronomy, Univ. of Illinois, Urbana, IL; 5. ARS, Raleigh, North Carolina.

1033. Nichols, T.E., Jr.; Clapp, John G., Jr.; Perrin, Richard K. 1975. An economic analysis of factors affecting oil and protein content of soybeans. *North Carolina State University, Department of Economics and Business, Economic Information Report* No. 42. 20 p. Sept.

• ***Summary:*** The aim of this study was to isolate and measure the effects of factors associated with variation in the oil and protein content of soybeans grown in North Carolina. These factors included varieties, lime and fertilizer applications, planting dates, soil conditions, seed treatments, herbicide application, and cultural practices. It was found that soil characteristics, soybean varieties, planting date, and cultural practices have an effect on the oil and protein content of soybeans. Two tons of lime per acre were found to increase the protein content by an average of 5%, to decrease oil content by 3.5%, and to increase yields by 7 bushels.

Table 2 (p. 9) lists the following named soybean varieties (with the change in oil and protein content of each): York, Coker Hampton 266A, Coker 69-87A, Ransom, Dare, McNair 600, Forrest, Davis, Picket 71, Coker 71-211, Lee 68, Coker 70-136, Coker 70-137, Coker 68-38, Essex, Bragg, McNair 800, Coker 71-222, and Hutton.

Economic choices: "The question arises whether farmers should be advised to adopt particular practices if farmers were, in fact, paid for the oil and protein produced, rather than the quantity of beans. The average yield per acre of the plots in these experiments was 43 bushels, or about 2,244 pounds of dry matter, assuming an average dry matter content of 87 percent. At a protein price of 16¢ per pound (corresponding to $140 per ton of 44 percent protein meal), a 1 percent increase in protein content would be worth an additional $3.59 per acre. For an oil price of 20¢ per pound, a 1 percent increase in oil content would be worth an additional $4.48 per acre. With yields lower than 43 bushels per acre, the value of additional protein and oil content would of course be proportionately lower." Address: Raleigh, NC.

1034. National Soybean Processors Association. 1975. Year book and trading rules 1975-1976. Washington, DC. ii + 103 p.

• ***Summary:*** On the cover (but not the title page) is written: Effective October 1, 1975. Contents: The National Soybean Processors Association [Introduction and overview]. Constitution and by-laws. Officers and directors. Executive staff. Members. Standing committees. Food Protein Council. Trading rules on soybean meal. Sales contract. Appendix to trading rules on soybean meal: Official methods of analysis (moisture, protein, crude fiber, oil {only method numbers listed}, sampling of soybean meal {automatic sampler, probe sampler}), official weighmaster application, semi-annual scale report, official referee chemists (meal). Trading rules on soybean oil. Sales contract. Definitions of grade and quality of export oils. Soybean lecithin specifications. Appendix to trading rules on soybean oil: Inspection, grading soybean oil for color (N.S.P.A. tentative method), methods of analysis (A.O.C.S. official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses; soap stock, acidulated soap stock and tank bottoms (only method numbers listed), official weighmaster application, semi-annual scale report, official referee chemists (oil). Soybean oil export trading rules. Foreign trade definitions (for information purposes only).

The page titled National Soybean Processors Association (p. ii) states: "The NSPA is the professional association of America's soybean processors. Its members process and market more than 95 percent of all soybean crushed within the continental U.S. From nearly 85 processing centers, in every major soybean producing region of the nation, NSPA members service America's agricultural community.

"During the past crop year about 700,000,000 bushels of soybeans moved through processing plants of NSPA's 33 member firms. Approximately 60 percent of America's 1.2 billion-bushel soybean crop is bought and processed by NSPA members. Exporters account for another 32 percent of the crop, and the remainder [8%] is returned to farms for seed, feed, and residuals." Also discusses industry programs, soybean research, and international market development.

The section on officers, executive committee, and board of directors (p. 7-8) gives the name, company affiliation, and phone number of each person. Officers–President: Lowell K. Rasmussen, Honeymead Products Co. Vice President: John G. Reed, Jr., Continental Grain Co. Secretary: Stiles M. Harper, Southern Soya Corporation. Treasurer: T.J. Suelzer, Central Soya Co. Immediate past president: James R. Spicola, Cargill, Inc. Executive Committee: Donald B. Walker ('77), ADM. James R. Spicola, Cargill. Thomas J. Suelzer, Central Soya. John G. Reed, Jr., Continental. Martin Hinby ('76), Cook Industries.

Board of Directors (alphabetically by company; each member company has one representative on the board): Thomas H. Wolfe, Anderson, Clayton & Co. Donald B. Walker, Archer Daniels Midland Co. George H. Heinz, Buckeye Cellulose Corp. John Fallon, Bunge Corporation. James R. Spicola, Cargill, Inc. Thomas J. Suelzer, Central Soya Co., Inc. John G. Reed, Jr., Continental Grain Co., Martin Hilby, Cook Industries. Joe C. Givens, Dawson Mills. Alfred Jenkins, Delta Cotton Oil & Fertilizer Co. John A. Dotson, Far-Mar-Co., Inc. Kenneth E. Sullivan, Farmers Grain Dealers Assn. of Iowa. Donald M. Chartier, Farmland Industries, Inc. Gaylord O. Coan, Gold Kist Inc.

Lowell K. Rasmussen, Honeymead Products Co. David C. Thompson, Krause Milling Co. Kenneth J. McQueen, Land O'Lakes, Inc. Floyd W. Brown, Lauhoff Grain Co. Kermit F. Head, Missouri Farmers Assn.–Grain Div. James A. Smith, National Protein Corp. Robert E. Hicks, Owensboro Grain Co., Inc. Frank P. Perdue, Perdue Incorporated. John H. Payne, Planters Manufacturing Co. William T. Melvin, Planters Oil Mill, Inc. Theodore W. Bean, Quincy Soybean Co. E.J. Cordes, Ralston Purina Co., W.L. Knoll, Riceland Foods, Inc. J.D. Morton, Sherman Oil Mill. Stiles M. Harper, Southern Soya Corp. James W. Moore, A.E. Staley Mfg. Co. W.W. Moore, Swift Edible Oil Co. Preston C. Townsend, Townsend's Inc. Tyler Terrett, West Tennessee Soya Mill, Inc.

Executive office, Washington, DC: Executive Director, Sheldon J. Hauck. Director, Public Affairs: Jack DuVall. Administrative Asst.: Jean N. Sullivan. National Soybean Crop Improvement Council: Robert W. Judd, Managing Director. General counsel: Edward H. Hatton, Esq., Jenner & Block, Chicago, Illinois.

Members (listed alphabetically by company; within each company, first the name of the official Association representative {who is on the Board}, followed by the other personal members listed alphabetically by surname. For example, Archer Daniels Midland Co., the company with the most personal members, has 24. After the name of each personal member is given his address and phone number. In the listing below, the number of personal members is shown in parentheses after the name of each company, followed by city and state of the various locations): Anderson, Clayton & Co. (6); Phoenix, Arizona; Osceola, Arkansas; Jackson, Mississippi; Vicksburg, Mississippi; Houston, Texas. Archer Daniels Midland Co. (24); Decatur, Illinois; Galesburg, Illinois; Granite City, Illinois; Fredonia, Kansas; Mankato, Minnesota; Red Wing, Minnesota; St. Louis, Missouri; Fremont, Nebraska; Lincoln, Nebraska; Kershaw, South Carolina. Buckeye Cellulose Corp. (8); North Little Rock, Arkansas; Augusta, Georgia; Cincinnati, Ohio; Memphis, Tennessee. Bunge Corporation (5); St. Louis, Missouri; New York City, New York; Cargill, Inc. (15); Gainesville, Georgia; Cedar Rapids, Iowa; Des Moines, Iowa; Sioux City, Iowa; Washington, Iowa; Chicago, Illinois; Wichita, Kansas; Minneapolis, Minnesota; Fayetteville, North Carolina; Memphis, Tennessee; Chesapeake, Virginia. Central Soya Co., Inc. (11); Chicago, Illinois; Gibson City, Illinois; Decatur, Indiana; Fort Wayne, Indiana; Indianapolis, Indiana; Belmond, Iowa; Marion, Ohio; Bellevue, Ohio; Delphos, Ohio; Chattanooga, Tennessee. Continental Grain Co. (8); Guntersville, Alabama; Chicago, Illinois; Taylorville, Illinois; New York City, New York; Cameron, South Carolina. Cook Industries (12); Pine Bluff, Arkansas; Emporia, Kansas; Marks, Mississippi; Memphis, Tennessee. Dawson Mills (3); Dawson, Minnesota. Delta Cotton Oil & Fertilizer Co. (1); Jackson, Mississippi. Far-Mar-Co., Inc. (1); St. Joseph, Missouri. Farmers Grain Dealers Assn. of Iowa (Cooperative), Soybean Processing Div. (1); Mason City, Iowa. Farmland Industries, Inc. (3); Van Buren, Arkansas; Sergeant Bluff, Iowa; Kansas City, Missouri. Gold Kist Inc. (3); Atlanta, Georgia. Honeymead Products Co. (3); Mankato, Minnesota. Krause Milling Co. (2); Milwaukee, Wisconsin. Land O'Lakes, Inc. (3); Fort Dodge, Iowa; Sheldon, Iowa. Lauhoff Grain Co. (1); Danville, Illinois. Missouri Farmers Assn.–Grain Div. (4); Mexico, Missouri. National Protein Corp. (2); Champaign, Illinois; Chicago, Illinois. Owensboro Grain Co., Inc. (1); Owensboro, Kentucky. Perdue Incorporated (2); Salisbury, Maryland. Planters Manufacturing Co. (2); Clarksdale, Mississippi. Planters Oil Mill, Inc. (1); Rocky Mount, North Carolina. Quincy Soybean Co. (4); Quincy, Illinois. Ralston Purina Co. (8); Bloomington, Illinois; Lafayette, Indiana; Iowa Falls, Iowa; Louisville, Kentucky; St. Louis, Missouri; Raleigh, North Carolina; Memphis, Tennessee. Riceland Foods, Inc. (8); Helena, Arkansas; Stuttgart, Arkansas. Sherman Oil Mill (1); Fort Worth, Texas. Southern Soya Corp. (1); Estill, South Carolina. A.E. Staley Manufacturing Co. (8); Decatur, Illinois. Swift Edible Oil Co., Div. of Swift & Co. (1); Chicago, Illinois; Townsend's Inc. (2); Millsboro, Delaware. West Tennessee Soya Mill, Inc. (1); Tiptonville, Tennessee.

Associate Members: Anderson Clayton Foods, Dallas, Texas. Best Foods Div. of CPC International Inc., Englewood Cliffs, New Jersey. Canadian Vegetable Oil Processing Co., Hamilton, Ontario, Canada. Capital City Products Co., Div. of Stokely-Van Camp, Inc., Columbus, Ohio. I.H. French & Co., Champaign, Illinois. General Mills, Inc., Minneapolis, Minnesota. Glidden-Durkee, Div. of SCM Corporation, Chicago, Illinois (Gerald J. Daleiden). Grain Processing Corp., Muscatine, Iowa (H.P. Woodstra). Hartsville Oil Mill, Hartsville, South Carolina (Richard A. Koppein). Humko Products, Memphis, Tennessee. Hunt-Wesson Foods, Inc., Fullerton, California. Kraft Foods Div. of Kraftco Corp., Chicago, Illinois. Lever Brothers Co., New York City, New York. Maple Leaf Mills Ltd., Toronto, Ontario, Canada (W.G. Milliken). Procter & Gamble Co., Cincinnati, Ohio. Quaker Oats Co. (The), Chicago, Illinois. Schouten International, Inc., Minneapolis, Minnesota. Southern Cotton Oil Co., New Orleans, Louisiana. Southern Feed Ingredients Co., Memphis, Tennessee. Wilsey Foods, Los Angeles, California.

Standing committees: For each committee, the function of the committee, the names of all members (with the chairman designated), with the company and company address of each are given–Crop Improvement Council. Meal trading rules. Oil trading rules. Safety and insurance. Soybean Research Council. Technical. Traffic and transportation. Food Protein Council (Objective and rules adopted 3 March 1971, amended 5 Nov. 1971). Address: 1800 M St., N.W., Washington, DC 20036. Phone: (202) 452-8040.

1035. Clapp, B.N., Jr.; Baird, J.V.; Sullivan, G.A.; et al. 1975. 1974 soybean on farm test report. *North Carolina Agricultural Extension Service, Miscellaneous Publication* No. 134. 24 p. *
Address: North Carolina State Univ., Raleigh.

1036. Berg, Steve. 1976. Soybean growers told future may brighten. *News and Observer* (*Raleigh, North Carolina*). Feb. 9.
• ***Summary:*** Growers attending the North Carolina Soybean Producers Association's annual meeting at the Hilton Inn Friday were unhappy about tumbling soybean prices.

The Association leadership has criticized the federal government which in August imposed an export ban [embargo] on soybeans. Within two months the price fell from $6.17 a bushel to $4.67. The leadership has blamed Secretary Gerald Ford and Secretary of State Henry A. Kissinger for using soybeans as a tool of U.S. international foreign policy–to the detriment of farmers. Address: Staff writer.

1037. **Product Name:** Soya Plus: Imitation Milk [Plain, or Chocolate].
Manufacturer's Name: Daritein Foods, Inc.
Manufacturer's Address: Charlotte, North Carolina.
Date of Introduction: 1976 February.
Ingredients: -
Wt/Vol., Packaging, Price: Half gallon gable-top carton. Retails for $0.97 (1976/02).
How Stored: Refrigerated.
New Product–Documentation: Food Product Development. 1976. Feb. p. 54. Soya Plus: Imitation soy-based milk. Daritein Foods, Inc. Charlotte, N.C. A large photo shows the carton.

1038. *Food Product Development.* 1976. Soya Plus: Imitation soy-based milk. Daritein Foods, Inc. Charlotte, N.C. 10(1):54. Feb.
• ***Summary:*** This soy-based drink is available in plain and chocolate flavors. It contains no cholesterol, lactose, or animal fats. Each 8 oz serving contains 165 calories and 9 gm of protein. A large black-and-white photo shows the carton.

1039. *Soybean Digest.* 1976. Seed directory (Ad). Feb. p. 26-28.
• ***Summary:*** Organized alphabetically by state, and within each state, alphabetically by city. For each seed seller is given, the Zip code, company name, address, the available number of bushels of each variety, and whether or not the seeds have been certified and/or registered. For example: "12,000 bu. certified Bragg." Seedsmen / seed dealers in the following states are listed: Alabama (6 seedsmen), Arkansas (11), Florida (1), Georgia (2), Illinois (15), Indiana (5), Iowa (16), Kansas (5), Kentucky (3), Louisiana (2), Michigan (1), Minnesota (29), Mississippi (4), Missouri (10), Nebraska (7), New York (2), North Carolina (7), North Dakota (1), Ohio (3), Oklahoma (5), South Carolina (4), South Dakota (2), Tennessee (6), Virginia (4), Wisconsin (1)

Note: This is the last "Seed directory" that appears in Soybean Digest.

1040. Morgans, Jim. 1976. Re: *The Mother Earth News* plans publish excerpts from *The Book of Tofu.* Letter to William Shurtleff at New-Age Foods Study Center (278-28 Higashi Oizumi, Nerima-ku, Tokyo 177, Japan), April 26. 1 p. Typed.
• ***Summary:*** "Thanks for your letter of March 27 and February 9 (to John Shuttleworth). And, by the way, its our pleasure to run excerpts from your fantastic book. I hope that you will try to stop in and see us here in the fall. (We're anxious to try out some of those tofu dishes you kindly offered to prepare!)." Discusses the excerpting schedule.

Note: This is the second earliest dated document seen in which "New-Age Foods Study Center" (the predecessor of Soyfoods Center) is mentioned. Address: Associate editor, The Mother Earth News, P.O. Box 70, Hendersonville, North Carolina 28739.

1041. Bullock, J. Bruce; Nichols, T.E., Jr.; Updaw, Nelson. 1976. Pricing soybeans to reflect oil and protein content. *North Carolina State Univ., Dep. of Economics and Business, Economic Research Report* No. 37. 31 p. May. [1 ref]
• ***Summary:*** Contents: Abstract. Testing soybeans for oil and

protein. Measurement problems. A system of discounts and premiums: Oil value of soybeans, meal value of soybeans. Total discounts. Effects of penalty structure for pricing soybean meal. Acceptability of discount system. Summary.

"The value of soybeans depends on their oil and protein content and the price of soybean oil and meal. Until recently, traders could not accurately determine the oil and protein content of soybeans through a quick and reliable method. Instead, market value is determined through visual inspection. Grades are related to standards based on moisture, foreign material, damage and other factors. Instruments for quick and accurate measurement of the protein and oil content of soybeans are becoming available. This will make it possible to price soybeans on the basis of their protein and oil content.

"The purpose of this bulletin is to report the development of a system of discounts and premiums that will more accurately reflect value differences of soybeans due to their oil and protein content and the price of soybean meal and oil."

"The newly developed instruments use an optical system involving infrared analysis to quickly determine the moisture, oil and protein content of soybeans and other grain products. The new infrared analysis is based on research completed over the past 10 years by engineers and scientists at the Agricultural Research Service's Agricultural Marketing Research Institute..."

"It was found that discounts (premiums) for some types of soybeans can be substantial. For example, soybeans with 17 percent oil and 32 percent protein are worth 53.64 cents per bushel less than standard soybeans when soybean oil is priced at 25 cents per pound and 44 percent soybean meal is priced at $140 per ton.

"Acceptability of a premium-discount system based on oil-protein content will undoubtedly vary greatly among producers, handlers and processors. Processors would likely have the greatest incentive for widespread adoption of the practice once reliable instruments for quick determination of oil and protein content were available.

"Handlers would be less enthusiastic about changing the present pricing practices unless handling margin were widened sufficiently to cover the entire costs of testing and handling. Farmer acceptance would depend largely on the quality of beans produced and the premium-discount schedule applied. Growers producing high protein-low oil beans would no doubt favor adoption of the premium-discount system when protein prices are high while farmers producing high oil-low protein beans would not favor any change in the present pricing system."

Note: This is an in-depth study of the subject of "component pricing," although that term does not appear in this bulletin. Address: Raleigh, NC.

1042. Deitz, L.L.; Van Duyn, J.W.; Bradley, J.R., Jr.; et al. 1976. A guide to the identification and biology of soybean arthropods in North Carolina. *North Carolina Agricultural Experiment Station, Technical Bulletin* No. 238. vi + 264 p. June. [254 ref]

• ***Summary:*** "Introduction: Interest in insects affecting soybeans, *Glycine max* (L.) Merrill, has risen sharply with the increased economic importance of the crop. Soybeans were introduced into North Carolina around 1900, but became a major cash crop only recently. For many years following its introduction, the crop found favor for soil building purposes and to some extent for forage; thus a large portion of the planted acreage was not harvested. During the last fifteen years soybean acreage has more than doubled and the proportion harvested increased to almost 100% (Fig. 1; Anon. 1961, Anon. 1962-1974).

"Between 1924 and 1972 the price remained fairly

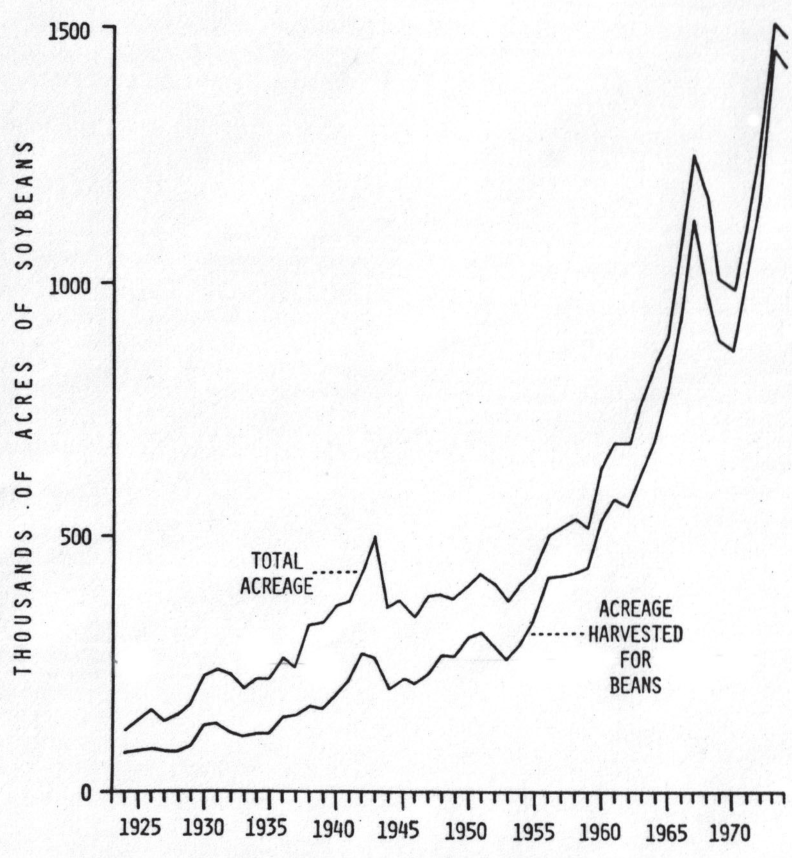


Fig. 1. The trend in soybean acreage from the early 1920's to mid-1970's in North Carolina.

constant at $2-3 per bushel (except 1923-1933), but from 1972-1975 the price increased to about $7.45 (Anon. 1961, Anon. 1962-1974). Soybeans are grown from the mountains to the coast in North Carolina (Fig. 2), but the bulk of the crop is concentrated in the Coastal Plain, including large acreages in the recently developed agricultural areas of the Northeastern Coastal Plain.

"Prior to the recent increase in the price of soybeans, growers seldom tried to control insect pests, but are now interested in maximum yields and are in a better financial position to include more insect control actions among their production costs. However, decisions for insect control should be made on the basis of sound criteria. One criterion is a knowledge of the insects occurring in the soybean fields.

"This bulletin presents a summary of information on the arthropods (chiefly insects, but including some spiders and mites) associated with soybeans in North Carolina. Each species is identified, its life and seasonal history outlined, and its relationship to the soybean plant and other species in the community of organisms within the soybean field described. The list of species beginning on page 147 is incomplete but attests to the rich diversity of the arthropod fauna of the soybean community. No effort was made to encompass soil arthropods associated with the soybean root system. Also, certain taxonomic groups (mites, thrips, etc.) presenting very difficult problems of sampling and identification are poorly represented.

"Arthropods which are most commonly encountered in soybeans (recognized pests, potential pests, parasites and predators) are discussed individually. The species are divided into two main groups: (1) phytophagous..." Address: Dep. of Entomology, North Carolina Agric. Exp. Station, Raleigh.

1043. Gurley's Inc. 1976. World's Best brand edible soybeans: Finest money can buy (Ad). *Soybean Digest Blue Book.* Inside front cover. June.
• ***Summary:*** "Specializing. Food & seed soybeans. Bulk or bagged. Export or domestic. Ship or carload." Varieties: Bossier, Dare, Hampton 266A, Coker 136, Coker 338, Tracy, York, Hardee, Bragg, Cobb, Davis, Pickett 71, Forrest, Hutton, Ransom, Essex, Lee 74, Lee 68.

Also: 44% Selsoy [soy flour]. 49% Hy-Protene Soybean Meal. Soybean oil.

Also sells rye, oats, wheat, barley, and cowpeas. Address: P.O. Box 388, Selma, North Carolina 27576. Phone: 919-965-2503.

1044. *Soybean Digest.* 1976. [American Soybean Assoc.] Activities, publications, market development program, educational films, affiliated states. June. p. 34-37.
• ***Summary:*** Contents: Activities: Objectives, government, annual conferences, answers your questions. Publications: *Soybean Digest,* Gold Book issue of *Soybean Digest* (published each June as a marketing guide and reference for soybean producers), Blue Book issue of *Soybean Digest* (published each June is the directory of the soybean industry), and *Soybean Profits* newsletter (published 32 times a year–weekly during the harvest and fall marketing season–devoted to: (1) Exchange of high-yield ideas among panel members, (2) Market intelligence information from a worldwide network of authorities). Membership (active or contributing. Note: The number of ASA members is not given). Market development program (started in 1956 in Japan; Fifteen states now have legislated checkoffs: Minnesota, Iowa, Illinois, Georgia, Florida, Arkansas, Texas, North Carolina, South Carolina, Mississippi, Louisiana, Alabama, Virginia, Kentucky, and Nebraska).

Educational films: Farmer for the world, The gold that grows, Japan–Your growing cash customer, More from less (no-tillage farming), and Soybeans to grow (Elanco).

Affiliated states (24):

Alabama Soybean Producers Association: Organized 1968.

Arkansas Soybean Association: Organized Aug. 1974 [sic, Aug. 1964].

Florida Soybean Producers Association: Organized March 1969.

Georgia Soybean Association: Organized 1968.

Land of Lincoln Soybean Association (Illinois): Organized Nov. [sic, Sept. 10] 1964.

Indiana Soybean Growers Association: Organized Sept. 1966.

Iowa Soybean Association: Organized Dec. 1974 [sic, Dec. 1964].

Kansas Soybean Association: Organized Dec. 1972.

Kentucky Soybean Association: Organized April 1970.

Louisiana Soybean Association: Organized Jan. 1967.

Michigan Soybean Association: Organized March 1974.

Mid-Atlantic Soybean Association: Organized March 1970 (Delaware, Maryland, Pennsylvania, and New Jersey).

Minnesota Soybean Growers Association: Organized 1962 [Dec. 6].

Mississippi Soybean Association: Organized Dec. 1963.

Missouri Soybean Association: Organized Feb. 1966.

Nebraska Soybean Association: Organized March 1969.

North Carolina Soybean Producers Association: Organized 1966.

Ohio Soybean Association: Organized March 1966.

Oklahoma Soybean Association: Organized Aug. 1975.

South Carolina Soybean Association: Organized Jan. 1966.

Tennessee Soybean Association: Organized Feb. 1966.

Texas Soybean Association: Organized Jan. [sic, Feb. 20] 1967.

Virginia Soybean Association: Organized Feb. 1968.

Wisconsin Soybean Association: Organized July 1973.

1045. Walsten, M. 1976. Processing centers in major

production areas. *Soybean Digest.* Aug. p. 18-19.
• ***Summary:*** "The tight relationship between major soybean production and processing areas emphasizes the importance of both the domestic feed industry and export markets to the soybean industry.

"The main livestock area of the nation is the Corn Belt where corn and hogs dominate agriculture. But the steady growth in confinement feeding necessitates a source of protein. With the soil well suited for soybean production and soybean meal a solid choice for protein sources, soybean production likewise is a major commodity in the Midwest. The result: 50% of the nation's soybean crop last year was grown in the four leading states of Illinois, Iowa, Indiana and Missouri.

"Foreign markets, of course, draw heavily on our soybean supplies taking around 50% of the crop in a year. Efficient river transportation systems give the competitive edge to those producing areas along the [Mississippi] river making Arkansas, Ohio, Minnesota, Mississippi and Louisiana important producing states as well. In total, these 10 states, all served by major river systems, produce about 80% of the nation's soybean crop.

"Since processors are producing for both domestic and foreign markets, it's not surprising to find processing plants concentrated in the major producing areas and near rivers for easy access to the export market. In those same 10 leading producing states is about 75% of the nation's crushing capacity. Estimates in figuring state and regional crushing capacities are based on data supplied by the National Soybean Processors Assn. which represents about 95% of the nation's total soybean crush and data supplied by the Census Bureau, U.S. Department of Agriculture and trade estimates.
"The nation's crushing capacity has nearly doubled in the past 10 years while the number of processing mills has declined about 18%, based on USDA figures. Older, smaller mills are being replaced by bigger capacity, more efficient mills, obviously. That also indicates that fewer cottonseed mills are slipping some soybeans through their plants.

"Total crushing capacity in the 1975-76 marketing year is 1,100 mil. [million] bu., estimates USDA. But mills do not run at full capacity because they must close down periodically for basic maintenance and repairs. Usual close down period is August into September. USDA expects a total crush for the 1975-76 marketing year of 865 mil. bu., about 78% of total capacity. That estimate matches closely the 80% capacity accepted by the trade as a practical capacity. In the 1974-75 marketing year, mills ran at about 67% capacity. The average annual crushing margin slipped to just 13¢/bu that crop year. Between the 1970 and 1973 crop years, total capacity ran between 78% and 87%; the average annual crushing margin swung between 9¢ and 72¢ during that period. The 1969 crop year recorded a high capacity of 92% with 132 mills crushing 737 mil. bu. The average crush margin for that crop year was 48¢/bu.

"Illinois is by far the major crusher and producer. Last year, 292 mil. bu. were produced in the state which represented 19% of the 1975 harvest. And Illinois produced that crop with 15% of the nation's soybean acreage. That volume of production attracts plenty of crushers. The Soybean Digest Blue Book lists 10 companies with 16 plants in that state. Two major processors have headquarters at Decatur, Illinois. Total crush capacity in that state is estimated at about 241 mil. bu. per year. Figuring most plants run at the practical capacity of 80%, practical annual crush is around 193 mil. bu.

"Iowa easily takes the runner-up crown for total production and processing capacity. Last year, Iowa produced 15.6% of the nation's bean crop on 13% of the nation's soybean ground. The state crushes about 15% of the nation's beans with an estimated total annual plant capacity of 170 mil. bu. In terms of the practical capacity, Iowa crushes an estimated 136 mil. bu.

"Indiana and Minnesota are closely tied for third in terms of estimated crush capacity. Indiana is third in terms of total production; Minnesota is seventh. Indiana has an estimated practical crush of about 54 mil. bu. as does Minnesota. However, in terms of the Indiana, Ohio and Kentucky region, that eastern Corn Belt region has an estimated potential capacity of 136 mil. bu. with a practical capacity of 109 mil. bu. The upper Corn Belt region of both Dakotas and Minnesota has an estimated potential capacity of 65 mil. bu. Missouri, the nation's fourth leading soybean producers, has an estimated crush of 28 mil. bu. annually.

"The South has some impressive crush capabilities, too. The central south region of western Tennessee, Arkansas, Mississippi, Louisiana and southeast Missouri has an estimated potential capacity of 192 mil. bu., with a practical limit of 154 mil. bu. Mississippi has an estimated practical capacity of 43.2 mil. bu.

"The southeast region of Alabama, Georgia, Florida, North Carolina, South Carolina, Delaware, Virginia, Maryland and eastern Tennessee could crush an estimated 207 mil. bu. But on a practical basis, an annual estimated crush of 166 mil. bu. is more likely. It is estimated that South Carolina has a practical capacity of 17 mil. bu.

"That leaves the southwest region which includes the rest of Missouri, Nebraska, Kansas, Oklahoma, Texas and the West Coast. Estimated annual crush capacity for that region is 123 mil. bu. The practical crush is estimated at 98 mil. bu. In Kansas, an estimated practical capacity of 35 mil. bu. exists to help satisfy the demand for protein supplement from cattle feedlots."

1046. Ford, Frank. 1976. The simpler life cookbook from Arrowhead Mills. Fort Worth, Texas: Harvest Press. 157 p. Introduction by Fred Rohé. Index. 18 cm. [13* ref]
• ***Summary:*** The copyright page states: "First printing–Oct. 1974–23,000. Second printing–Feb. 1976–17,000. Third

printing [this book], 110,000. This book is the second third edition of a book which was originally released under the title of *Pack to Nature."*

The body of the book is the same as that of earlier printings. However the 2-page directory titled "Some Natural Foods Sources" has been updated and expanded. It now lists 41 companies with full addresses and Zip codes. New additions include: Arrowhead Mills Distributing Co. (Denver, Colorado). Ceres Natural Foods (2582 Durango Dr., Colorado Springs, Colorado). Cinagro Distributors (now in Chamblee, Georgia). Earth Bound, Inc. (Woodbury, Connecticut). Earthwonder (Blue Eye, Missouri). Health Foods, Inc. (Des Plaines, Illinois). Houston Health Food Distributors (Houston, Texas). Kahan & Lessin Co. (Compton, California). Kozek Products (Los Angeles, California). Landstrom Co. (San Francisco, California). Laurelbrook Foods No. 2 (Raleigh, North Carolina). Lifestream Natural Foods (now at 1241 Vulcan Way, Richmond, BC, Canada). Manna Foods (Scarborough, Ontario, Canada). Midwest Natural Foods (Ann Arbor, Michigan). Nature's Best (El Segundo, California). Pure & Simple (795 West Hedding, San Jose, California). Shiloh Farms, Inc. Eastern Warehouse (Martindale {near New Holland}, Pennsylvania). The Wide Earth Store (Anchorage, Alaska). Tochi Products (Fargo, North Dakota).

Note: This is the earliest document seen (March 2006) that mentions Health Foods, Inc., a wholesale distributor of health foods and natural foods in Des Plaines (near Chicago). Address: Deaf Smith County, Hereford, Texas.

1047. Shurtleff, William; Aoyagi, Akiko. 1976. Tofu & Miso America Tour: 29 Sept. 1976 to 3 Feb. 1977 [Itinerary with two maps]. Lafayette, California: New-Age Foods Study Center. Unpublished manuscript.

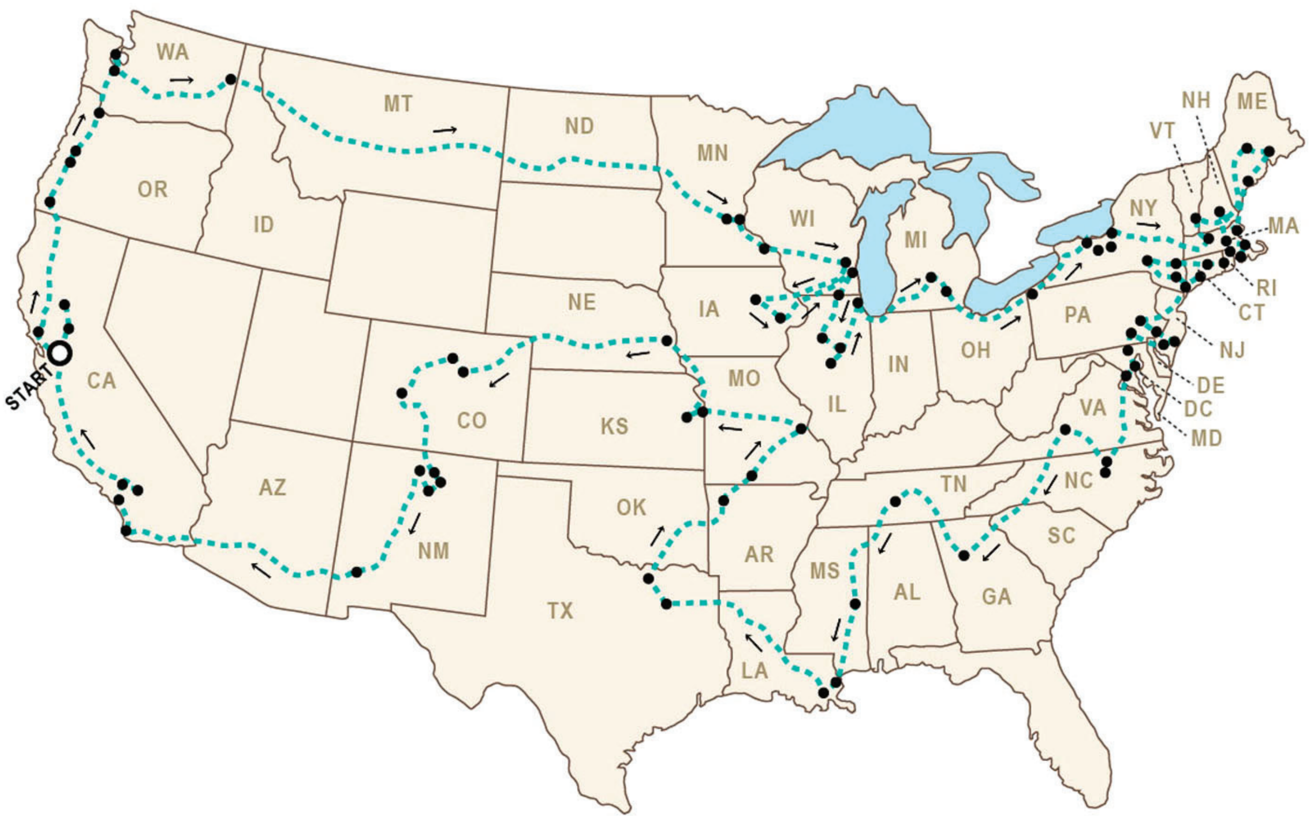
• ***Summary:*** On 13 Sept. 1976 the authors bought a large, white 1975 Dodge Tradesman 300 van (used, with 40,000 miles on it). On one side Akiko painted in large, bold letters "Tofu and Miso America Tour 1976-77." Their *Book of Tofu* had been published in December 1975 and *Book of Miso* on 23 Sept. 1976. On Sept. 29 they packed the van full to the ceiling with their books on tofu and miso, plus Larry Needleman's tofu kits–and departed. In the van was an itinerary of hosts and places to which they had been invited and the route drawn on a large map of the USA.

This trip had four main purposes: (1) To introduce tofu and miso to America; (2) To introduce people to the many benefits of a meatless / vegetarian diet; (3) To encourage people to start soyfoods companies, especially tofu shops; and (4) To promote the authors' newly-published *Book of Tofu* and *Book of Miso.*

This itinerary includes the name and address of 64 people and organizations visited. Many of these were pioneers in the soyfoods and natural foods movements: Sept. 29–David and Kathleen Sandler, Robert Dolgin, Don Wilson, Farm Food Co. (San Rafael, California; we observed and recorded in detail how Don Wilson made tempeh and tempeh starter / inoculum, and how soymilk ice cream was made at Farm Food Co.). Oct. 1–Petaluma, California. Oct. 2–Josephine County Food Center, Grants Pass, Oregon. Oct. 3. Heliotrope Natural Foods (Salem, OR). Oct. 4–West Bank Cafe (Corvallis, OR). Oct. 5. Visit Linda Shurtleff (McMinville, OR). Visit *Rain Magazine* (Portland, Oregon). They do an interview which is published in their Nov. 1976 issue. Oct. 6. Blake Rankin and Janus Natural Foods (Seattle, Washington). Oct. 7. Janus. Oct. 8–Luke Lukoskie and Sylvia Nogaki of Island Spring (Vashon, Washington). Oct. 10–Jack Grady, a macrobiotic (Spokane, WA). Oct. 13–Univ. of Minnesota. Oct. 14–Georgie Yiannias of Wedge Food Co-op and Ananda Marga (Minneapolis, Minnesota). Our largest class with 300 people. Oct. 15–Barbara ("Bobbie") Reinhardt Shurtleff dies of colon cancer at Alta Bates Hospital, Berkeley, CA. Oct. 15. Famine Food Co-op (Winona, Minnesota). Oct. 16–Bonnie Maroney of The Wisconsin Farm (Ettrick, WI). Oct. 19–Visit George Strayer and Larry Krueger of the American Soybean Assoc. (Hudson, Iowa). Visit David and Ann Tucker (Iowa City, Iowa). Oct. 20. Outpost Natural Foods (Milwaukee, WI). Visit Bountiful Bean Co-op. Oct. 21. Visit Dr. Danji Fukushima and Kikkoman Foods (Walworth, Wisconsin). Oct. 22–Visit Drs. Hesseltine, Wang, Wolf, Mustakas, Cowan at Northern Regional Research Center (Peoria, Illinois). Oct. 23–Morning class on commercial production for Les Karplus and 5 people at Vegetarian Incorporated (Urbana, Illinois). Oct. 23-24. Side trip to visit ADM and Staley (Decatur, IL). Oct. 24–Les and Debbie Karplus of Vegetarian Inc. (Urbana, IL). Oct. 25–Visit Dr. L.S. Wei of the Univ. of Illinois Dept. of Food Science (Urbana, Illinois). Evening program for Karplus in Urbana. Oct. 26. Purdue University (Indiana). Oct. 27–Chris Steele (Lansing, Michigan). Oct. 28–Mike Potter and Louis Howie of Eden Foods (4601 Platt Rd., Ann Arbor, Michigan). Oct. 29–Calico Market (Erie, Pennsylvania). Oct. 30–Visit Greg Weaver and Jay Thompson of Rochester Zen Center (Rochester, New York; Later Northern Soy). Visit Genesee Co-op. Oct. 31–Alternative Health Education Center (Rochester).

Nov. 1–Visit Arnold Karmody at Empty Cloud (Canandaigua, New York). Meet Dr. Keith Steinkraus (Geneva, New York). Nov. 2–Visit with Dr. Steinkraus at New York Agric. Exp. Station (Geneva, NY). Lunch together with his wife, Maxine. Nov. 3–Tom MacDonald at Hannibal, New York. Nov. 4–Ira and Kathy Leviton of Corncreek Bakery (South Deerfield, Massachusetts). Visit Laughing Grasshopper tofu shop just before it begins operation. Nov. 5–Fritz Hewitt of Common Ground Restaurant (Brattleboro, Vermont). Visit Tom Timmins of Llama, Toucan & Crow (Brattleboro). Nov. 6. Shep Erhard (Franklin, Maine). Nov. 7–Ann S. Johnson, assistant manager of dining halls, Univ. of Maine (Orono, ME). Nov. 8–Visit Marine Colloids

TOFU & MISO AMERICA TOUR 1976-77



(Rockland, Maine). Nov. 10–Drive to Boston, stay with Nahum & Beverly Stiskin (Brookline). Nov. 13–Tofu & Miso program in Boston. Visit Erewhon Natural Foods (33 Farnsworth St., Boston, Massachusetts), Martha Trundy, Jeffrey & Gretchen Broadbent. Nov. 14–Visit to shops in Boston's Chinatown. Michio and Aveline Kushi give a big party in our honor at their home at 62 Buckminster Rd., Brookline, then take us out to dinner at the Seventh Inn. Nov. 15–Tofu-making class at a home in Boston. Nov. 17–Visit offices of *East West Journal.* Sherman Goldman conducts long interview, later published in Jan. 1977 issue. Misomaking class at home of Ken Burns. Nov. 18–Visit Joel Wollner in Cape Cod. Nov. 19–Radio show then program for Joel. Nov. 20–Peter Smith at Quaker group in Pennsylvania. Nov. 22–Visit Woods Hole, Massachusetts to study sea vegetables. Evening program at New Bedford, MA. Nov. 23–Stay with Seung Sahn, Sa Nim at Providence, Rhode Island Zen Center. Meditate and show students how to make tofu. Evening at Insight Meditation Center, Barre, MA, a Vipassana center in a former Catholic seminary, co-founded in 1976 by Jack Kornfield, Joseph Goldstein and 3 others. We have dinner, meditate with the sangha, and hear Jack talk about Vipassana. Nov. 24 Sit morning zazen with master and students at Providence zendo. Nov. 25–Thanksgiving. Akiko and I stay alone in a house near Hartford, Connecticut and taste a good tofu pumpkin pie. I read about seaweeds. We take a long walk in the countryside. Nov. 26–Program for Erewhon Natural Foods in Hartford (stay with Maria Orefice, owner of Garden of Eating restaurant in Hartford). Article in *The Hartford Courant* (Dec. 1). Nov. 27–Long River Food Coop in Connecticut. Nov. 28–Stay with Susan and Kirk Gershuny of Snowflower (Tivoli, New York). They plan to make soy ice cream soon. Nov. 29–Drive in deep snow to the New York Farm in Franklin, New York. Stay in a big house they built. Nov. 30–Carl Bethage of the East West Center in Gardiner, New York. Also did a radio program.

1976 Dec. 1–Visit Frances Moore Lappé at her upstairs office in Hudson-on-Hastings, New York. Then visit her large home on the hillside. Dec. 1-5–We missed a program for Annemarie Colbin in New York City (partly because we feared our van would be burglarized on the street) so we stayed Dec. 1-5 at the luxurious home of Leo S. Nikora (Niki; Bobbie's friend). I work on writing *The Book of Kudzu.* Dec. 6-7. Program for 40 people (Hosts: Nancy N. Bailey and Robert Rodale) at Rodale Press (Emmaus, Pennsylvania); I am surprised they serve white sugar on their dining tables. Dec. 8–Tim Snyder of Ecology Co-op in Philadelphia. Dec. 9–Stay at home of Sylvia Anderson in Pleasantville, New Jersey and do a program upstairs in a modern university. Study magnificent photos of Native Americans by Edward S. Curtis. Dec. 10–Visit Jay and Freya Dinshah of the North American Vegetarian Society (Malaga, New Jersey); their poor vegan child has bowed legs. Dec. 12–Cindy Blouse in Dallastown, Pennsylvania. Dec. 13–Visit Laurelbrook Foods, a natural foods distributor in Forest Hill, Maryland. We meet Rod and Margie Coates. Dec. 14–Big program hosted by Ella May Stoneburner and Seventh-day Adventists near Washington, DC. Dec. 15–Michael Rossoff (who ran the East West Center in Washington, DC) planned to host a class in a DC church. After we witness a robbery, we are afraid to leave our van on the street. So we do a scaled-down program in the home of Murray and Pam Snyder, which was the East West Center in Baltimore, Maryland. Visit Laurelbrook Foods Warehouse #2 in Durham / Chapel Hill. Dec. 16–Roanoke Food Co-op in Copper Hill, Virginia. Dec. 17-18–John Shuttleworth and Jim Morgans of *Mother Earth News* (Hendersonville, North Carolina). They do a long interview and take photos. Program at night. Note: An audio tape of Bill's talk at this program is filed with Soyfoods Center documents for 1976. Dec. 19–Chandler Barrett in Atlanta, Georgia.

Dec. 28 & 29–Workshop on tofu and miso at East West Foundation, Coconut Grove, Florida. Not on written schedule, but shown in two published articles. Handwritten trip notes show: "Dec. 27-29. Heartsong, Miami. Bob & Toni Heartsong, 6051 S.W. 46th Terrace, Miami, FL 33155. Was this also related to Mary Pung, who flew from Florida to attend one of the programs on our tour? At the time, she invited us to come to Florida–which was not on our planned route.

Note 1. This is the earliest document seen (April 2013) concerning the work of Ira Leviton or Tom Timmins with soy. One evening, before Shurtleff was scheduled to speak at Leviton's Corncreek Bakery, Leviton drove Shurtleff to see the Laughing Grasshopper Tofu Shop which was under construction on the second story of an old wooden building in the nearby town of Millers Falls, Massachusetts. Much of the equipment was made out of wood–including wooden curding vats and a wooden cider press. The company opened in Jan. 1977.

Note 2. This is the earliest document seen (April 2006) concerning Llama, Toucan & Crow in Brattleboro, Vermont.

Note 3. This is the earliest document seen (May 2006) concerning the forerunners of United Natural Foods, Inc. (INFI)–in the form of Llama, Toucan & Crow. Address: 790 Los Palos Manor, Lafayette, California 94549. Phone: 283-3161.

1048. Shurtleff, William; Aoyagi, Akiko. 1976. Tofu & Miso America Tour: 29 Sept. 1976 to 3 Feb. 1977. Continued from Jan. 1977. [Itinerary with two maps]. Lafayette, California: New-Age Foods Study Center. Unpublished manuscript.
• ***Summary:*** Continued: 1976 Dec. 21. Arrive at The Farm in Summertown, Tennessee. Meet Margaret Nofziger and Stephen Gaskin. Stay until 2 Jan. 1977. We stayed most of the time at "Hoot Owl Hollow," a large community owner-built home with many families; our host was Edward Sierra. During the next few weeks we stayed in a parked mobile

home (owned by the Sandlers) in a lovely valley about 1 hour drive away. I worked on *The Book of Kudzu* final draft. Heavy confrontation with Farm folks–as I am about to start a program–about how they didn't like my way. Write a 4-page pamphlet titled "What is Tempeh?" jointly with Cynthia Bates. 1976 Dec. 31–This is our first year with significant income ($27,390, mostly from Autumn Press royalties) but no profit. During 1976 thirty articles and book reviews about our work with tofu and miso were published in magazines and newspapers in the USA and Japan.

1977 Jan. 2–Our Tofu & Miso America Tour continues. Jan. 3–Stay in a suburban home with Lynn Delacruz in Meridan, Mississippi. Jan. 4–Program for Atlantis Distributors in New Orleans. That night we stay in a trailer home with John and Katherine Gabriel in Houma, Louisiana. They are from The Farm and make commercial tempeh in their trailer. Jan. 6–Jim Baker (Dallas, Texas). After the program I meet Dr. Ralph Sand who is studying tofu and soy cheeses at Anderson Clayton. We also visit with my cousin, Bob Shurtleff, near Dallas. Jan. 7–Jane Binante in Denton, Texas. Jan. 9–Jim Hemminger of Gregg St. Tofu Co. (started by Thom Leonard) in Fayetteville, Arkansas. His partner is Mary Weingartner. We sleep on the floor of a small house in Fayetteville and the next morning see Jim make tofu in a bathtub. Jan. 10–East Wind in Tecumseh, Missouri. Jan. 12–Stay with Robert Nissenbaum (a fine, humble fellow) in St. Louis, Missouri. I finish typewritten manuscript of "What is Tempeh?" Jan. 13–Program at a restaurant, The Sunshine Inn (St. Louis). Sponsored by The Ethical Society. Stephen Uprichard, Dale Deraps, and Robert Nissenbaum are there.

Jan. 15–Meet David and Danette Briscoe (Kansas City, Missouri; they soon start publishing *Soycraft,* a small periodical on soyfoods), dinner with Thom Leonard at his home in Lawrence, Kansas (we have miso soup with miso that Thom made, then do a big program sponsored by the Mercantile Community Co-op in downtown Lawrence at either the Lawrence Library or Community Center–in a big downstairs room. I tape the lecture. Unbeknownst to me, Ken Bader, CEO-to-be of the American Soybean Assoc., is in attendance). Jan. 16–Visit Bob Amelay of the Omaha Food Co-ops in Omaha, Nebraska. Jan. 17–Drive across Nebraska to Denver. Jan. 18-19–Dave Bolduc and Christie Shurtleff in Boulder, Colorado. The first night we do a big tofu program in the historic Boulder Theater. That afternoon we have an audience with the Karmapa–a high Tibetan spiritual leader, who has diabetes; we give him an inscribed hardcover copy of *The Book of Tofu.* Akiko recalls cooking tofu burgers for him. That evening in a large, packed hall, we witness his Holiness conduct the Black Crown Ceremony.

Jan. 20. Jimmy Carter is inaugurated as president. Jan. 24–Program for The Colorado Farm in Hotchkiss, Colorado–way out in the boondocks. Jan. 25–Stay with Andrea Chin in Taos, New Mexico. Visit Lama Foundation high above Taos in the snow (Steve Durkee, teacher). They have many small meditation cubicles around the hillside and have just finished a nice adobe meditation hall. Near Durango, Colorado, we visit Ed Tripp, who looks lonely, sad and desolate, farming a little patch of organically grown wheat and living alone in a bare shack on coffee and cigarettes.

Jan. 26. We stay somewhere in New Mexico. Jan. 27–Program at the First Unitarian Church in Albuquerque (79 p.m.) hosted by Michele E. Martin of Jemez Bodhi Mandala Zen Center, Jemez Springs, New Mexico. Sit meditation in their cold Rinzai zendo then soak in the hot springs outside in the snow. Their teacher, Sasaki roshi, is not there. Jan. 28–Susan Berry in Silver City is supposed to host a program. We cannot find her house. At one point along in here we do a program in or near Utah in a remote church up on a little bluff. Dinner before at Frosty Hot Dog place. Jan. 29–Long drive across Arizona to San Diego. Jan. 30–Big program in San Diego for 350 people at the Ocean Beach Community School hosted by David and Barbara Salat, publishers of *Well Being* magazine. Afterwards we stayed overnight on their houseboat in San Diego Bay. Magical. Akiko had a bad cough and was very tired.

In Los Angeles we spend a day (in late January or early February 1977) with Lewis Headrick and Jimmy Silver visiting three small tempeh shops: Bali Foods (in Baldwin Park, run by Mr. Henoch Khoe), Country Store Health Foods (in Sun Valley; Joan Harriman), and Toko Baru (in West Covina; Randy Kohler). One evening we had dinner with Mr. Yamauchi and perhaps Al Jacobson. I gave a presentation on tofu. Afterwards, in the parking lot, Mr. Yamauchi gave me an envelope containing several hundred dollars in bills–his way of saying thank you for the work we were doing on behalf of tofu.

Feb. 1. Drive to northern California, then have dinner at the home of Herman and Cornellia Aihara (Oroville, CA). Feb. 2. Last program of the tour for Harold Lockhard of the Sacramento Natural Foods Co-op (Sacramento, California; Program is in a modern college building).

On 3 Feb. 1977 arrive home in Lafayette, California.

On this 4-month tour the Shurtleffs, trying to do for soyfoods what Johnny Appleseed did for apples, presented 70 public programs attended by about 3,646 people, did many media interviews and appearances, and travelled 15,000 miles. They had a gross income of $18,020 from honoraria and sales of their books (Book of Tofu, Book of Miso), tofu kits, pamphlets, and nigari. Total trip expenses were about $5,361 plus about $7,200 for books from the publisher, leaving a net income of about $5,459. It was a huge, challenging, and exhausting Odyssey that bore abundant fruit in the founding of a new tofu shop almost everywhere they spoke.

1977 Feb. 9–Meeting in Lafayette (790 Los Palos Dr.) with Robert Dolgin and David Sandler (from the Farm and Farm Foods in San Rafael) and Larry Needleman leads to the establishment of Bean Machines, Inc. (BMI). The Farm

places a firm order for a Japan tofu system.

1977 Feb. 12–Bill and Akiko leave America and fly to Japan. Air fare paid by Hydrometals. Address: 790 Los Palos Manor, Lafayette, California 94549. Phone: 283-3161.

1049. McDowell, John R. ed. 1976. The history of Hendricks County, Indiana, 1914-1976. Indianapolis, Indiana: Hendricks County Historical Society. Printed by White Arts Inc. 640 p. See p. 117-18, 473-75. Oct. 28 cm.

• ***Summary:*** Hendricks County was created in 1824.

In the chapter on "Agriculture" is a long passage about the pioneering work of Adrian A. Parsons excerpted from *The Prairie Farmer* (11 Jan. 1930, p. 6, 26). In Chapter 4, titled "Biographies," the section on "Adrian A. Parsons family" (p. 473-75; written by Lee Parsons, a great-grandson of Adrian Parsons, a grandson of Adrian's second child, Norman E. Parsons, and son of Edgar Barker Parsons {born 10 Sept. 1905}) states: Adrian A. Parsons, son of Y. and Elvira Swain Parsons, was born on 7 Nov. 1846 in Guilford County, North Carolina. In 1852 Nelson moved his family to Indiana, ultimately settling in Washington Township, Hendricks County. A second son, Oliver E. Parsons, was born on 12 Jan. 1854.

Adrian served in the Union Army for 2 years during the Civil War, with Company I, Ninth Indiana Cavalry; he enlisted in Dec. 1863 at age 17. On 14 Dec. 1864, while on a scouting mission near Franklin, Tennessee, against General Hood's Confederate raiders, he suffered a severe gunshot wound during an ambush. He was taken to a nearby log cabin and left to die. After five days near death, drinking from a spring to which he could crawl, he was discovered by a member of his unit, who took him to a makeshift Union "hospital" in a cotton shed. Waiting five more days for medical attention, he managed to survive–amazingly–but this brush with death left Adrian with reduced physical vigor the remainder of his long life. "Ironically, this like resulted at least indirectly in the work which was to become his most significant contribution to Hendricks County, and indeed to Indiana and the entire nation–the development of the soybean as a major commercial farm crop."

After returning from the Civil War, Adrian continued his education, studying at Danville Academy [for several years; it higher than high school but lower than college] and Earlham College [for one term for teacher preparation; Located in Richmond, Indiana, founded 1847], and subsequently both farmed and taught school. On 10 April 1870, at about age 23, Adrian married Mary Anne Fox, daughter of Barney and Hannah Gossett Fox. This union, lasting until Mary's death on 27 Oct. 1922, produced nine children. Their youngest, Frank, died on 22 Oct. 1918, during World War I. Adrian served as Hendricks County Recorded from 1882 to 1886.

"Intellectual curiosity more than compensated for the physical limitations Adrian's Civil War wound imposed. The soybean was known by few farmers in the United States and was grown as little more than a novelty plant, when, in 1886, Adrian Parsons imported a batch of 'soja' seed from Japan to grow experimentally.

"It was originally thought that the bean could be used as a substitute for coffee, but Adrian soon realized the soybean had far greater value as feed for livestock. Each succeeding year he increased his soybean acreage, always experimenting with the culture and utilization of the corp.

"Beginning in the 1890s, Adrian Parsons reported his work with the soybean in articles and letters submitted to a number of farm publications. The United States Department of Agriculture became interesting in his work and remained in touch with him for many years.

"It should be noted that Adrian Parsons began growing the soybean two years before the Agriculture Experiment Stations came into existence. The practical experience he gained and reported in his writing complemented the scientific experimentation with the plant done by the Experiment Stations in later years.

"In his early years of growing the soybean, Adrian was not without detractors. During a visit to the Parsons farm shortly after the turn of the century, a Liberty Township farmer commented that Adrian would regret bringing 'that weed' into the county. Only a few years were to pass before this critic's own family [the Edmondson family] began reaping the benefits of this uncommon 'weed.'

"By the early decades of the 20th Century, Adrian and several of his sons were growing hundreds of acres of soybeans in Hendricks County, at a time when the crop was only beginning to be widely cultivated in other portions of the Midwest.

"Around this time, Adrian's experimentations resulted in the development of a new variety of soybeans. Family members recall that one year he found a single plant growing in his bean field which displayed superior characteristics, of which the primary one was the fact that the mature pods did not shatter as badly as did the pods of existing varieties.

"Adrian transplanted this plant in his garden, and the next season planted its seed. The plant's distinctive characteristics were passed on, and ultimately a new variety of soybean was established. It was named Mikado, and was distributed through seed houses in Ohio and Iowa.

"Adrian Parsons followed other pursuits. However, developing and promoting the soybean as a useful farm crop was his primary interest."

Adrian Parsons died on 1 Aug. 1929. Today his descendants number in the hundreds, and many of them still reside in Hendricks County, Indiana. "The nine children of Adrian and Mary Anne Parsons were: Lester Wharton (B. December 22, 1871), Norman E. (B. January 17, 1873), Ethel (B. August 11, 1875), William Nelson (B. April 8, 1878), Edith (B. April 28, 1880), Gilbert (B. June 27, 1883), Mary (B. May 16, 1885), Chester Adrian (B. June 22, 1887)

and Frank Harrison (B. February 11, 1889; D. October 22, 1918).” There follows a long genealogy of each of his nine children.

A large portrait photo shows the Adrian Parsons family in 1908, including Adrian and his wife, all nine of their children, and many grandchildren.

Note: Talk with Lee Parsons. 2000. April 8. One day, right after this book was published, Ruth Pritchett, the acknowledged authority/expert on the history of Hendricks County who had long lived in Liberty Township, came up to Lee in the local post office and asked him if he knew anything about the biography of Adrian Parsons and the soybean in the new county history book. Lee admitted that he had written it. She slapped him on the shoulder, started laughing, and said “Good for you! Those Edmondsons always did think they were better than anyone else.” Even though Lee hadn’t mentioned the Edmondsons in his biography, she had “read between the lines.”

1050. Sisson, V.A.; Miller, P.A.; Campbell, W.V.; Van Duyn, J.W. 1976. Evidence of inheritance of resistance to the Mexican bean beetle in soybeans. *Crop Science* 16(6):835-37. Nov/Dec. [4 ref]
• ***Summary:*** “Recently Van Duyn et al. (1971), after extensive screening of the United States Regional Soybean Laboratory germplasm collection for maturity groups VII and VIII, identified three plant introductions as being highly resistant, PI 229358, PI 227687, and PI 171451, and several others, including PI 229321, as being resistant.” Address: North Carolina Agric. Exp. Station, Raleigh.

1051. Farm (The). 1976. Astronaut–Sister Farms. 156 Drakes Lane, Summertown, TN 38483. 1 p. Unpublished manuscript. Mimeographed.
• ***Summary:*** Gives the name and address (and in some cases the phone number) of 15 sister Farms related to The Farm in Summertown, Tennessee. They are located in: Ettrick, Wisconsin. Louisa, Virginia. Franklyn, New York. Eckert, Colorado. Mobile, Alabama. Warner, New Hampshire. Futone, Missouri. near Hampton, Nova Scotia, Canada. Utuado, Puerto Rico. Columbia, Kentucky. San Rafael, California. Parkton, North Carolina. Wileyville, West Virginia. Lafayette, Tennessee. Nashville, Tennessee. Address: Summertown, Tennessee.

1052. Lewis, W.M. 1976. Double cropping soybeans after winter small grains. In: L.D. Hill, ed. 1976. World Soybean Research [Conference I: Proceedings]. Danville, Illinois: Interstate Printers and Publishers, Inc. xvii + 1073 p. See p. 44-52. [16 ref]
• ***Summary:*** Contents: Examples of double cropping. Variety selection. Row widths. Planting methods. Herbicides. Summary. References. Address: Dep. of Crop Science, North Carolina State Univ., Raleigh, NC.

1053. Neufeld, Don F. 1976. Seventh-day Adventist encyclopedia, 2nd ed.: Madison Academy and Madison Institutions. Washington, DC: Review and Herald Publishing Assoc. 1640 p. See p. 827-32.
• ***Summary:*** Madison Academy was the school on the senior high school level that came into being with the closing of Madison College in the summer of 1964.

Madison Institutions. Introduction. This “group of institutions situated at Madison, Tennessee, 10 miles northeast of Nashville, was owned and operated from 1904 to 1963 by the Nashville Agricultural Normal Institute Corporation independently as a self-supporting institution, but closely allied to the Seventh-day Adventist (SDA) church. Included were a school (grades one through 16), a sanitarium-hospital, a food factory and a farm of 800 acres.

“Ownership of the college and hospital was transferred to the SDA denomination in April, 1963. In 1964 Madison College was closed, and Madison Hospital became a Southern Union institution. Madison Academy continued to operate under the ownership of the Kentucky-Tennessee Conference. Madison Foods was turned over to the Southern Union Association in 1964, and became a division of Nutritional International Corporation (Worthington Foods). The food factory was operated on the Madison Campus until 1972 when it was moved to Worthington, Ohio.”

“Origin of the School. The idea that bore fruit at Madison originated with David Paulsen, M.D. during a talk with Edward A. Sutherland. The latter was the first president of Walla Walla College, president of Battle Creek College when it moved to Berrien Springs [Michigan], and first president of Emmanuel Missionary College [in Berrien Springs]. The school was to be self-supporting by work from the students. In Oct. 1904 possession of a farm was secured and the first term of the Nashville Agricultural and Normal Institute (NANI) began with 11 students. E.A. Sutherland was president, an office he held until 1946.”

Self-supporting “Units” Established. Madison was founded to train home and foreign missionary teachers. It soon began to send out self-supporting workers. Some units included vegetarian cafeterias and treatment rooms in several large cities of the South–Nashville, Knoxville, Louisville, Memphis (Tennessee), Birmingham (Alabama), and Asheville (North Carolina). “Wildwood Sanitarium and Institute, Wildwood, Georgia, is another self-supporting institution of note.”

The Madison Rural Sanitarium was a major institution at Madison from the very beginning. The first physician there was Dr. Lillian Magan, wife of Prof. Percy T. Magan. In the early years, Mrs. Nellie Druillard (Mother “D”) trained 3 nurses. After 1963 when the Southern Union assumed ownership, “Sanitarium” was dropped from the name and the institution was called Madison Hospital.

Industries. “The 20 campus industries provided

employment as well as learning skills for the students, who could earn all their expenses. The sanitarium-hospital might have been considered the biggest industry and chief source of income for the school. The food factory and the large farm also provided employment and food to feed both students and staff as well as patients.

"As early as 1907 Mrs. White had advised operating a food factory in connection with the Madison school. A decade later, in 1917, a food factory was purchased and moved to the campus. The industry became known as Madison Foods.

"At one time 100,000 copies of the *Madison Health Messenger* were sent out each year. The food factory building, which also contained a bakery, was a five-story structure with a tower, and was situated on the east end of the campus. Madison Foods went through a series of managements until taken over by Worthington Foods in 1964, and in 1972 was moved to the main office in Ohio. In 1973 the building was put to use by the Madison School of Industrial Services.

"For many years the dairy herd was rated among the best herds in the State. There was also a poultry industry with 1,000 hens housed in seven modern units in 1948."

Madison College. "The name given in 1904 was Nashville Agricultural Normal Institute (NANI), indicating training in agriculture and 'normal' courses, or teaching. It was not until 1937 that the name became Madison College...

"In 1928 Madison was accredited as a junior college. In 1933 it was accepted as a four-year college by the Tennessee College Association. The first senior college class was graduated August 27, 1933..."

Madison College Graduates. "In 1960 the Madison College Alumni Association obtained a full-time executive secretary and editor of *The Madison Survey,* Mable H. Towery. A room was set aside on the ground floor of the Druillard Library for headquarters... *The Madison Survey* had been published continuously since 1919. At one time 21,000 copies of the *Survey* were sent out each month free of charge as the voice of Madison College."

Changes in the 1960s. Madison College had become heavily in debt. On November 6, 1963, the news came that the accreditation for the nursing education program at Madison College had been withdrawn by the State of Tennessee. This loss of accreditation, coupled with the heavy debt on the institution, ultimately caused the closing of the college on 1 Sept. 1964.

"Presidents: E.A. Sutherland, 1904-1946; T.W. Steen, 1946-1948; W.E. Straw, 1948-1950; W. Amundsen, 1950-1952; A.A. Jasperson, 1952-1957; W.C. Sandborn, 1957-1961; R.M. Davidson, 1961-1963; Horace R. Beckner, 1963-1964."

Note: The entry for Madison in this 1976 Encyclopedia is much longer and more detailed than the entry in the 1966 encyclopedia. Address: Washington, DC.

1054. Ramsey, Harold A.; Willard, Tommy R. 1976. Utilization of soy protein by newborn mammals. In: L.D. Hill, ed. 1976. World Soybean Research [Conference I: Proceedings]. Danville, Illinois: Interstate Printers and Publishers, Inc. xvii + 1073 p. See p. 977-89. [6 ref]
• ***Summary:*** Discusses milk replacers. Contents: Introduction. Experimental results. Summary. References. Address: Dep. of Animal Science, North Carolina State Univ., Raleigh, NC.

1055. Simmonds, N.W. ed. 1976. Evolution of crop plants. London and New York: Longman. xii + 339 p. See p. 159-62. Illust. Index. 26 cm.
• ***Summary:*** This interesting and authoritative book treats concisely, but in some detail, the evolution of each of the world's major economic crops; it also provides brief summaries of many minor ones. "It presents a synoptic view of crop history, linking studies of origin and early evolution with recent and even possible future trends in breeding" (from the rear cover).

Chapters 42-52 are devoted to the Leguminosae: 41. Groundnut–Arachis (by W.C. Gregory and M.P. Gregory, North Carolina Agric. Exp. Station, Raleigh). 43. Pigeon pea–Cajanus. 44. Chickpea–Cicer. 45. Soybean–Glycine (by T. Hymowitz, Univ. of Illinois, Urbana, Illinois). 46. Lentil–Lens. 47. Alfalfa–Medicago. 48. Beans–Phaseolus. 49. Pea–Pisum. 50. Clovers–Trifolium. 51. Broad bean–Vicia. 52. Cowpea–Vigna.

Also: 2. Grain amaranths: *Amaranthus* spp. (Amaranthaceae) (by J.D. Sauer, UCLA). Address: Director, Scottish Plant Breeding Station, Pentland Roslin Midlothian, Scotland.

1056. Munyer, L. 1977. North Carolina operation moves beans. *Soybean Digest.* March. p. 22c.
• ***Summary:*** "Cargill's Fayetteville, N.C., refinery, which opened in the spring of 1975, was the first major soy oil refinery built in the United States in more than 4 years...

"The Cargill refinery is an expansion of 'one of the most modern bean crushing plants in the country. The processing plant began operation 6 years ago. At this time it was billed as a '$50 million opportunity' for processing soybeans into protein meal and oil...

"Cargill, a 106-year-old concern, has 2 other refineries in operation in the United States. These are located in Des Moines, Iowa, and in Chicago, Illinois."

1057. *Soybean Digest.* 1977. Soybean Digest Gold Book. June. Cover, p. 5, 23-30.
• ***Summary:*** The "Gold Book" is the June issue of *Soybean Digest* published as "An aid to soybean producers for profitable soybean marketing." The last section in this issue (p 23-30) has the following contents: (1) Soybeans:

Acreage, yield and production, 1975-76, by states. Gives statistics for 30 states. (2) Metric conversions of bushels into tons, metric tons, and long tons. (3) Current publications on soybeans from each for the following states: Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, South Carolina, Tennessee, Texas, Virginia, Washington, DC, Wisconsin.

1058. Shurtleff, William. comp. 1977. Large natural food distributors, health food distributors, and book distributors in North America. Lafayette, California. 1 p. Undated. Unpublished typescript.
• ***Summary:*** Most of the following companies are presently distributing *The Book of Tofu, The Book of Miso* and *The Book of Kudzu* published by Autumn Press. For each, the company name (listed alphabetically) and address are given:

Large natural food distributors (28): Arrowhead Distributing (Denver, Colorado), Beautiful Foods (Philadelphia, Pennsylvania), Cc Grains (Seattle, Washington), Chico-San Inc. (Chico, California), Clear Eye (Rochester, New York; $3 million/year in sales), Dari Farms Natural Foods (Tolland, Connecticut), Eden Foods (Ann Arbor, Michigan; Phone: 313-973-9400. Tim Redmond, Michael Potter), Erewhon (Cambridge, Massachusetts; Phone: 617-354-2001. John Fogg, President), Erewhon West (Vernon, California; Phone: 213-582-6144. James Silver), Japan Food Corp. (JFC–South San Francisco, California; also in New York), Laurelbrook Foods (Raleigh, North Carolina), Llama Trading Co. (Greenfield, Massachusetts), Midwest Natural Foods (Ann Arbor, Michigan), Pure and Simple/The Well (San Jose, California; Pure & Simple changed to 1045 Pepitone, San Jose, CA 95110; Jon Hoefler), Rainbow Distributing (Denver, Colorado), Reality Natural Foods (Haleiwa, Oahu, Hawaii), Redwood Natural Foods (3245 Santa Rosa Ave., Santa Rosa, California; Greg Hartman. Phone: 707-546-5878). Rock Island Foods (Ignacio, California), Shadowfax (Binghamton, New York), Starflower (Eugene, Oregon), Tree of Life (Augustine, Florida), United Naturals (Eureka, California), Westbrae (Emeryville, California), Lifestream Natural Foods (Vancouver, British Columbia, Canada), Manna Foods (Scarborough, Ontario, Canada).

Large health food distributors (8–also carry books): Akin (Tulsa, Oklahoma), Akin Southeast (Jacksonville, Florida), Balanced Foods (Bergen, New Jersey), Collegedale Distributors (Collegedale, Tennessee), Foods for Health (Phoenix, Arizona), Health Foods Inc. (Des Plaines, Illinois), Kahan and Lessin (Los Angeles, California), Natures Best (El Segundo, California).

Large booksellers [distributors] (3): Nutribooks Corp. (Denver, Colorado), Bookpeople (Berkeley, California), Landstrom (South San Francisco, California).

1059. Dunphy, E.J. 1978. Conversion of soybeans to consumer products. *Soybean News* (*NSCIC*) 29(2):3, 2. Jan.
• ***Summary:*** Very similar to an article in *Soybean Digest.* Address: North Carolina State Univ., Raleigh.

1060. Shurtleff, William. comp. 1978. Mailing labels of companies buying large quantities of *The Book of Tofu,* and *The Book of Miso* from Autumn Press. Lafayette, California. 1 p. Undated. Unpublished typescript.
• ***Summary:*** Mailing labels (including the company name, purchaser or key contact person, and address) are given for the following companies: Erewhon, Inc. (Cambridge, Massachusetts), Nutri-Books Corp. (Denver, Colorado), Lifestream Natural Foods (Richmond, BC, Canada), Manna Foods (Scarborough, Ontario, Canada), Midwest Natural Foods (Ann Arbor, Michigan), Nature's Best (Torrance, California), Laurelbrook Foods (Bel Air, Maryland), Feather River (Bellevue, Washington), Arrowhead Mills (Denver, Colorado), Llama Trading Co. (Greenfield, Massachusetts), Reality Natural Foods (Honolulu, Hawaii), Tree of Life (St. Augustine, Florida), Eden Foods (Ann Arbor, Michigan), New Leaf Distributing Co. (Atlanta, Georgia), East West Journal (Brookline, Massachusetts), Mother Earth News (Hendersonville, North Carolina), Bookpeople (Berkeley, California), Landstrom (South San Francisco, California), Health Foods Inc. (Des Plaines, Illinois).

A single-letter code, A through D, appears in the upper right corner of each label. A = Biggest buyer. B = Second biggest buyer, etc. Erewhon and Nutri-Books are the two biggest buyers. Address: Lafayette, California.

1061. National Soybean Processors Association. 1978. Year book and trading rules 1978-1979. Washington, DC. ii + 106 p.
• ***Summary:*** On the cover (but not the title page) is written: Effective October 1, 1978. This is the 50th anniversary issue. Contents: The National Soybean Processors Association [Introduction and overview]. Constitution and by-laws. Officers and directors. Executive office. Members. Standing committees. Food Protein Council. Trading rules on soybean meal. Sales contract. Appendix to trading rules on soybean meal: Official methods of analysis (moisture, protein, crude fiber, oil {only method numbers listed}), sampling of soybean meal (automatic sampler, probe sampler), official weighmaster application, semi-annual scale report, official referee chemists (meal). Trading rules on soybean oil. Sales contract. Definitions of grade and quality of export oils. Soybean lecithin specifications. Appendix to trading rules on soybean oil: Inspection, grading soybean oil for color (N.S.P.A. tentative method), methods of analysis (A.O.C.S. official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses; soap stock, acidulated soap stock and tank

bottoms (only method numbers listed), official weighmaster application, semi-annual scale report, official referee chemists (oil). Soybean oil export trading rules. Foreign trade definitions (for information purposes only).

The page titled National Soybean Processors Association (p. ii) states: "During the past crop year about 900,000,000 bushels of soybeans moved through processing plants of NSPA's 29 member firms. Approximately 55 percent of America's 1.7 billion-bushel soybean crop is bought and processed by NSPA members. Exporters account for another 41 percent of the crop, and the remainder [4%] is returned to farms for seed, feed, and residuals." Also discusses industry programs, soybean research, and international market development."

The section on officers, executive committee, and board of directors (p. 7-8) gives the name, company affiliation, and phone number of each person. Officers–Chairman: John G. Reed, Jr., Continental Grain Co. Vice Chairman: C. Lockwood Marine, Central Soya Co., Inc. President: Sheldon J. Hauck. Secretary: A.E. Idleman, A.E. Staley Manufacturing Co., Inc. Treasurer: Edward J. Cordes, Ralston Purina Co. Immediate past chairman: Lowell K. Rasmussen, Honeymead Products Co.

Executive Committee: Gorge A. Heinz ('79), Buckeye Cellulose Corp. Donald H. Leavenworth ('79), Spicola, Cargill, Inc. C. Lockwood Marine, Central Soya Co. Inc. John G. Reed, Jr., Continental Grain Co. Gaylord O. Coan ('80), Gold Kist, Inc. Lowell K. Rasmussen, Honeymead Products Co. William T. Melvin ('80). Planters Oil Mill, Inc. Theodore W. Bean ('79), Quincy Soybean Co. Edward J. Cordes, Ralston Purina Co. Richard E. Bell ('80), Riceland Foods, Inc. Austin E. Idleman, A.E. Staley Mfg. Co.

Board of Directors (alphabetically by company; each member company has one representative on the board): Thomas H. Wolfe, Anderson, Clayton & Co. Charles Bayless, Archer Daniels Midland Co. Keith Voight, Boone Valley Coop. Processing Assn. George H. Heinz, Buckeye Cellulose Corp. David C. Thompson, Bunge Corporation. Donald H. Leavenworth, Cargill, Inc. C. Lockwood Marine, Central Soya Co., Inc. John G. Reed, Jr., Continental Grain Co. Joe C. Givens, Dawson Mills. Alfred Jenkins, Delta Cotton Oil & Fertilizer Co. Kenneth E. Sullivan, Farmers Grain Dealers Assn. of Iowa. Donald M. Chartier, Farmland Industries, Inc. Gaylord O. Coan, Gold Kist Inc. Lowell K. Rasmussen, Honeymead Products Co. Kenneth J. McQueen, Land O'Lakes, Inc. Floyd W. Brown, Lauhoff Grain Co. Kermit F. Head, Missouri Farmers Assn.–Grain Div. Robert E. Hicks, Owensboro Grain Co., Inc. Sewell L. Spedden, Perdue Incorporated. John H. Payne, Planters Manufacturing Co. William T. Melvin, Planters Oil Mill, Inc. Theodore W. Bean, Quincy Soybean Co. Edward J. Cordes, Ralston Purina Co. Richard E. Bell, Riceland Foods, Inc. J.D. Morton, Sherman Oil Mill. Stiles M. Harper, Southern Soya Corp. Austin E. Idleman, A.E. Staley Mfg. Co. Preston C. Townsend, Townsend's Inc. Tyler Terrett, West Tennessee Soya Mill, Inc.

Executive office, Washington, DC: Executive Director, Sheldon J. Hauck. Director, Public Affairs: Jack DuVall. Director, Regulatory Affairs: William F. Sullivan. Administrative Asst.: Helen Miller. National Soybean Crop Improvement Council: Robert W. Judd, Managing Director.

Members (listed alphabetically by company; within each company, first the name of the official Association representative {who is on the Board}, followed by the other personal members listed alphabetically by surname. For example, Archer Daniels Midland Co., the company with the most personal members, has 26. After the name of each personal member is given with his address and phone number. In the listing below, the number of personal members is shown in parentheses after the name of each company, followed by city and state of the various locations): Anderson, Clayton & Co. (6); Phoenix, Arizona; Jackson, Mississippi; Houston, Texas. Archer Daniels Midland Co. (26); Decatur, Illinois; Galesburg, Illinois; Granite City, Illinois; Fredonia, Kansas; Mankato, Minnesota; Red Wing, Minnesota; Fremont, Nebraska; Lincoln, Nebraska; Kershaw, South Carolina. Boone Valley Coop. Processing Assn., Eagle Grove, Iowa. Buckeye Cellulose Corp. (8); North Little Rock, Arkansas; Augusta, Georgia; Cincinnati, Ohio; Memphis, Tennessee. Bunge Corporation (6); Cairo, Illinois; Logansport, Indiana; Emporia, Kansas; New York City, New York; Cargill, Inc. (18); Osceola, Arkansas; Gainesville, Georgia; Cedar Rapids, Iowa; Des Moines, Iowa; Sioux City, Iowa; Washington, Iowa; Chicago, Illinois; Wichita, Kansas; Minneapolis, Minnesota; Fayetteville, North Carolina; Sidney, Ohio; Memphis, Tennessee; Chesapeake, Virginia. Central Soya Co., Inc. (11); Gibson City, Illinois; Decatur, Indiana; Fort Wayne, Indiana; Indianapolis, Indiana; Belmond, Iowa; Marion, Ohio; Bellevue, Ohio; Delphos, Ohio; Chattanooga, Tennessee. Continental Grain Co. (6); Guntersville, Alabama; Chicago, Illinois; Taylorville, Illinois; New York City, New York; Cameron, South Carolina. Dawson Mills (3); Dawson, Minnesota. Delta Cotton Oil & Fertilizer Co. (1); Jackson, Mississippi. Farmers Grain Dealers Assn. of Iowa (Cooperative), Soybean Processing Div. (1); Mason City, Iowa. Farmland Industries, Inc. (5); Van Buren, Arkansas; Sergeant Bluff, Iowa; Hutchinson, Kansas; St. Joseph, Missouri. Gold Kist Inc. (3); Atlanta, Georgia. Honeymead Products Co. (3); Mankato, Minnesota. Land O'Lakes, Inc. (2); Fort Dodge, Iowa; Sheldon, Iowa. Lauhoff Grain Co. (1); Danville, Illinois. Missouri Farmers Assn.–Grain Div. (5); Mexico, Missouri. Owensboro Grain Co., Inc. (2); Owensboro, Kentucky. Perdue Incorporated (2); Salisbury, Maryland. Planters Manufacturing Co. (2); Clarksdale, Mississippi. Planters Oil Mill, Inc. (2); Rocky Mount, North Carolina. Quincy Soybean Co. (4); Quincy, Illinois. Ralston Purina Co. (8); Bloomington, Illinois; Lafayette, Indiana; Iowa

Falls, Iowa; Louisville, Kentucky; Kansas City, Missouri; St. Louis, Missouri; Raleigh, North Carolina; Memphis, Tennessee. Riceland Foods, Inc. (8); Helena, Arkansas; Stuttgart, Arkansas. Sherman Oil Mill (1); Fort Worth, Texas. Southern Soya Corp. (1); Estill, South Carolina. A.E. Staley Manufacturing Co. (7); Decatur, Illinois. Townsend's Inc. (2); Millsboro, Delaware. West Tennessee Soya Mill, Inc. (1); Tiptonville, Tennessee.

Associate Members: ACLI Soya Co, White Plains, New York. Anderson Clayton Foods, Dallas, Texas. Balfour MacClaine International, Ltd., New York City, New York. Best Foods, a Unit of CPC International Inc., Englewood Cliffs, New Jersey. California Vegetable Oils, Inc., San Francisco. Canadian Vegetable Oil Processing Co., Hamilton, Ontario, Canada. Cobec Brazilian Trading and Warehousing Corp. of the U.S., New York City. Louis Dreyfus, Stamford, Connecticut. Durkee Foods, Div. of SCM Corporation, Chicago, Illinois (Gerald J. Daleiden). Gordon-Kutner Co., Dallas, Texas. Grain Processing Corp., Muscatine, Iowa (H.P. Woodstra). Hartsville Oil Mill, Hartsville, South Carolina (Richard A. Koppein). Humko Products, Memphis, Tennessee. Hunt-Wesson Foods, Inc., Fullerton, California. Lever Bros Co., New York City, New York. Maple Leaf Mills Ltd., Toronto, Ontario, Canada (W.G. Milliken). Marwood Company, San Francisco, California. Overseas Commodities Corp., Minneapolis, Minnesota. Pillsbury Co., Bloomington, Minnesota. Procter & Gamble Co., Cincinnati, Ohio. PVO International Inc., San Francisco, California. Quaker Oats Co. (The), Chicago, Illinois. Schouten International, Inc., Minneapolis, Minnesota. Sofico, Memphis, Tennessee. Spencer Kellogg, Div. of Textron, Inc., Buffalo, New York. Alfred C. Toepfer, Inc., New York City, New York (Dieter Rahlmann).

Standing committees: For each committee, the function of the committee, the names of all members (with the chairman designated), with the company and company address of each are given–Crop Improvement Council. Meal trading rules. Oil trading rules. Safety and insurance. Soybean Research Council. Technical. Address: 1800 M St., N.W., Washington, DC 20036. Phone: (202) 452-8040. Telex 89-7452.

1062. **Product Name:** Natural Instant Miso-Cup (Miso Soup).
Manufacturer's Name: Edward & Sons Trading Co. (Importer). Made in Japan.
Manufacturer's Address: Box 271, Union, NJ 07083.
Date of Introduction: 1978 November.
Ingredients: Soybeans, rice, sea salt, onions, parsley.
Wt/Vol., Packaging, Price: Twelve 8-oz. servings in six flavor-tight envelopes. Each envelope weighs 18 gm.
How Stored: Shelf stable.
New Product–Documentation: Label. 1979, undated. 3.5 by 4.75 inches by 1.75 wide. Paper box. Red, blue, green and black on gold. Drawing of Japanese woman by a hearth serving miso soup (adapted, with permission, from *The Book of Miso* by Shurtleff & Aoyagi), and pictures of soup and vegetables in the foreground. "Natural/instant. Pure vegetarian soup in seconds. Original golden light." Gives directions, serving ideas, and "A short history of Miso," quoting from *The Book of Miso.*

Ad in *Whole Foods.* 1979. Jan. p. 10. "Introducing ... Soup in Seconds. Natural/Instant Miso-Cup. The Long Awaited Combination of Purity and Convenience. Two 8 oz. servings per packet. Six packets per display box. Twelve boxes per case.

Ad in *Vegetarian Times.* 1979. Sept/Oct. p. 9. "Have you ever wished..."

Ad in Tom Riker and Richard Roberts. 1979. *The Directory of Natural & Health Foods.* p. 57. "Introducing ... Soup in Seconds."

Ad in Vegetarian Times. 1980. No. 40. Aug. p. 12. "The Best of Both Worlds. Miso Cup. Convenience Without Compromise."

Ad (1/6 page) in *East West Journal.* 1984. Jan. p. 10. "Miso Cup: Delicious vegetarian soup in seconds... Convenience without compromise." A photo shows the box, one packet, and a steaming cup of miso soup.

Article by Richard Leviton in Soyfoods. 1982. Summer. p. 34-35. Joel and Diondra Dee of Edward & Sons live in Saluda, North Carolina. Their instant Miso Cup, made of freeze-dried miso and vegetables, was launched in 1978. "They hitched their mobile home to the back of a Chevy van and toured the Northeast, reportedly for two years, handing out samples of *Miso-Cup* and collecting business cards and orders. In 1980 they added a second flavor (with seaweed) while a third is planned for late 1982."

"Miso-Cup is a vegetarian, natural foods version of Lipton's *Cup-A-Soup.* A photo shows Joel Dee. Spot in Soyfoods. 1982. Summer. p. 55. "Miso Soup in Seconds." Sold in golden light and rich savory with seaweed flavors. Label, box. Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. "Pure Vegetarian Soup in Seconds."

Shurtleff & Aoyagi. 1983. The Book of Miso. 2nd ed. p. 239. "In the fall of 1978 Edward & Sons Trading Co., under the direction of Joel Dee, introduced Miso-Cup. Miso cup soon became the most widely advertised miso product in America."

Ad (1/6 page) in *East West Journal.* 1984. Jan. p. 27. "To create the fine flavor of authentic Japanese soup, you need two thousand years of tradition... Or one minute with Miso Cup." A photo shows the box, one packet, and a steaming cup of miso soup.

Talk with Joel Dee. 1988. June 15. He pioneered convenience natural foods in America, starting with Miso Cup. He is in the process of moving to Carpinteria, California. Ad in East West. 1988. Feb. p. 27. "Warm up with an 'old friend' Miso-Cup." Address is now 1115 Lousons

Rd., Union, New Jersey 07083.

Talk with Joel Dee. 1994. July 4. Miso Cup is the flagship of his product line. The miso is freeze dried. Because of the falling value of the U.S. dollar against the Japanese yen, importing Miso Cup from Japan is increasingly expensive, so Joel is now looking for a way to have this "instant savory soup or seasoning" made entirely in America.

Shurtleff & Aoyagi. 1983. The Book of Miso. 2nd ed. p. 239. "In the fall of 1978 Edward & Sons Trading Co., under the direction of Joel Dee, introduced Miso-Cup. Miso cup soon became the most widely advertised miso product in America."

Talk with Joel Dee. 1988. June 15. He pioneered convenience natural foods in America, starting with Miso Cup. He is in the process of moving to Carpinteria, California.

1063. Sisson, V.A.; Brim, C.A.; Levings, C.S., III. 1978. Characterization of cytoplasmic diversity in soybeans by restriction endonuclease analysis. *Crop Science* 18(6):991-96. Nov/Dec. [17 ref]
• ***Summary:*** The authors found diversity among mitochondrial genomes in the subgenus. Address: North Carolina Agric. Exp. Station, Raleigh.

1064. Belleme, John. 1979. Re: Starting a new miso company with Sandy Pukel and Michio Kushi. Letter to William Shurtleff at New-Age Foods Study Center, Jan. 1 p. Undated. Handwritten, with signature on letterhead.
• ***Summary:*** "Dear Bill–Last weekend Sandy, Michio and I got together in Boston to discuss the miso factory. We agreed on a few points. I know you are interested in the project so would like to keep you posted. Also, we need your opinion on a few points.

"First, thanks for sending your miso book, I have read it and found it very informative. We are now going full steam ahead. I am learning Japanese. Michio is going to Japan in May to set up an apprenticeship program for me. Sandy and I have started looking for the land..."

"Bill, If you were going to make miso in the U.S., based on climate, what state would you choose? Thanks, John Belleme."

Talk with John Belleme. 1999. Nov. 8. This letter was probably written in late December 1978 or very early January 1979. John dictated the letter to his wife, Jan, who actually wrote it. He can tell that because the handwriting is legible and there are no spelling mistakes. This idea later became Oak Feed Miso, Inc., then American Miso Co.

Note: This is the earliest document seen (April 2009) connected with American Miso Co., which started making miso in Aug. 1981 in Rutherfordton, North Carolina. John and Jan Belleme were the head miso makers. They learned how to make miso with the Onozaki family in Japan. Address: Oak Feed, 3030 Grand Ave., Coconut Grove, Florida 31333. Phone: 448-0076 (restaurant); 448-7595 (store).

1065. Fornari, Harry D. 1979. The big change: Cotton to soybeans. *Agricultural History* 53(1):245-53. Jan. [16 ref]
• ***Summary:*** An good concise history of soybean production in America, especially the South. Table 1 shows cotton and soybean production in Alabama, Arkansas, Georgia, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, and Tennessee, with statistics every 5 years from 1940 to 1975.

By 1937 excess cotton production and huge surpluses was regarded as one of the major problems affecting the American people. In response, Congress passed the Agricultural Adjustment Act of 1938, which established a system of acreage allotments, individual marketing quotas with penalties for excess production, price adjustment (parity) payments, soil conservation payments, and crop storage loans. Production dropped but the outbreak of World War II brought a reversal of policy and production climbed to earlier levels. Then gradually after the war, soybeans came to be grown on land formerly used to grow cotton.

"As demand for soybean meal increased, further spurring expansion of soybean growing, the concomitant problem of surplus soybean oil was largely solved by government-subsidized exports under PL-480. And as demand for soybeans grew, demand for cotton declined. Cotton's share of the fiber market, which had dropped from 88 percent in 1920 to 66 percent in 1951, by 1973 hit 29 percent. In 1951 synthetic fibers had held only 4.6 percent of the market. A quarter-century later the polyesters, acrylics, nylons, and other synthetics had a 68 percent market share." Address: Vice President, Bunge Corp.

1066. Pattee, Harold E. 1979. Symposium on lipoxygenase: It's biochemistry, products, and role in plant and animal chemistry. *J. of Agricultural and Food Chemistry* 27(2):215. March/April.
• ***Summary:*** "The rapid expansion of lipoxygenase research has spread the boundaries of investigation beyond that of the plant kingdom, to which it was once thought limited."

Not only is the research literature expanding so fast as to be challenging, but there are also a growing number of meetings at which new lipoxygenase research is presented.

"One of the aims of this symposium was to attempt to bring researchers from both the plant and animal lipoxygenase-related areas together." Address: Mid-Atlantic, Southern Region Agricultural Research and Education Administration, USDA, North Carolina State Univ., Raleigh, North Carolina 27650.

1067. *Soybean News* (*NSCIC*). 1979. Commercial soybean breeders [directory]. 30(3):3. April. See also 31(3):4 (April

1980); 32(3):4 (1981); 34(1):4 (1982).
• ***Summary:*** Note: These private-sector soybean breeders are listed alphabetically by last name / surname:

"Sam Anand, McNair Seed Co., Box 706, Laurinburg, North Carolina 28352

"Douglas Baker, N. Amer. Plant Breeders, Rt. 2, Brookston, Indiana 47923

"Jimmy Barber, N. Amer. Plant Breeders, Box 1522, W. Memphis, Arkansas 72301

"Norman Bradner, Pfizer Genetics, Vigo Plant, Terre Haute, Indiana 47808

"Tom Burmood, Jacques Seed Co., Prescott, Wisconsin 54021

"Alfonso Calub, Alexandria Seed Co., Drawer 1830, Alexandria, Louisiana 71301

"William Campbell, Dairyland Seed Co., Clinton, Wisconsin 53525

"Philip Cargill, Coker's Pedigreed Seed Co., Box 205, Richland, Indiana 47634

"Harry Collins, Delta and Pine Land Co., Scott, MS 38772

"Wayne Crook, FFR Coop., RR1, Box 285, Marshall, Missouri 65340

"Bill Davis, Ring-Around Products, Inc., Box 1629, Plainview, Texas 79072

"William Eby, Midwest Oilseeds, Inc., Rt. 3, Box 98, Adel, Iowa 50003

"Wayne Ellingson, N. Amer. Pl. Breeders, Rt. 2, Ames, Iowa 50010

"Michael Haniford, V.R. Seeds, Inc., Box 34, Flora, Indiana 46929

"John Hicks, Jr., Pioneer Hi-Bred Intl. Pl. Breed. Div., Box 916, Leland, MS 38756

"Joel Hudgins, FFR Coop., Box 624, Lake City, South Carolina 29560

"Drew Ivers, Land O' Lakes, Inc., RR 2, Webster City, Iowa 50595

"Clark Jennings, Pioneer Hi-Bred Intl., Pl. Br. Div., 3261 W. Airline Hwy., Waterloo, Iowa 50701

"Bobby Jones, Gold Kist, Inc., Ashburn, Georgia 31714

"Charles Laible, Funk Seeds Intl., Box 2911, Bloomington, Illinois 61701

"Donald Lindahl, Pioneer Hi-Bred Int'l, Pl. Br. Div., Rt. 150 W, St. Joseph, Illinois 61873

"Arnold Matson, Soybean Research Foundation, Mason City, Illinois 62664

"Roy Meeks, Lynnville Seed Co., Lynnville, Iowa 50153

"Brian Moraghan, Asgrow Seed Co., Box 407, Oxford, Indiana 47971

"Mung van Nguyen, Illinois. Found. Seeds, Inc., Box 722, Champaign, Illinois 61820

"Stephen Robinson, FFR Coop., Ellsworth, Iowa 50075

"Marvin Rode, Illinois. Found. Seeds, Inc., Box 722, Champaign, Illinois 61820

"John Schillinger, Asgrow Seed Co., 634 E. Lincolnway, Ames, Iowa 50010

"Carol Schoener, Pioneer Hi-Bred Intl, Pl. Br. Div., Rt. 150 W, St. Joseph, Illinois 61873

"Grover Shannon, Asgrow Seed Co., Box 1160, Caruthersville, Missouri 63830

"Arthur Simpson, Jr., Pfizer Genetics, Cleveland, Mississippi 38732

"Gary Smelser, Voris Seed, Box 457, Windfall, Indiana 46076

"J.J. Stanton, Jr., Coker Ped. Seed Co., Box 340, Hartsville, SC 295E0

"Paul Sun, Pfizer Genetics, Beaman, Iowa 50609

"Robert Taylor, FFR Coop., 4112 E. State Rd., W. Lafayette, Indiana 47906

"John Thorne, Northrup, King & Co., Box 49, Washington, Iowa 52353

"Terry Walker, Northrup, King & Co., Rt. 1, Box 226A, Bolivar, Tennessee 38008

"Darell Widick, Green Seed Co., Box 943, Gallatin, Tennessee 37066

"Curtis Williams, Jacob Hartz Seed Co., Box 946, Stuttgart, Arkansas 72160"

1068. *Soybean Digest.* 1979. Should grade standards reflect processing value? May/June. p. SID-8, 10.
• ***Summary:*** "'Present soybean grading standards aren't adequate for measuring differences in value for processing,' says Lowell Hill, University of Illinois agriculture marketing professor. Addressing the Second World Soybean Research Conference March 26-29 in Raleigh, North Carolina, Hill highlighted deficiencies in using current grade standards as a basis for world trade."

1069. *Shelby Star* (*North Carolina*). 1979. Soybean's future really looks great. July 18. *

1070. Curtis, Austin W., Jr. 1979. Memoirs of his life and work with Dr. George Washington Carver and Henry Ford (Interview). Conducted by Dave Glick and Doug Bakken of Ford Archives & Tannahill Library, July 23. 24 p. transcript. Acc. 1600 in the Ford Archives and Research Library, The Edison Institute.
• ***Summary:*** Dr. Curtis was born at Institute, West Virginia, on 28 July 1911. His father was Director of Agriculture at West Virginia State College, a negro college located at Institute, West Virginia. Both his parents were teachers. His father was very interested in soybeans, which he used as a legume to improve the condition of the soil in West Virginia. His father retired in about 1944.

After 2 years at West Virginia State College, A.W. Curtis, Jr. went to Cornell University, where he majored in plant physiology. Upon graduation in 1932 he went to A&T (Agricultural and Technical) College in Greensboro,

North Carolina, where he became an instructor. His father had been the first graduate of that college. From there he received a fellowship (provided by the General Education Board, established by the Rockefeller family in New York) to be assistant to Dr. George Washington Carver at Tuskegee, Alabama. He arrived at Tuskegee in Sept. 1935 and began to work as Dr. Carver's laboratory assistant, conducting research on peanuts and sweet potatoes. Soon he gained Dr. Carver's trust and affection. The Carver Foundation was Curtis's idea; Dr. Carver, "a man free of any ego and of any self-aggrandizement, eventually accepted it. Curtis also started the Carver Museum on the 3rd floor of the Library at the Tuskegee Institute.

Dr. Carver and Henry Ford first met at the Chemurgic Conference at the Dearborn Inn in Dearborn in 1936. Curtis was with Dr. Carver then and at all of Carver's subsequent meetings with Henry Ford. They met again in 1939 when Dr. Carver came to Star Commonwealth. On 11 March 1938 Henry Ford made his first visit to Tuskegee. Then in March 1940 they met again in Ways, Georgia, for the dedication of the Carver School there. In March 1941 Ford, travelling in his private railroad car, Fairlane, stopped at Tuskegee to visit Carver on his way home from Georgia; at that time the Carver Museum was dedicated. In July 1942 Dr. Carver visited Dearborn to dedicate the Carver Cabin (he was born in a log cabin in Diamond Grove, Missouri) in Greenfield village, and the Carver Laboratory, which was over on Michigan Avenue, the former Dearborn Waterworks Building.

Henry Ford and Dr. Carver were kindred spirits and they greatly enjoy each other's company. They would sit facing each other with their knees touching and talk about all kinds of things, including soybeans and peanuts. "Mr. Ford has this tremendous interest in the farm, and how the lives of farmers could be made more profitable.

In the summer of 1940 Curtis did research in Dearborn at the Carver Laboratory, working with Robert Boyer.

After Dr. Carver's death in Jan. 1943, Curtis succeeded his mentor as director or research at Tuskegee. But in 1944 he left Tuskegee and came to work briefly for the Ford Motor Co. in Dearborn. He left for two main reasons: (1) "I fell into disfavor with the president of the school because Dr. Carver had signed a contract with the Doubleday Company granting me a royalty on the book on his life. The president didn't feel that I was entitled to it, so he told me that if I didn't relinquish my rights to it, he's have to ask for my resignation. And my reply was that I wouldn't, that he would have to fire me... and he proceeded to do it"; (2) He tried unsuccessfully to interest Tuskegee in commercializing potentially promising ideas to provide income and jobs for black people.

In 1945 Curtis started his own company, A.W. Curtis Laboratories, in Detroit. This business is still in operation. One of their key products is a rubbing oil, based on peanut oil, for the relief of pain from arthritis and rheumatism. This is one of the products on which Curtis and Dr. Carver did a great deal of research together. The product is not patented but a photo of Dr. Carver appears on its trademark. Address: Detroit, Michigan.

1071. *Raleigh Times* (*North Carolina*). 1979. Is it a cheese? Is it a meat? Is it a dessert? Yes–It's tofu. Tofu sophistication in the bean patch. July 27. *

1072. Oak Feed Miso, Inc. 1979. Land deed (Rutherford County, North Carolina). Deed of trust. Promissory note. North Carolina. 3 p. Aug. 7. Unpublished typescript. 36 cm. • ***Summary:*** Land deed: With this deed Oak Feed Miso buys two parcels of land, 48.3 acres and 44.08 acres totaling 92.38 acres, in Rutherfordton, North Carolina.

This is "the same property as described in deed from Robert Warren Deakin and wife to Lawrence L. Bridges and E. Milton Singletary dated January 26, 1979 and recorded in Deed Book 401 on page 146, Rutherford Country Registry, the property hereby conveyed being described as follows:..."

"Subject to Deed of Trust to Tryon Federal Savings and Loan Association of Tryon, North Carolina, which Oak Feed Miso, Inc. agrees to assume and pay the balance due. Said Deed of Trust is recorded in Deed of Trust Book 223, Page 411, Rutherford County Registry."

Deed of trust: This indenture, made on 7 Aug. 1979, is by and between Oak Feed Miso, Inc., a Florida corporation... Oak Feed Miso agrees to pay $23,000 for two parcels on Maple Creek or Maple Creek Road in Green Hill Township, Rutherford County, North Carolina. Half of the total is payable to Lawrence L. Bridges and half to E. Milton Singletary. Terms: $200 by 1 Sept. 1979 and $200 by the first day of each successive month until the full amount of principal and interest has been paid. Interest 9%.

The 1-page promissory note (a separate document) is to Lawrence L. Bridges for $11,500. Terms: $100 by 1 Sept. 1979 and $100 by the first day of each successive month. Interest 9%.

Both documents are signed by Sanford J. Pukel, president, Oak Feed Miso, and Janet Belleme, President. The land deed is recorded in book 405, p. 727. The deed of trust is in book 268, p. 460.

Note 1. See interview (March 2000) with Mae McMahan of the Rutherford County records room (Phone: 828-287-6195). Note 2. Talk with Barry Evans, owner of American Miso Co. (AMC) 2000. June 29. Barry is quite sure American Miso Co. had a second mortgage on this property. Those were the days when interest rates were around 17%. Lawrence L. Bridges and E. Milton Singletary probably provided some of the financing at lower interest rates as a help and incentive for AMC to buy the land. That way, not all the financing had to be provided by the bank at high interest rates. He estimates the total cost of the land to

be about $110,000 to $120,000. The $23,000 paid to Bridges and Singletary was the difference between what AMC made as a down-payment and what they were assuming as the mortgage. Address: North Carolina.

1073. Culpepper, Levin B. 1979. Re: The pioneering work of his late father, W.T. Culpepper, with soybean processing in North Carolina. Letter to Honorable Walter B. Jones, House of Representatives, Washington, DC 20515, Aug. 13. 1 p. Typed, with signature.

• ***Summary:*** In 1915 the writer's late father [William Thomas Culpepper–1885-1945] was the first person to process American-grown soybeans in the United States. This was recognized by the National Soybean Processors Association in 1952 (according to the *Raleigh News and Observer,* 25 Dec. 1967).

According to an article in the *Elizabeth City Daily Advance* (31 May 1952) "Mrs. W.T. Culpepper was presented with a plaque by Herbert J. Waters, assistant to the Under-Secretary of Agriculture, honoring the work her late husband did in the discovery of soybean oil" [sic]. Address: Elizabeth City, North Carolina 27909.

1074. Athow, Kirk L. 1979. Soybean pathology and nematology 1928-1978. In: R.W. Judd, ed. 1979. 50 Years with Soybeans. Urbana, IL: National Soybean Crop Improvement Council. 86 p. See p. 39-49.

• ***Summary:*** "The history of soybean pathology in the United States would encompass only 35 years if it had not been for one person, Samuel George Lehman (1887-1973). His entire professional career was spent at North Carolina State University... Dr. Lehman did more than any other person for soybean pathology.

"The modern era of soybean pathology began in 1943. In that year, William B. Allington (1912-1976) joined the USDA Regional Soybean Laboratory at Urbana, Illinois as the first full time soybean pathologist.

Important fungus diseases of soybeans in the United States were first reported as follows (with the earliest listed first): Fusarium wilt 1917, pod and stem blight 1920, brown spot 1922, downy mildew 1923, frogeye leaf spot 1924, purple seed stain 1924, sclerotinia stem rot 1924, pythium root rot 1926, anthracnose 1926, phyllosticta leaf spot 1927, powdery mildew 1931, charcoal rot 1939, yeast spot 1943, brown stem rot 1944, target spot 1945, stem canker 1948, rhizoctonia root rot 1950, phytophthora root rot 1951, mycoleptodiscus root rot 1954, fusarium root rot 1961, thielaviopsis root rot 1970, neocosmospora stem rot 1972, black root rot 1972.

Important bacterial disease of soybeans in the United States was first reported as follows: Bacterial blight 1919, bacterial pustule 1922, wildfire 1925, bacterial crinkle leaf 1965.

Important virus diseases of soybeans in the United States were first reported as follows: Soybean mosaic 1921, bud blight 1941, bean yellow mosaic 1948, bean pod mottle 1958, cowpea chlorotic mottle 1968.

Important nematode diseases of soybeans in the United States were first reported as follows: Root-knot nematode 1923, sting nematode 1951, cyst nematode 1954, root lesion nematode 1956, reniform nematode 1967, lance nematode 1968. Address: Purdue Univ., Indiana.

1075. 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.

1076. 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.

1077. Turnipseed, Sam G. 1979. A brief history of soybean entomology in the United States. In: R.W. Judd, ed. 1979. 50 Years with Soybeans. Urbana, IL: National Soybean Crop Improvement Council. 86 p. See p. 36-38.
• ***Summary:*** "Even though the soybean has ancient origins in the Orient, little attention was given to entomological aspects of its culture prior to 1960... Expanded production in our southern states has been phenomenal in the last 25-30 years. It is in this area that large complexes of economically important insect-pests attack the crop, whereas insect outbreaks are much less frequent in northern states...

"Early surveys on soybean insects came from the Midwest. Balduf published on the insects of soybeans in Ohio in 1923. Later (1948) Kretzschmar did the same in Minnesota with emphasis on sampling techniques. In 1962, Blickenstaff and Huggans listed soybean insects and related arthropods in Missouri.

"Until the early 1960's there was not a single entomologist working full-time on soybean insects. However, in 1961, two graduates of North Carolina State College began programs in soybean insect research. Dave Daugherty was hired by USDA to work half-time on soybean insects and half-time on grasshoppers in Missouri and Sam Turnipseed was employed by Clemson University to work full-time on soybean insects in South Carolina...

"Probably the most important factor contributing to entomological research on soybeans was the formation of a work group in the southern states in the mid 1960's that led to the formation of Regional Project S-74, 'Biology and Control of Arthropods on Soybeans...'

"A milestone which enabled strong efforts to be organized in several states was the funding of the so-called 'Huffaker Project' entitled 'The Principles, Strategies and Tactics of Pest Population Regulation and Control in Soybean Ecosystems.' This project was jointly funded in the early 1970's by NSF and EPA and, along with the previously mentioned activities, enabled strong program building in certain states." Address: Dep. of Entomology, Clemson Univ., Blackville, South Carolina.

1078. Wann, Mien; Raper, C.D., Jr. 1979. A dynamic model for plant growth: Adaptation for vegetative growth of soybeans. *Crop Science* 19(4):461-67. July/Aug. [20 ref]
• ***Summary:*** "A dynamic model for vegetative plant growth has been constructed with a set of nonlinear, ordinary differential equations. The model accepts photosynthetically active radiance (PAR) between 400 and 700 nm wavelengths as input and quantitatively predicts the partitioning of photosynthate to leaves, stems, and roots over a normal range of temperatures." Address: Raleigh, North Carolina.

1079. D.B. 1979. Down-home miso [from Ohio Miso Co.].

Whole Foods (*Berkeley, California*). Oct. p. 62.
• ***Summary:*** About Ohio Miso Co. started in Monroeville, Ohio by Thom Leonard and Richard Kluding. "Although the Japanese have started manufacturing [miso] here, there only appears to be one Caucasian American operation [Ohio Miso Co.] going at this point, with another one on the way.

"The start of the Ohio Miso Co. in Monroeville, Ohio, was one of those inexplicable coincidences which are usually dismissed as chance in the West, but which our Oriental counterparts may call 'karma.' Thom Leonard, a man of considerable experience in natural foods even though still in his 20s, was passing through Ohio visiting friends when he was introduced to Richard Kluding, the owner of a natural food store in Norwalk, Ohio. It so happens that Kluding, in his mid-30s, also had a small 26-acre farm nearby, with good quality well water. And as Thom explained his dream of producing high-quality miso, and gave him some two-year-old miso he'd already produced to try, Richard let it drop that he also had some capital.

"Within a month [in Oct. 1978], they'd started building a 1200-square-foot shed to house the 60,000 pounds of miso that are now sitting there to mature. What's so special about this miso, and why are some Americans walking where others fear to tread?

"It's the ingredients, plus the fact that Thom had the expertise to know how to grow koji, which is the heart of the operation, explains Richard Kluding. 'The miso is made with all organic products–whole grain brown rice, the short-grained variety from Lundberg Farm in California, and a variety of soybeans which are higher in protein and lower in oil."

"'We have a very deep well, with very clean, pure-tasting water,' he added. 'And the miso is being stored in 300-gallon wooden vats specially made in Buffalo, New York, as opposed to the plastic types of materials often used now.'" Then discusses some of Leonard's experiences making "the mysterious koji."

Notes in closing that Oakseed Co. [sic, Oak Feed Store] from Miami, Florida, is planning to start up a miso facility in North Carolina.

1080. *SoyaScan Notes.* 1979. Chronology of soybeans, soyfoods and natural foods in the United States 1979 (Overview). Dec. 31. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Jan. Yvonne and Irene Lo incorporate The Soya Bean Products Co., N.A. in San Francisco as a marketing company and immediately begin to import and distribute Vitasoy, the world's most popular soymilk, to Canada from their parent company in Hong Kong. It is not yet sold in America due to an FDA ban on aseptic Tetra Pak cartons.

Jan. Soycrafters Association of North America headquarters moves to Colrain, Massachusetts. Richard Leviton takes over as Director. Decides to edit and publish *Soycraft* magazine.

Jan. "The Soyfoods Revolution" published as a cover story by *Whole Foods* magazine.

Jan. 15-18. Second International Workshop on Low-Cost Extrusion Cookers held in Dar es Salaam, Tanzania, with 43 participants.

Feb. Takai catalog of large scale equipment published.

Feb. 9. Judith Rubenstein, institutional consultant for the New England Soy dairy, initiates a correspondence with Carol Tucker Foreman, Director of Child Nutrition programs at USDA, on the subjects of tofu standards and acceptance of tofu in USDA Child Nutrition Programs, including the school lunch program. Four letters are exchanged between Feb. and Aug. 1979. This is the start of work of tofu standards and tofu in school lunch programs.

Feb. *Natural Foods Merchandiser* magazine starts publication, founded by Doug and Karen Greene.

March 11. KOPTI is founded in Indonesia. It soon functions as an active, effective trade association for Indonesian tempeh and tofu manufacturers. By June 1986 it has more than 12,000 members from 40 cooperatives, and is promoting mechanization of production.

March. Soycrafters Assoc. and Quong Hop & Co. have adjoining booths at the New Earth Expo in San Francisco. 6,000 people sample free tofu burgers, tofu chip dips. Farm Foods sells Ice Bean (soymilk ice cream) and tofu cheesecakes. Gilman Street Gourmet sells tofu burgers.

March. Oak Feed Miso Company founded by Sandy Pukel, John Belleme, and Barry Evans. Joe Carpenter, Michio Kushi, and James Kenny are also involved. It is soon renamed American Miso Co.

March 26-29. World Soybean Research Conference II held at North Carolina State University. The 897-page proceedings, edited by F.T. Corbin, are published in 1980.

March. Food Protein Council holds International Soybean Fair in Washington, D.C. Many Congressmen, consular officials, etc. attend and sample soy protein products and tofu dips.

March. The Ohio Miso Company, founded by Thom Leonard and Richard Kluding, begins production in Ohio. America's first Caucasian-run miso company.

March. Richard Leviton takes a 3-week soyfoods research trip to the Midwest. Establishes many important contacts.

April. *New England Soy Dairy Product and Merchandising Guide* published.

April 12. "Good Old Bean Curd Is Suddenly Popular, But You Call It Tofu" by W.M. Bulkeley published as a front page article in *The Wall Street Journal.*

May 24. "The Americanization of Bean Curd," an expansion of Bulkeley's April article, published in the *Washington Post.*

May. Quong Hop & Co. in San Francisco introduces vacuum packed firm tofu, tofu cutlets, tofu burgers, and

teriyaki tofu. Each of the latter three products is the earliest known product of its type in America.

June. *The Tofu Cookbook* by Kathy Bauer and Juel Andersen published by Rodale Press.

June 29. An internal FDA memorandum is prepared by FDA headquarters personnel to set forth the agency's views on the attributes of tofu. Publication of a "pull date" on tofu packages is encouraged.

July. Farm Foods starts national advertising of tempeh starter and tempeh kits.

July. David Mintz, owner of Mintz's Buffet, a kosher Jewish deli in New York City, first learns of tofu from Pesach Lazaroff, a young Jewish vegetarian. That summer Lazaroff spends many hours working with Mintz as a paid consultant, developing kosher tofu recipes. Mintz later becomes rich and famous for developing Tofutti, a soy ice cream.

July. *The Book of Tempeh,* by Shurtleff and Aoyagi published by Harper & Row in both large-format paperback and professional hardcover editions. The world's first book about tempeh.

July. *Tofu & Soymilk Production,* by Shurtleff and Aoyagi published by The Soyfoods Center. This is the first book to use the term "soyfoods" in English.

July 17. "Tofu–The Oriental Way to High-Protein, Low-Calorie Meals" published by *Family Circle.*

July 23. Judith Rubenstein (see Feb. above) writes the Commissioner of the FDA requesting that the agency establish a standard of identity for tofu. She notes that the Director of Nutrition and Technical Services for USDA suggested that FDA give top priority to this issue. Issues of imitation tofu products and bacterial contamination are raised.

July 26-29. Second Soycrafters of North America Conference: "Producing and Marketing Soyfoods," held at Hampshire College, Amherst, Massachusetts, organized by Richard Leviton and financed on a shoestring. A major milestone for the U.S. soyfoods industry. 230 people attend and the content is a great success, but Leviton loses $1,000 on the venture. The first issue of Soycraft magazine, written and published (1,900 copies) by Leviton, is distributed at the conference. In the keynote address, Shurtleff notes that the biggest challenges facing the industry are to build a strong trade association with adequate funding, and to develop soyfoods standards.

July. *Alimentacion Integral Para Una Vida Plena: Los Mil Usos de la Soya* (*Integral Nutrition for a Full Life: The Thousand Uses of Soya*)*,* by Blanca Dominguez published by Editorial Posada in Mexico. The country's first book on soyfoods.

Aug. Robert Rodale and Rodale Press gives strong support to *Soycraft* magazine, with ads and a nice mention in an article, which brings in 135 subscriptions in November.

Sept. The Soycrafters Apprenticeship Program is started by Luke Lukoskie at Island Spring, Vashon, Washington. Here people can spend about 3 weeks getting hands-on experience in making tofu, soymilk, and tempeh.

Sept. Tempeh Works, America's first Caucasian-run commercial tempeh shop in a commercial building and making only tempeh, starts production in Greenfield, Massachusetts. Founded and run by Michael Cohen.

Sept. Many articles about the Amherst Soyfoods Conference published in national magazines, such as *New Age.*

Sept. New England Soy Dairy opens America's first in-house tofu & soymilk sanitation laboratory.

Sept. "Chinese Cuisine: Bean Curd" by Nina Simonds published in *Gourmet* magazine.

Nov. 26. A fire destroys Eden Foods warehouse and $800,000 inventory. The company, struggling for its life, moves to rural Clinton, Michigan.

Oct. The Great American Tofu Cookbook by Patricia McGruter published by Autumn Press.

Dec. Rodale Press contacts Richard Leviton to announce plans to do a Soybean Newsletter, with Leviton as editor. The idea later falls through.

Dec. *Frijol Soja* (Soybeans) published in Peru by INTSOY.

Dec. *The Soysage Cookbook,* by Cloud and Burdett self-published in Vermont.

* San-J tamari starts to be imported to America from Japan.

* California and Maine become the second and third states to enact organic labeling laws. California's becomes a model and a standard for many other similar laws, and it is cited on many soyfood product labels. By 1988 there are 12 states with organic laws, and 5 more planned.

* Tofu production in Japan tops 1.1 million metric tons for the first time.

* Soybean research in America begins to shift from emphasis on production to emphasis on utilization.

* Syntex corporation of Palo Alto, California, recalls its soymilk Neo Mull Soy after it is found to be missing a key nutrient, chloride. Many children who used this product were mentally damaged.

* Lauhoff Grain Corp. acquired by Bunge.

* 1979-82. Years of the "salt craze." Growing concern with the level sodium in American food products begins to hurt sales of miso and shoyu. Continued.

1081. **Product Name:** Tofu.
Manufacturer's Name: Blue Ridge Soyfoods.
Manufacturer's Address: Fletcher, North Carolina. Phone: 704-684-8501.
Date of Introduction: 1979 December.
New Product–Documentation: Leviton. 1982. Soyfoods. Summer. p. 35. Jeanne and Bob Hunt started company in Dec. 1979 then in June 1980 moved to renovated dairy milking parlor on the grounds of a Seventh-day Adventist

Hospital.

1082. **Product Name:** Tofu.
Manufacturer's Name: Bean Mountain Soy Dairy.
Manufacturer's Address: 121 W. Howard St., Boone, NC 28607. Phone: 704-264-0890.
Date of Introduction: 1979.
Ingredients: Water, organic soy beans, nigari.
Wt/Vol., Packaging, Price: 1 lb.
How Stored: Refrigerated.
New Product–Documentation: Rick Mashburn. 1980. *The Sentinel* (Winston-Salem, North Carolina). Feb. 15. p. 7. "From beans to 'cheese.'" Four photos show Jerry MacKinnon and Marc Crowell making tofu. A blow-up photo shows one of their tofu labels. Below the ingredients is written: "Store in fresh water."

Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address, and phone number. Owner: Jerry McKinnon.

Talk with Jon Kessler of Virginia Soyworks, then with an employee of the company. 1991. Sept. 14. The company, now named Bean Mountain Natural Foods, has just moved to 1096 New Stock Rd., Weaverville, North Carolina (phone: 704-658-2326), and has just gotten a major account with Tree of Life. John Swann is president. The company is privately owned and presently makes only tofu and tempeh.

D. Christner. 1992. Dec. 14. *Times-Dispatch* (Richmond, Virginia). Bear [Bean] Mountain Natural Foods of North Carolina went out of business during 1992.

Letter (e-mail) from John Swann. 2012. July 18–in reply to a question from Shurtleff. "I did indeed own a tofu and tempeh shop from 1987 until 1992. Your books on commercial tofu and tempeh production were invaluable to us, and I still have them. Thank you for writing them. I would be glad to share a brief history of the company.

"The shop was started in 1979 in Boone, NC, by Gerry McKinnon. I helped Gerry get it started for the first few months (he actually rented the production space from me at the time), but was not actively involved in the business until I bought it in 1987. We ran it in Boone for three more years, then moved the plant to Weaverville, NC, (north of Asheville) in 1990. At the height of the business, we had two refrigerated trucks and were delivering weekly to retail stores throughout most of NC. We had Tree of Life, Harris Teeter, Biggers Brothers (Fresh Market), and Mountain Warehouse Co-op as wholesale accounts. We also distributed American Miso Co. and a few other products on our delivery runs, which is when I met John and Jan Belleme.

"For the tofu operation, we used a hammer-mill disintegrator and an 80-gallon steam jacket kettle with a steam injection wand. Our hydraulic okara press was homemade. We curdled with nigari. We used weighted buckets to press the tofu, with locally made stainless steel press boxes. We hand packed in a 16-oz printed cup and lid, packed 6/ and 12/case, as well as bulk in 12# and 25# buckets.

"For the tempeh, we used an antique stone mill to split the beans and a centrifugal commercial laundry extractor to dry them. We used a sausage mixer to inoculate, and we incubated on dishwasher trays set in rolling bread racks, in an incubator room that I designed. We packed in perforated poly bags, over-wrapped by printed poly bags after steam oven pasteurization. We packed (24) 8-ounce frozen cakes in a punch-out display box.

"Unfortunately, the same month that we opened our new plant near Asheville, Cornucopia Natural Foods (now UNFI) opened their warehouse in Atlanta, Georgia, bringing with them Nasoya tofu and Lightlife tempeh. We worked hard for two years to get Cornucopia to pick up our products, but they never would pick them up. And my associate John Paino (we served together on the Soyfoods Association of America for a year) made good on his promise that he (Nasoya) would "own tofu in the eastern US," with killer promos and pricing through both Tree and Cornucopia. We ran for two more years, but never could get sales to grow enough to cover the higher cost of the new plant. So, in 1992 we sold the assets of the company to Jon Kessler and Twin Oaks Community Foods in Virginia, and moved on.

"That's the short story. If you want any more of the bloody details, I would be glad to fill in the blanks.

The only product that we made other than regular soy tofu and tempeh was a Dulse Tofu, which only had modest success.

"Thanks again for your work and all you have done for the industry.

"Best Regards,..."

"P.S. I am still in Asheville. After Bean Mountain, I worked in several food related businesses, including a year as general manager at Great Eastern Sun, and four years with a local produce distributor. Since then, I have been working mostly in retail, with seven years at Earth Fare and seven years with Greenlife Grocery, of which I was a partner. Since Whole Foods bought out Greenlife two years (over my strenuous objections), I have been consulting and am currently developing a new retail venture here in Asheville."

1083. **Product Name:** Soymilk.
Manufacturer's Name: Bean Mountain Soy Dairy.
Manufacturer's Address: 121 W. Howard St., Boone, NC 28607.
Date of Introduction: 1979.
New Product–Documentation: Mashburn. 1980. The Sentinel. Feb. 15. p. 7.

1084. **Product Name:** Tempeh.
Manufacturer's Name: Bean Mountain Soy Dairy.
Manufacturer's Address: 121 W. Howard St., Boone, NC 28607. Phone: 704-264-0890.

Date of Introduction: 1979.
New Product–Documentation: Mashburn. 1980. The Sentinel. Feb. 15. p. 7. Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Jerry McKinnon.

Talk with Jon Kessler of Virginia Soyworks, then with an employee of the company. 1991. Sept. 14. The company, now named Bean Mountain Natural Foods, has just moved to 1096 New Stock Rd., Weaverville, North Carolina (phone: 704-658-2326), and has just gotten a major account with Tree of Life. John Swann is president. The company is privately owned and presently makes only tofu and tempeh.

1085. Updaw, Nelson Jacob. 1979. Market analysis of the component pricing of soybeans. PhD thesis, Dep. of Economics and Business, North Carolina State University–Raleigh. viii + 121 p. Page 5131 in volume 40/09-A of Dissertation Abstracts International.
• ***Summary:*** "This study was concerned with the change in social welfare expected to be incurred by the pricing of soybeans in accordance with measured oil content and protein content."

"The elasticities of demand for soybean oil and protein were estimated to be -0.05 and -0.31, respectively. The elasticity of transformation between oil and protein was indeterminable when soybean variety represented the tool by which oil was transformed to protein. This result led to the conclusion that the addition of oil and protein measurements to the pricing procedures for soybeans would not be expected to induce farmers to alter the characteristics of their commodity. Therefore, the expected benefits to society of the component pricing of soybeans were valued at zero. Since there would be a cost incurred in obtaining these measurements, the net social benefits to the component pricing of soybeans were estimated to be negative.

"It was demonstrated that if the elasticity of transformation was -1.0 and estimated demand elasticities were held constant, the component pricing of soybeans would increase the ratio of oil/protein production in the United States by only 1.16 percent. The resulting estimates of the changes in social welfare associated with this estimate were an increase in consumer surplus of $145,119,550 per year and a decrease in producer surplus of $144,412,000 per year. Since the estimated costs of component pricing were $5,034,150 per year, predicted net social benefits were slightly negative under these circumstances. Next, the elasticity of demand for soybean oil was increased to -0.5 and social welfare changes recomputed. In this case, the component pricing of soybeans was predicted to increase the ratio of oil/protein produced each year by 4.13 percent. Producer surplus was predicted to rise by $32,061,800 ad consumer surplus was expected to fall by $29,059,776 per year. Once again, calculated net social benefits were slightly negative. In none of the cases examined could it be determined that the introduction of component pricing for soybeans in the United States would increase social welfare."

Note 1. This is the earliest document seen (Aug. 2011) that uses the term "component pricing" in connection with soybeans.

Note 2. The title of this thesis is cited incorrectly in several publications as "Producer response to the component pricing of soybeans." Address: North Carolina State Univ.–Raleigh.

1086. Mashburn, Rick. 1980. From beans to 'cheese.' *Sentinel* (*The*) (*Winston-Salem, North Carolina*). Feb. 15. p. 7. [1 ref]
• ***Summary:*** About Jerry MacKinnon and Bean Mountain Soy Dairy of Boone, North Carolina. The shop makes 1,000 lb/week of tofu plus some tempeh and soymilk. MacKinnon left a tofu business he started in Ann Arbor with four other people 2 years ago when it grew too big. "MacKinnon seems reluctant to start sermonizing on the virtues of tofu. He'd much rather hand out a copy of a chapter from *The Book of Tofu,* by William Shurtleff. Crowell, however, is a more zealous missionary." Concerning the future of tofu, he notes: "As soon as General Foods realize Americans are gonna eat tofu, we'll be out of business." Four photos show Jerry MacKinnon, with beard and hat, cooking 50 lb of ground soybeans in steam-jacketed cooker. A portrait shows Marc Crowell. A label for the company's tofu product.

1087. Conte, Mary. ed. 1980. Balanced Foods' 40th anniversary. Ads. *Health Foods Retailing* 44(8):99-226. Aug. Special supplement / section.
• ***Summary:*** Continued: There are ads (mostly full page) from the following companies: Balanced Foods: A family of [five] companies (p. 100). KAL (Canoga Park, California, p. 102). Nature's Gate Herbal Cosmetics (Chatsworth, CA, p. 103). Arrowhead Mills, Inc. (Hereford, Texas, p. 104-05). Hoffman's Food Products (York, Pennsylvania, p. 107). Schiff (p. 109). Loma Linda Foods (Riverside, CA, p. 110-11). Bima Industries–The Sprout People, Sprout-Ease sprouting seeds (Seattle, Washington, p. 112). American Dietaids–Acerola Plus (p. 113). Mill Creek Natural Products–Elastin, Keratin (Rolling Hills, CA, p. 114-15, 119). Hain–"pure cold-pressed vegetable oils" (incl. soy oil, sesame oil, safflower oil, p. 116). Plus Products–Torula and brewer's yeast (Irvine, CA, p. 117). Hair Trip (p. 120). Health Valley Natural Foods (Montebello, CA, p. 121). MLO–Fillmore Foods (Hayward, CA, p. 123). Holistic Products Corp. (East Rutherford, New Jersey, p. 129). Office of Monopoly–Korean Red Ginseng (p. 130). Imedex–Siberian ginseng products (p. 132). Nature's Way (herbs, p. 133-35). L&A Juice Company (p. 136). NuLife (Long Beach, CA, p. 137). Chico-San (Chico, CA, p. 139). Joyva Corp.–Sesame tahini (Brooklyn, New York, p. 140). Para Laboratories, Inc.–Queen Helene natural health and beauty aids (Hempstead, New York, p. 141). Balanced Foods–

private label products (p. 160). Viobin Corp. (A subsidiary of A.H. Robins Co.) Wheat germ oil (Monticello, Illinois, p. 170). Tom's of Maine roll-on deodorant (p. 173). Miller's Honey Co. (p. Colton, CA, p. 174). Para Labs–Footherapy natural mineral foot bath for corns and calluses (p. 176). Alacer Corp.–Ora-Pops, Super-Gram II (p. 178, 194). Pacific Trends, Inc.–Korean ginseng and Oriental herb products (Canoga Park, CA, p. 180). Sovex Natural Foods without sugar–incl. 5 Granolas (Collegedale, Tennessee, p. 182). Larchmont Books–from the publishers of Better Nutrition, Health Foods Retailing (p. 183, 208). Pet Care Inc. (Miami, Florida, p. 185). American Dietaids–Bran n' Honey, Papaya enzyme (p. 186, 188, 190, 192). Advance Laboratories, Inc.–Prostex (Cambridge, Massachusetts, p. 187). Worthington Foods (Worthington, Ohio, p. 189). Loanda Products Corp.–Beyond Soap (Novato, CA, p. 191). Alvita Products Co.–Herb teas (Huntington Beach, CA, p. 193). Fearn Soya Foods–cakes mixes (p. 195). CellLife–selenium powder (San Diego, CA, p. 200, 247). The Food Supplement Co.–Propolis from England (West Palm Beach, Florida, p. 201). Plantation Molasses (p. 203). Bio-Strath from Switzerland (p. 204). SugarLo Company–LactAid (Atlantic City, NJ, p. 205). Sterling Cider Co., Inc. (Sterling, MA, p. 206). Natural Aloe Vera soap (p. 206). Ener-G (formerly Jolly Joan, for wheat, egg and milk-free diets)–Soyquik (Seattle, Washington, p. 207). Jonathan Green's sprouting seeds (p. 208). Nu Age Laboratories Ltd.–Silica, Biochemic way (St. Louis, Missouri, p. 210). Food Science Laboratories, Inc.–Aangamik, Freedom (Burlington, Vermont, p. 211). San Francisco Herb & Natural Food Co.–Herb teas (p. 212). Nature de France–Pierre Cartier (New York, NY, p. 213). Food for Health, Inc. (p. 215). Larchmont Books (p. 216, 221, 223). Hoffman's and York Barbell (p. 216). Dynamic Natural Products (Theradophilus–the pure Lactobacillus acidophilus, p. 217). Acme Juicer Mfg. Co. (Lemoyne, PA, p. 217). Merit Publications–health food books (North Miami, Florida, p. 218). Carris Candy (Riverside, CA, p. 219). Golden California (Chatsworth, CA, p. 219). R.W. Knudsen–Natural fruit juices (p. 219). Richter Bros. Inc. (Carlstadt, NJ, p. 220). Jones Manufacturing–Foods of Nature pet food (Covina, CA, p. 221). Barbara's Bakery (p. 223). Celestial Seasonings (Iced Delight herb tea, p. 224). Lion Cross (Ridgefield, NJ, p. 225). Balanced Foods (Ridgefield, NJ, p. 226). Solgar (Lynbrook, NY, p. 227, 235). Canasoy's Soya Lecithin Spread–Non-hydrogenated margarine (Snohomish, Washington, p. 234, 237). Niblack (Rochester, NY, p. 234). Solgar Co. (Lynbrook, NY, p. 11563). Bioforce of American, Ltd.–Herbamare herb seasoning, Trocomare (Westbury, NY, p. 236). Canasoy High-Protein Soya Macaroni–Shells, alphabets, elbows (p. 237). The Fibertone Co. (Los Angeles, CA, p. 246). Nature's Best–Distributor (Torrance, CA, p. 246). Jumbo's Jumbos–Vacuum packed peanut butter stock (Edenton, North Carolina, p. 247). Joyva Corp.–Sesame Tahini, Halvah, Sesame Candies (Brooklyn, NY, p. 258). Hoffman's Products–Hi-Proteen Powder (York, Pennsylvania, inside rear cover).

1088. *Soybean Digest.* 1980. Mystery bean is top crop. July/Aug. p. 15.

• ***Summary:*** "The soybean has appeared in recorded history for about 5,000 years, but is a relatively new crop for American farmers.

"North Carolina boasts its soils were the first to produce commercial soybeans in this country. But it wasn't easy to get farmers to accept them. And the soybean went by a number of names.

"Some say soybean originated with the Chinese word meaning sauce of the bean. Now it's called soya, soybean and sojabean.

"According to the late Charles B. Williams, an agronomist at North Carolina State University, the first soybeans were brought to North Carolina by an old sea captain who got them in the Orient. Farmers called them Japan Peas, coffee berries and soyabeans. And they weren't very interested in planting them.

"But Williams kept working at it, spending nearly 50 years promoting the strange little bean. Farmers considered them useful only for soil improvement and planted them in rotation with tobacco, then plowed the plants for fertilizer.

"Williams encouraged farmers to grow soybeans, conducted variety and fertilizer demonstrations, helped in breeding and wrote as much as he could about it. He also urged oil mills to buy the beans for crushing and suggested ways to use the beans in varnishes, plants and other products.

"On Dec. 13, 1915, the Elizabeth City Oil and Fertilizer Co. began crushing beans, the first facility in North Carolina to make the switch from cotton to soybeans. And, claim North Carolinians, it was the first commercial maker of soybean oil and meal in the U.S.

"The crop became a part of North Carolina crop rotations, but eventually farmers there lost interest. Midwest farmers liked it, found a place for it and eventually made it a major crop. Now, North Carolina growers are rediscovering soybeans and planted nearly 2 million acres this year.

"And U.S. soybeans are sold all over the globe, even to China, where it probably all began."

1089. 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.

1090. Belleme, John. 1980. Re: Building a miso factory in North Carolina. Pasteurizing miso and selling dry koji. Letter to William Shurtleff at Soyfoods Center, Sept. 29. 2 p.

Typed, without signature or letterhead.
• ***Summary:*** "Our miso project is going quite well. This summer I located the remaining equipment in New Jersey and ordered our vats from Arrow Tank Co. in Buffalo [New York]. The owner is stone deaf; it was an interesting afternoon.

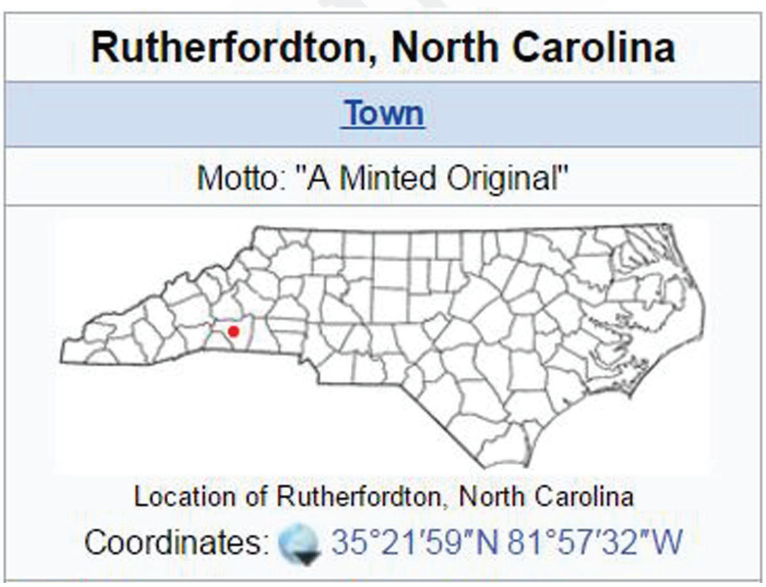
"We are now leveling the site for the miso factory. It's going to be one of those metal Butler buildings, about 4,000-sq-feet. Besides the miso project, we are working on other projects such as building a structure for summer camps, shiitake mushroom farming, and preparing our land for growing soybeans. There's just Jan. and I, so our hands are full."

While in Japan, John noticed that Mr. Onozaki's wife and most older traditional people never boil their miso soup. "People go out of their way to buy Mr. Onozaki's unpasteurized miso. These people believe that there is a very beneficial bacteria in miso which is killed by heat. More specifically, old people in rural Japan strongly feel that if you smoke, it is best to drink unpasteurized miso every day.

"On the other hand, the people at Sendai [Miso Shoyu Co.] and Michio [Kushi] believe this is nonsense. I have great faith in the wisdom of tradition. People that live close to the earth do not waste their time if not for good reason. Also, the people at Sendai pasteurize all exported miso, much of which is sold by Erewhon." John asks Shurtleff's opinion on these matters.

John would like to sell some of the koji he makes as dry koji. He asks how to dry it and the effect of drying on the enzyme activity of the koji. "Finally, do you know anything about the nutritional benefits of koji in making amasake or pickles?"

Talk with John Belleme. 1980. Oct. 3. The rebuilt cypress vats are 7 feet tall and 5 feet in diameter. Each costs $1,000 with stainless steel hoops. John is deeply interested in macrobiotics.



Note: Rutherfordton, North Carolina, is located in the beautiful Blue Ridge Mountains of western North Carolina. Address: Route 3, Box 541, Rutherfordton, North Carolina. Phone: (704) 287-2940.

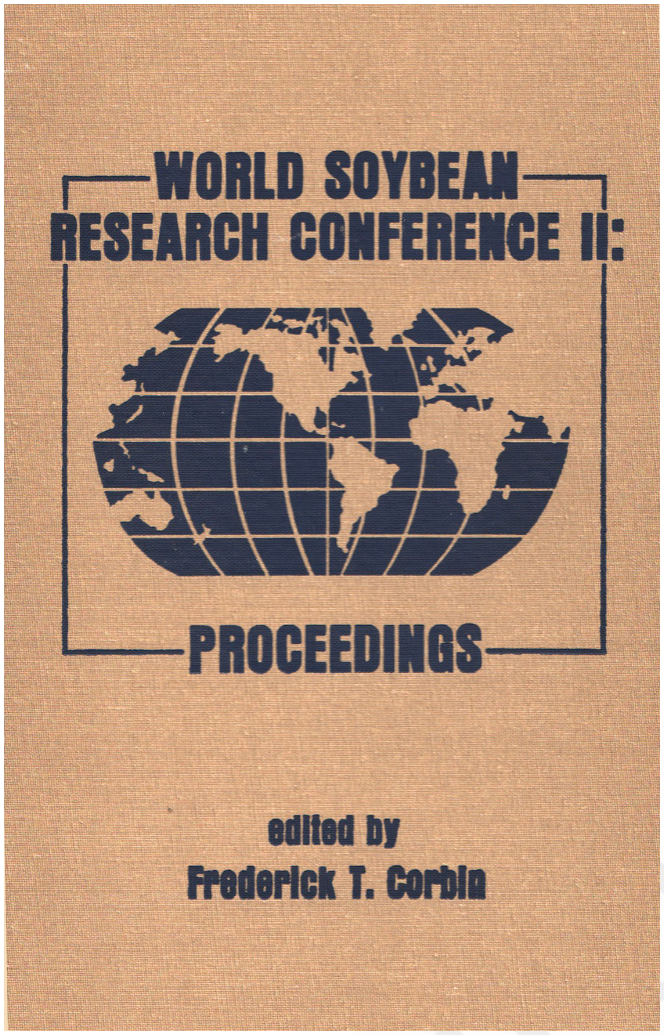
1091. **Product Name:** Tofu.
Manufacturer's Name: Prem Soyfoods.
Manufacturer's Address: P.O. Box 5321, Fletcher, NC 28732. Phone: 704-684-8501.
Date of Introduction: 1980 September.
How Stored: Refrigerated.
New Product–Documentation: Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address, and phone number. Owner: Bob & Jeanne Hunt.

1092. **Product Name:** Tofu.
Manufacturer's Name: White Clouds of Tofu.
Manufacturer's Address: 300 Hillside St., Asheville, NC 28801. Phone: 704-252-0854.
Date of Introduction: 1980 September.
How Stored: Refrigerated.
New Product–Documentation: Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address, and phone number. Owner: Joelen Bell.

1093. *Mother Earth News.* 1980. Mom's marketplace: Has-bean souper snack. Nov. p. 138.
• ***Summary:*** "'Miso Cup' is a natural instant soup that can provide a preservative-free, quick, hot, nutritious, vegetarian 'protein break'–and do so anywhere there's hot tap water or a steaming kettle. A base of carefully aged soybeans, rice, and sea salt is low-temperature dried–further seasoned only with land or sea vegetables–and packed in sealed envelopes, each of which contains enough of the blend to make two cups of soup. Ask for Miso-Cup at your health food store, or order it (at 50¢ per package or a box of six for $2.98 postpaid) from the originators: Edward & Sons Trading Co., Dept. ME, Rt. 1, Box 153, Saluda, North Carolina 28733.

A small photo shows the Miso-Cup box.

1094. Corbin, Frederick T. ed. 1980. World Soybean Research Conference II: Proceedings. Boulder, Colorado: Westview Press. xv + 897 p. Held at North Carolina State Univ., 26-29 March 1979. Author index. 24 cm. [1500+ ref]
• ***Summary:*** The book contains the following major divisions: Foreword. Preface. Keynote addresses. Mineral nutrition (3 papers). Nitrogen fixation (3). Physiology (6). Breeding (8). Entomology (8). Plant pathology (2). Weed control (3). Production (4). Engineering (6). Modeling soybean systems (6).



Research techniques (2). Utilization–oils (4). Utilization–protein (5). Protein and oil (3). Agribusiness (4). Marketing, transport and storage (6 papers). Address: Prof. of Crop Science; North Carolina State Univ., Raleigh.

1095. Corbin, Frederick T. ed. 1980. World Soybean Research Conference II: Abstracts. Boulder, Colorado: Westview Press. 124 p. Conference held 26-29 March 1979 at North Carolina State Univ. Author index. 24 cm.
• ***Summary:*** The World Soybean Research Conference II was held on 26-29 March 1979 at North Carolina State University. This volume contains summaries of the more than 200 papers, both invited and contributed, presented at that meeting. The full proceedings contains 74 of the invited papers in full.

Contents: Keynote addresses. Mineral nutrition. Engineering. Nitrogen fixation. Entomology. Utilization. Breeding. Physiology. Production. Protein and oil. Plant pathology. Modeling soybean systems. Regional. Agribusiness. Marketing, transport and storage. Weed control. Research techniques. Addendum. Address: Prof. of Crop Science; North Carolina State Univ., Raleigh.

1096. Nave, W. Ralph. 1980. Soybean harvesting equipment: Recent innovations and current status. In: F.T. Corbin, ed. 1980. World Soybean Research Conference II: Proceedings. Boulder, Colorado: Westview Press. xv + 897 p. See p. 433-49. [32 ref]
• ***Summary:*** Contents: History of soybean harvesting. Harvesting loss evaluation. Ohio study. Illinois and USDA study. Iowa study. Development of improved equipment. Header performance comparisons. Recent developments in grain threshing. Comparison of rotary and conventional threshing. Monitoring devices for combines. Summary. References.

"The earliest harvester designed specifically for soybeans was a two-wheeled, horse-drawn machine that straddled the bean row (Norman 1963, p. 219). This special harvester was used in Virginia and North Carolina about 1920, but was never used frequently in the North Central States. Harvesting losses ranged from a low of 20% to a high of 60%. In areas where small grains are grown, the binder or mower and thresher were used for soybean harvesting. When soybeans were cut with the binder or mower and then threshed, harvesting losses ranged from 16 to 35% of the total yield and averaged 25%.

"The grain combine harvester was first used for soybeans in the mid-twenties and has been a major factor in the expansion of soybean production." A survey of 12 combines operated in Illinois was conducted in 1927.

"The first major breakthrough in significantly reducing soybean harvesting loss was the introduction of the floating cutterbar attachment developed by Horace D. Hume and J. Edward Love in 1930. In 1933 Hume successfully demonstrated the floating cutterbar and reel in soybeans at Champaign, Illinois, but acceptance in the soybean region was slow. As an example, only 12 flexible floating cutterbars and 12 pickup reels were delivered to farms in Illinois in 1934, and the 12 cutterbars were returned as having no apparent value (Quick & Buchele 1978).

"Until about 1970, little progress was made in reducing soybean harvesting losses. In recent years, attachments such as floating cutterbars with hydraulic height control and pickup reels with hydraulic height and speed control have become common features on many combines used for soybean harvesting." Address: USDA SEA/AR, Univ. of Illinois, Urbana, IL 61801.

1097. Stalker, H.T. 1980. Utilization of wild species for crop improvement. *Advances in Agronomy* 33:111-47. [266* ref]
• ***Summary:*** Incorporation of useful alien traits from wild perennials to the soybean has not been feasible so far, compared to other crop species. Contents: 1. Introduction. 2. Biosystematics (incl. collection and preservation of germplasm). 3. The gap between hybridization and

utilization. 4. Approaches for utilizing wild germplasm resources. 5. Examples of species used in wild species hybridization programs. 6. Specific uses of wild species for crop improvement: Disease and insect resistances, yield, quality, earliness and adaptation, modes of reproduction, miscellaneous uses, new crops. 7. Summary and conclusions. Address: Dep. of Crop Science, North Carolina State Univ., Raleigh, NC.

1098. **Product Name:** Tofu.
Manufacturer's Name: Libby Outlaw Tofu Shop.
Manufacturer's Address: Box 34, Hillsborough, NC 27278. Phone: 919-732-3359.
Date of Introduction: 1981 January.
How Stored: Refrigerated.
New Product–Documentation: Soyfoods Center Computerized Mailing List. 1981. Jan. 22.

1099. *Soybean News* (*NSCIC*). 1981. Public soybean breeders and geneticists [directory]. 32(2):4. Jan.
• ***Summary:*** "By states geographically NE to West Coast as reported to Dr. Leffel by state coordinators

"New York: Dr. Richard Zobel, USDA, Cornell U. at Ithaca.

"Pennsylvania: Dr. Elwood Hatley, Pa. State U. at University Park.

"Mr. J.O. Yocum, Pa. State U. at Landisville.

"New Jersey: Dr. J.R. Justin, Rutgers State U. at New Brunswick.

"Delaware: Mr. E.L. Wisk, Del. Agr. Exp. Sta. at Georgetown.

"Maryland: Dr. Perry Cregan, USDA at Beltsville.

"Dr. T.E. Devine, USDA at Beltsville.

"Dr. J.M. Joshi, U. of Md., Eastern Shore at Princess Ann.

"Dr. W.J. Kenworthy, U. of Md. at College Park.

"Dr. R. C. Leffel, USDA at Beltsville.

"Virginia: Dr. G.R. Buss, VPI at Blacksburg.

"Dr. P.S. Benepal, Va. State C. at Petersburg.

"North Carolina: Dr. P.J. Buescher, NC State U. at Raleigh.

"Dr. J.W. Burton, USDA, NC State U. at Raleigh.

"Dr. W.D. Hanson, NC State U. at Raleigh.

"South Carolina: Dr. H.L. Musen, Clemson U. at Blackville.

"Dr. E.R. Shipe, Clemson U. at Clemson.

"Georgia: Mr. S.H. Baker, Coastal Plain Exp. Sta. at Tifton.

"Dr. H.R. Boerma, U. of Ga. at Athens.

"Florida: Dr. Kuell Hinson, USDA, Fla. State U. at Gainesville.

"Puerto Rico: Dr. L.H. Camacho, INTSOY, U. of P.R. at Mayaguez.

"Alabama: Dr. V.T. Sapra, Ala. A&M U. at Normal.

"Dr. D.L. Thurlow, Auburn U. at Auburn.

"Mississippi: Mr. C.J. Edwards, Jr., USDA at Stoneville.

"Dr. E.E. Hartwig, USDA at Stoneville. Dr. T.C. Kilen, USDA at Stoneville.

"Louisiana: Dr. D.F. Gilman, La. State U. at Baton Rouge.

"Texas: Dr. R.D. Brigham, Texas Agr. Exp. Sta. at Lubbock. and Tex. A&M U. at Beaumont.

"Oklahoma: Dr. Lewis Edwards, Okla. State U. at Stillwater.

"Arkansas: Dr. K.D. Beatty, U. of Ark. at Keiser.

"Dr. C.E. Caviness, U. of Ark. at Fayetteville.

"Dr. L.A. Duclos, Ark. State U. at Jonesboro.

"Tennessee: Dr. F.L. Allen, U. of Tenn. at Knoxville.

"Kentucky: Dr. J.H. Orf, U. of Ky. at Lexington.

"Ohio: Dr. R.L. Cooper, USDA, Ohio State U. at Wooster.

"Dr. S.K. St. Martin, Ohio State U. at Columbus.

"Dr. A.K. Walker, Ohio State U. at Wooster.

"Indiana: Dr. N.C. Nielsen, USDA, Purdue U. at W. Lafayette

"Dr. J.R. Wilcox, USDA, Purdue U. at W. Lafayette.

"Illinois: Dr. R.L. Bernard, USDA, U. of Ill. at Urbana.

"Dr. H.H. Hadley, U. of Ill. at Urbana.

"Dr. T. Hymowitz, U. of Ill. at Urbana.

"Dr. R.L. Nelson, USDA, U. of Ill. at Urbana.

"Dr. C.A. Newell, U. of Ill. at Urbana.

"Dr. C.D. Nickell, U. of Ill. at Urbana.

"Dr. Oval Myers, Jr., So. Ill. U. at Carbondale.

"Missouri: Dr. Sam Anand, U. of Mo. at Portageville.

"Dr. V. D. Luedders, USDA, U. of Mo. at Columbia.

"Kansas: Dr. W.T. Schapaugh, Kans. State U. at Manhattan.

"Nebraska: Dr. J.E. Specht, U. of Nebr. at Lincoln.

"Dr. J.H. Williams, U. of Nebr. at Lincoln.

"Iowa: Dr. S.R. Cianzio, Ia. State U. at Ames.

"Dr. W.R. Fehr, Ia. State U. at Ames.

"Dr. D.E. Green, Ia. State U. at Ames.

"Dr. R.G. Palmer, USDA, Ia. State U. at Ames.

"Dr. K. Sadanaga, USDA, Ia. State U. at Ames.

"Michigan: Dr. T.J. Johnston, Mich. State U. at E. Lansing.

"Dr. D. A. Reicosky, Mich. State U. at E. Lansing.

"Wisconsin: Dr. E.T. Gritton, U. of Wis. at Madison.

"Minnesota: Dr. J.W. Lambert, U. of Minn. at St. Paul.

"North Dakota: Dr. D.A. Whited, ND State U. at Fargo.

"South Dakota: Dr. J.J. Bonnemann, SD State U. at Brookings.

"Arizona: Dr. D.L. Johnson, U. of Ariz. at Tucson.

"California: Dr. B.H. Beard, USDA, U. of Calif. at Davis.

"Canada: Dr. W.D. Beversdorf, U. of Guelph at Guelph, Ont.

"Dr. R.I. Buzzell, Agr. Canada Res. Sta. at Harrow, Ont.

"Dr. H.H. Mindel, Agr. Canada Res. Sta. at Lethbridge, Alb.

"Dr. H.D. Voldeng, Agr. Canada Res. Sta. at Ottawa, Ont."

1100. MacIvor, Charles R. 1981. Re: Dr. John Harvey Kellogg's work with meatlike products and soyfoods. Letters to William Shurtleff at Soyfoods Center, March 4 and April 28. 3 p. and 1 p. Typed, with signature.

• ***Summary:*** Protose was the first meat analog made by Dr. Kellogg, introduced in 1896. Nuttolene was next. It was named Nuttose later to rhyme with Protose. Battle Creek Steaks and Battle Creek Skallops followed later, sometime before 15 Oct. 1944, as they were listed in the 1944 dealer retail price list. None of these products contained any soya. Peanut butter was first made by Dr. Kellogg in 1892. "I never heard that it was patented."

In 1960 when Battle Creek Food Co. was purchased by Worthington Foods, Protose was a mixture of wheat gluten and peanut meal. Vegetable Steaks and Vegetable Burger were made of pure gluten with certain seasonings.

Mr. MacIvor worked in the sales division of Battle Creek Food Co. from 1929 to 1939. He was writing a book on Dr. Kellogg but it will probably never be published because it is too big and he can't condense it.

Update: Talk with Lenna M. MacIvor. 1995. Oct. 20. Charles MacIvor, her husband, died of a massive stroke about 10 years ago, on about 28 Dec. 1985. He was age 85 at the time. He was very clear of mind until days before his death. His book on Dr. Kellogg, which he titled "The Lord's Physician," was never published. She and her daughter each have a copy of the manuscript, which is about 700 pages long, and contained extensive original information. She will try to send a photocopy of the pages concerning the development and manufacture of Protose. She now lives at P.O. Box 32, Route 11, Hendersonville, North Carolina 28792-8233. Address: Route 8, Box 164, Hendersonville, North Carolina 28739. Phone: 704-684-8329.

1101. O'Conell, Jean. 1981. First cousins in Greenfield [Massachusetts]: Tempeh follows tofu to market. *Morning Union* (*The*) (*Springfield, Massachusetts*). March 18. p. 25-26.

• ***Summary:*** A few nights ago the New England Soy Dairy organized a dinner meeting in Greenfield for the members of the Northeast Chapter of the Institute of Food Technologists. The meal included cottage cheese made without milk and lasagna made without meat. "Fairly tasty, but hardly exciting." But the dinner menu wasn't the point. Rather the "event served to point out that soy is coming of age here in the Connecticut Valley." More people are including tofu in their cooking, and tofu is now available in the lunch program of the Springfield public schools. "Soy is a good, cheap source of protein and it's receiving more attention as people scramble to beat, or at least meet inflation."

A little tofu shop named Laughing Grasshopper opened in 1976 in Greenfield. It was the forerunner of the New England Soy Dairy which is now the third or fourth largest tofu maker in the USA. Eighteen months ago Michael Cohen, one of the four partners, left the Soy Dairy to establish his own soy business, the Tempeh Works, which is also located in Greenfield. Cohen's shop now produces an average of 4,000 lb/week of tempeh. Photos show: (1) Michael Cohen putting soybeans into a centrifugal extractor for removal of the water before adding tempeh culture. (2) Skat McPherson examining finished cakes of tempeh on a rack at the Tempeh Works.

"Another chapter in the soy story in the Connecticut Valley is expected to begin in the fall of this year with the opening of the South River Miso Company in Conway [Massachusetts]. Christian Elwell and his family are moving the company here from Ohio.

"Miso, even less known than tempeh, is a fermented soybean puree made with water and barley or rice. It has a long fermentation period and is used for such things as soup stock, according to Elwell who attended the Soy Dairy dinner in Greenfield.

"There are only three miso companies in the United States, one on the West Coast, one in North Carolina [American Miso Co.] and the one which is coming to Conway, it was noted by Richard Leviton at the Greenfield meeting." Leviton added that he and others in the soy industry are heartened that a few farmers in the Connecticut Valley are trying to grow soybeans, since the nearest source is now about 1,000 miles away. Contains a recipe for "Peanutty Soy," peanut butter extended with tofu, from Madeline Fox, marketing director and recipe developer at the New England Soy Dairy.

Note: This is the earliest document seen (Nov. 1999) that mentions the South River Miso Company–which began selling miso under its name in Oct. 1982. Address: Union Food and Fashion Editor.

1102. Belleme, John. 1981. The miso-master's apprentice. *East West Journal.* April. p. 51-54.

• ***Summary:*** Describes how John and Jan Belleme learned to make miso at the Onozaki household in Japan. They were located in an old Japanese farming village 10 miles north of Yaita city [Tochigi prefecture]. They plan to set up a miso-making operation in Rutherfordton, North Carolina. The Onozaki family started making fermented foods on a large scale 200 years ago, at first saké, and later koji (fermented rice). Now the family makes about 120 tons of natural miso each year. Mr. Takamichi Onozaki is the miso master. The process for making the miso is described in detail. Based on a 6½-day weekly cycle, it begins when 1,500 pounds of rice is milled, washed, and soaked overnight. All of the koji is handmade. Onozaki miso is now sold in America at natural

food stores or can be purchased in 11-pound boxes from Oak Feed Stores (3030 Grand Avenue, Coconut Grove, Florida 33133).

Photos show: (1) A wedding portrait of the Onozakis in traditional Shinto robes taken 25 years ago. (2) Mrs. Itsuko Onozaki, the miso master's wife, today. (3) The Onozaki's thatch-roofed home, seen from the back hillside. (4) Traditional living room with *kotatsus* (heated tables). (5) Jan chats with Onozaki grandmother, age 78. (6) Mrs. Onozaki and a neighbor wash rice for miso. (7) Koji is transferred from a huge wooden fermentation crib into wooden trays. (8) Jan, Mrs. Onozaki, and a cousin pour hot soybeans into a grinder; they will be extruded to a paste, then blended with koji. (9) John Belleme washes soybeans in a huge pressure cooker. (10) In front of gigantic cedar vats, Mr. Onozaki and John scrape mature koji from koji trays in preparation for making miso. (11) Seated around the *kotatsu,* Onozaki grandmother reads from the family scroll while John listens. John and Jan Belleme. The miso-making process in Japan.

1103. **Product Name:** Wizard Baldour's Hot Stuff [Regular, or Blazing].
Manufacturer's Name: Elf Works, Ltd. Later, American Natural Foods.
Manufacturer's Address: P.O., Box 2321, Chapel Hill, NC 27514.
Date of Introduction: 1981 April.
Ingredients: Apple cider vinegar, deep well water, organic red miso, unfiltered honey, African bird peppers, cayenne peppers, umeboshi plums, natural herbs & spices, arrowroot powder, natural seaweed extract, tarragon.
Wt/Vol., Packaging, Price: 5 fluid oz (147 ml), 10 oz, and 32 oz glass bottle.
How Stored: Shelf stable.
Nutrition: Per 1 tsp.: Calories 4, carbohydrate 1 gm, sodium 43 mg.
New Product–Documentation: Shurtleff & Aoyagi. 1983. The Book of Miso. 2nd ed. p. 239. Label. 1983, dated. 5.5 by 2.5 inches. Red, blue, and yellow on bright orange background. Picture of wizard and "Blazing" dragon. "Hot Stuff is an all purpose, all natural hot sauce that's really good for ya! Hot Stuff adds sure fire magic to your favorite flavor. Great on chicken, seafood, Mexican food or as a natural barbeque baste use your imagination. Shake well to wake up the dragon!" Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. Spot in Natural Foods Merchandiser. 1984. Feb. p. 113. Ad (full page, color) in Natural Foods Merchandiser. 1984. "It's Hot Stuff." July. At the top of this full-page color ad is a hand pouring a bottle of Hot Stuff. Hot Stuff comes in two intensities: Regular and Blazing. Distributed by U.S. Naturals Corp., 84 Galli Drive, Novato, California 94947.

Interview with John Troy. 1984. Sept. 26.

Note: This is the earliest record seen (March 2012) concerning the work of John Troy or Elf Works with miso. Before this, John made (by hand) an all-natural candy bar named "Wizard Baldour's Power Pak." It was very successful.

1104. Meekins, Bill. 1981. Re: The soybean is the largest money crop in northeastern North Carolina. Letter to The Honorable J.J. Harrington, State Senate, Legislative Building, Raleigh, North Carolina 27611, July 8. 1 p. Typed, without signature on letterhead.
• ***Summary:*** "Dear Monk: When you speak about the soybean, then you are speaking about the largest money farm crop in northeastern North Carolina. Did you know that the soybean was first processed in Elizabeth City, N.C. in 1915? William T. Culpepper, who was Levin's father, built the processing plant. Mr. Culpepper was postmaster of Elizabeth City in 1915. As you know, Levin is postmaster now.

"The newly formed Albemarle Agribusiness Council in

Pasquotank County and the Elizabeth City Lions Club will co-sponsor an agriculture exposition in Elizabeth City during the latter part of 1982. It is appropriate that the soybean be the featured crop. The event will be called the North Carolina Soybean Festival. Our purpose is to attract the entire population of the northeast region of North Carolina and Tidewater Virginia.

"I am writing to request your support for a North Carolina historical marker to be placed at the site or close proximity commemorating the first soybean processing plant. It would be ideal to have the marker placed during the soybean festival.

"I realize this session of the legislature is almost over and apologize for such short notice. I understand House Bill 641 is supposed to provide funds for historical markers and if this marker is not specifically mentioned in the bill, then you might have it added. I have written this letter to the other area legislative delegation and anything each of you can do will be appreciated. No doubt the placement of the marker would be one of the highlights of the festival and a remembrance for generations to come.

"I am also writing our congressional delegation to request a commemorative postage stamp and hopefully the first day of issue would coincide with the date of the festival. Any encouragement you can give them will be appreciated." Address: Carolina Telephone and Telegraph Company, 103 South Road Street, Elizabeth City, North Carolina 27909. Phone: (919) 338-5186.

1105. 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.

1106. 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.

1107. Meekins, William C., Jr. 1981. Re: Highway historical marker for soybeans near Elizabeth City, North Carolina. Letter to Hon. Vernon G. James, Route 4, Box 265, Elizabeth City, North Carolina 27909, Aug. 21. 1 p. Typed, with signature.

• ***Summary:*** "Speaking for all of the committee, we are very happy to get your letter of July 14 about money being available for the historical marker at Elizabeth City. The presentation of the marker during the [soybean] festival will be a big plus and possible we can get the governor here to do it."

The proposed wording of the marker is given; William Thomas Culpepper lived 1884-1945. Copies are sent to 3 persons. Address: Committee member, 1003 Woodruff Ave., Elizabeth City, NC 27909.

1108. Oak Feed Miso, Inc. 1981. Minutes of Annual

Stockholders Meeting of Oak Feed Miso, Inc. Rutherfordton, North Carolina. 3 p. Sept. 27. Unpublished manuscript.
• ***Summary:*** The meeting was held on 27 Sept. 1981 at the corporation offices in Rutherfordton, North Carolina. It was called to order by Barry Evans, who was appointed acting chairman. This annual meeting had been postponed from 1 April 1981 (5 months). "The following shareholders were present in person or by proxy: Barry Evans, 1400 shares; John Belleme, 900 shares; Sandy Pukel, 1400 shares; Madelene Kenny [sic, Kenney], acting as representative of her deceased son, James Kenny, 50 shares; Yoso Masudo [sic, Yozo Masuda], 100 shares (proxy held by Sandy Pukel); Edmund Benson, 100 shares [sic, 250 shares] (proxy held by Sandy Pukel). The total number of shares represented at the meeting was 4100 shares, all of the outstanding stock of the Corporation, which constituted a quorum for the transaction of business."

Several important changes were made: The capitalization of the corporation was increased to 10,000 shares of Class A stock. Class B non-voting shares were eliminated. The "subscribers consent" agreement executed on 16 August 1979 was altered and amended so that all shares subscribed for became Class A common stock. All of the above allowed Barry Evans to vote–for the first time. Address: Rutherfordton, North Carolina.

1109. Shurtleff, William; Aoyagi, Akiko. 1981. History of A.E. Staley Manufacturing Co. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 11 p. Sept. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** A comprehensive history of the subject. Address: Lafayette, California. Phone: 415-283-2991.

1110. 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.

1111. **Product Name:** Red Miso.
Manufacturer's Name: American Miso Co., Inc.
Manufacturer's Address: Box 541, Route 3, Rutherfordton, NC 28139.
Date of Introduction: 1981 October.
New Product–Documentation: Leviton. 1982. Soyfoods. Summer. p. 18-22. The company was founded in October 1981 by John Belleme; Ad in East West Journal. 1985. Jan. "The secret of Japanese miso comes to America." Shurtleff & Aoyagi. 1983. The Book of Miso. 2nd ed. p. 238, 240. By 1983 they were America's third largest miso maker, with 125 tonnes a year.

1112. National Soybean Processors Association. 1981. Yearbook and trading rules 1981-1982. Washington, DC: National Soybean Processors Association. ii + 106 + A1-12. 23 cm. Spiral bound.
• ***Summary:*** On the cover (but not the title page) is written: Effective October 1, 1981. Issued annually to all members of the association. Contents: Constitution and by-laws. Officers and directors. Executive office. Members. Associate members. Standing committees. Trading rules on soybean meal (first adopted 18 Oct. 1933). Sales contract. Appendix to trading rules on soybean meal: Official methods of analysis (moisture, protein, crude fiber, oil {only method numbers listed}), sampling of soybean meal {at origin} (automatic mechanic sampler, pneumatic probe sampler, probe sampler), sampling of soybean meal (at barge loading transfer facilities), official weighmaster application, semi-annual scale report, manufacturers' certification–Installation of automatic sampler (at barge loading transfer facility), semi-automatic sampler certification (at barge loading transfer facility), official referee chemists (meal). Soybean meal export trading rules: Minimum blending procedures for export meal blended at ports, sampling of soybean meal (at vessel loading facilities), manufacturers certification–Installation of automatic sampler (at vessel loading facility), semi-automatic sampler certification (at vessel loading facility). Trading rules on soybean oil (first adopted 21 May 1930). Sales contract. Definitions of grade and quality of export oils. Soybean lecithin specifications. Appendix to trading rules on soybean oil: Inspection, grading soybean

oil for color (NSPA tentative method), methods of analysis (A.O.C.S. official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses; soap stock, acidulated soap stock and tank bottoms (only method numbers listed), official weighmaster application, semi-annual scale report, official referee chemists (oil). Soybean oil export trading rules. Uniform soybean oil export contract. Foreign trade definitions.

The page titled National Soybean Processors Association (p. ii) states: "During the past crop year about 1,000,000,000 bushels of soybeans moved through processing plants of NSPA's 24 member firms. Approximately 50 percent of America's 1.8 billion-bushel soybean crop was bought and processed by NSPA members. Exporters account for another 36 percent of the crop, and the remainder [14%] is returned to farms for seed, feed, and residuals." Also discusses industry programs, soybean research, and international market development."

The section on officers, executive committee, and board of directors (p. 7-8) gives the name, company affiliation, and phone number of each person. Officers–Chairman: Gaylord O Coan, Gold Kist, Inc. Vice Chairman: Edward J. Cordes, Ralston Purina Co., President: Sheldon J. Hauck. Secretary: Donald H. Levinworth, Cargill, Inc. Treasurer: Lowell K. Rasmussen, Honeymead Products Co. Immediate past chairman: C. Lockwood Marine, Central Soya Co., Inc.

Executive committee: Richard G. Rypkema ('83), Agri Industries. Charles Bayless ('83), Archer Daniels Midland Co. David C. Thompson ('82), Bunge Corporation. Harold H. Leavenworth, Cargill, Inc. C. Lockwood Marine, Central Soya Co., Inc. Gaylord O. Coan, Gold Kist, Inc. Lowell K. Rasmussen, Honeymead Products Co. Kermit F. Head ('82), Missouri Farmers Assn.–Grain Div. Sewell L. Spedden ('82), Perdue, Incorporated. Edward J. Cordes, Ralston Purina Co.

Board of directors (alphabetically by company; each member company has one representative on the board): Richard G. Rypkema, Agri Industries. Thomas H. Wolfe, Anderson, Clayton & Co. Charles Bayless, Archer Daniels Midland Co. Keith Voigt, Boone Valley Coop. Proc. Assn. David C. Thompson, Bunge Corporation. Harold H. Leavenworth, Cargill, Inc. C. Lockwood Marine, Central Soya Co., Inc. Ronald L. Anderson, Continental Grain Co. Donald M. Chartier, Farmland Industries, Inc. Gaylord O. Coan, Gold Kist, Inc. Lowell K. Rasmussen, Honeymead Products Co. Kenneth J. McQueen, Land O'Lakes, Inc. Kermit F. Head, Missouri Farmers Assn.–Grain Div. Robert E. Hicks, Owensboro Grain Co., Inc. Sewell L. Spedden, Perdue, Incorporated. Wilton L. Adcock, Planters Oil Mill, Inc. Thomas L. Shade, Quincy Soybean Co. Edward J. Cordes, Ralston Purina Co. William P. Hudson, Riceland Foods, Inc. J.D. Morton, Sherman Oil Mill. Styles M. Harper, Southern Soya Corp. Kenneth A. Robinson, A.E. Staley Mfg. Corp. Preston C. Townsend, Townsends, Inc. Tyler Terrett, West Tennessee Soya Mill, Inc.

Executive office, Washington, DC: Executive Director, Sheldon J. Hauck. Director, Public Affairs: Murray C. Keene. Director, Regulatory Affairs: Rhond R. Roth. Administrative Asst.: Alicia B. Rickman. National Soybean Crop Improvement Council: Robert W. Judd, Managing Director. General counsel: Elroy H. Wolff, Sidley & Austin. Special counsel: Julian B. Heron, Jr., Heron, Haggart, Ford, Burchette & Ruckert.

Members (listed alphabetically by company; within each company, first the name of the official Association representative {who is on the Board}, followed by the other personal members listed alphabetically by surname. For example, Archer Daniels Midland Co., the company with the most personal members, has 23. After the name of each personal member is given with his address and phone number. In the listing below, the number of personal members is shown in parentheses after the name of each company, followed by city and state of the various locations): Agri Industries–Soybean processing division (2); Des Moines, Iowa. Anderson, Clayton & Co. (4): Phoenix, Arizona, Jackson, Mississippi, Houston, Texas. Archer Daniels Midland Co. (23); Archer Daniels Midland Co. (26); Little Rock, Arkansas; Augusta, Georgia; Decatur, Illinois; Galesburg, Illinois; Granite City, Illinois; Fredonia, Kansas; Mankato, Minnesota; Red Wing, Minnesota; Kansas City, Missouri; Clarksdale, Mississippi; Fremont, Nebraska; Lincoln, Nebraska; Kershaw, South Carolina; Memphis, Tennessee. Boone Valley Coop. Processing Assn. (3); Eagle Grove, Iowa. Bunge Corporation (9); Cairo, Illinois; Danville, Illinois; Logansport, Indiana; Emporia, Kansas; Marks, Mississippi; New York City, New York. Cargill, Inc. (20); Osceola, Arkansas; Gainesville, Georgia; Cedar Rapids, Iowa; Des Moines, Iowa; Sioux City, Iowa; Washington, Iowa; Chicago, Illinois; Wichita, Kansas; Burnsville, Minnesota; Minneapolis, Minnesota; Fayetteville, North Carolina; Sidney, Ohio; Memphis, Tennessee; Chesapeake, Virginia. Central Soya Co., Inc. (11); Gibson City, Illinois; Decatur, Indiana; Fort Wayne, Indiana; Indianapolis, Indiana; Belmond, Iowa; Bellevue, Ohio; Marion, Ohio; Delphos, Ohio; Chattanooga, Tennessee. Continental Grain Co. (11); Guntersville, Alabama; Chicago, Illinois; Taylorville, Illinois; New York City, New York; Cameron, South Carolina. Farmland Industries / Far Mar Co (4); Van Buren, Arkansas; Sergeant Bluff, Iowa; Hutchinson, Kansas; St. Joseph, Missouri. Gold Kist Inc. (6); Decatur, Alabama; Atlanta, Georgia; Valdosta, Georgia. Honeymead Products Co. (3); Mankato, Minnesota. Land O'Lakes, Inc. (5); Fort Dodge, Iowa; Sheldon, Iowa; Dawson, Minnesota; Minneapolis, Minnesota. Missouri Farmers Assn.–Grain Div. (6); Mexico, Missouri. Owensboro Grain Co., Inc. (2); Owensboro, Kentucky. Perdue Incorporated (2); Salisbury, Maryland. Planters Oil Mill, Inc. (2); Rocky Mount, North Carolina. Quincy Soybean Co. (4); Quincy, Illinois. Ralston Purina Co. (8); Bloomington, Illinois;

Lafayette, Indiana; Iowa Falls, Iowa; Louisville, Kentucky; Kansas City, Missouri; St. Louis, Missouri; Raleigh, North Carolina; Memphis, Tennessee. Riceland Foods, Inc. (9); Helena, Arkansas; Stuttgart, Arkansas. Sherman Oil Mill (1); Fort Worth, Texas. Southern Soya Corp. (1); Estill, South Carolina. A.E. Staley Manufacturing Co. (7); Decatur, Illinois. Townsend's Inc. (2); Millsboro, Delaware. West Tennessee Soya Mill, Inc. (1); Tiptonville, Tennessee.

Associate Members: ACLI Soya Co, White Plains, New York. Anderson Clayton Foods, Dallas, Texas. Balfour MacClaine International, Ltd., New York City, New York. Best Foods, a Unit of CPC International Inc., Englewood Cliffs, New Jersey. Canadian Vegetable Oil Processing–Div. of Canada Packers Inc., Hamilton, Ontario, Canada. Cobec Brazilian Trading & Warehousing Corp. of the U.S., New York City. Delta Cotton Oil & Fertilizer Co., Jackson, Mississippi. Durkee Foods, Div. of SCM Corporation, Chicago, Illinois (Millark M. Evak). Hunt-Wesson Foods, Inc., Fullerton, California. Kraft, Inc.; Glenview, Illinois; Memphis, Tennessee. Lever Bros Co., New York City, New York. Louis Dreyfus, Stamford, Connecticut. Maple Leaf Monarch Co., Toronto, Ontario, Canada (W.G. Milliken). Marwood Company, San Francisco, California. Overseas Commodities Corp., Minneapolis, Minnesota. Pillsbury Co., Minneapolis, Minnesota. Procter & Gamble Co., Cincinnati, Ohio. Schouten International, Inc., Minneapolis, Minnesota. Spencer Kellogg, Div. of Textron, Inc., Buffalo, New York. Alfred C. Toepfer, Inc., New York City, New York (Dierk Overheu).

Standing committees: For each committee, the function of the committee, the names of all members (with the chairman designated), with the company and company address of each are given–Export development committee, Crop Improvement Council. Meal trading rules. Oil trading rules. Safety, health, and loss prevention. Technical. Address: 1800 M. St., N.W., Washington, DC 20036. Phone: 202/452-8040.

1113. Shurtleff, William; Aoyagi, Akiko. 1981. History of soybean production pioneers: Leading states, agronomists, growers, breeders, and others. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 24 p. Oct. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Kansas. North Carolina. Illinois. Indiana. Ohio. Iowa. Southern States. Minnesota. Missouri. Arkansas. Florida. Nebraska. Address: Lafayette, California. Phone: 415-283-2991.

1114. 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.

1115. Acton, Robert W. 1981. Details on history of the American Soybean Association (Interview). *SoyaScan Notes*. Nov. 9. Conducted by William Shurtleff of Soyfoods Center. • ***Summary:*** The ASA office in Paris, France opened on 1 March 1977 and closed in Sept. 1980. The ASA Market Development Foundation was started in 1968 when the checkoff program started. [Note: Not true. The checkoff program started in 1966 in North Carolina.] In Dec. 1980 it merged with the ASA Research Foundation to become the ASA Development Foundation.

Twenty-four states have state soybean associations,

and 23 of these have a checkoff program. Three states have an association but no checkoff program: Wisconsin, Ohio, and Indiana. Florida has had a ½ cent checkoff since March 1971, and they still do. Wisconsin has never had a checkoff, but ASA hopes to get one approved in 1982 legislation. In Indiana, growers did not pass the checkoff in 1980; the problem is getting it past the legislative body. A key farm leader opposes the checkoff. 48% of the farmers in the state voted for it, but a 2/3 majority is needed. Ohio is the same as Indiana. The 4th vote failed. It passed by a majority but needs 2/3 of the votes to pass. Key legislators oppose it. They feel that the grain companies should promote soybeans, not the federal government. They also feel that people will buy soybeans anyway, whether or not they are promoted.

In a state with a ½ cent per bushel checkoff, a farmer growing 200 acres of soybeans that yield 40 bu/acre would harvest 8,000 bu and pay $40 checkoff–not much. Address: Senior Economist, ASA, St. Louis, Missouri.

1116. Belleme, John. 1981. Update on work with miso in North Carolina (Interview). *SoyaScan Notes.* Nov. 24. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Erewhon Trading Co. recently filed for Chapter 11 bankruptcy protection. They are in receivership and on the verge of bankruptcy; they are no longer delivering products to stores, only manufacturing. Erewhon owes Mr. Kazama of Mitoku $400,000 plus the shipments on the docks.

John plans to sell a miso fermentation kit, consisting of koji plus instructions for making miso at home. Address: Route 5, Box 258, Rutherfordton, North Carolina 28139. Phone: 704-749-9537.

1117. Meekins, William C., Jr. 1981. Request form for highway historical marker. Elizabeth City, North Carolina. 4 p. Nov. 16. Typed.

• ***Summary:*** "A. Topic of proposed marker: Extraction of oil from commercially grown soybeans–Elizabeth City Oil & Fertilizer Co.

"B. Site to be marked: Elizabeth City Oil & Fertilizer Co. (the building no longer exists).

"C. Verification of authenticity of site:... Located along Knobbs Creek and Lamb's Ferry road as provided in the following transaction: Pasquotank County Deeds, August 24, 1912, Book 36, pages 566 and 567, Pasquotank County Courthouse, Elizabeth City.

"D. Location of proposed marker: On the corner of McMorrie and Ehringhaus Streets at the Chamber of Commerce building, Elizabeth City, N.C.

"E. Distance from proposed marker location to site to be marked: The mill site was approximately two miles north of the proposed location of the marker."

F. Historical sketch." 1912 June 22–The company was incorporated. 1915 late fall–"First domestic soybeans were crushed for commercial purposes." (two references).

"G. Supplementary bibliography:" (5 sources).

"Please return to: Research supervisor, Archaeology and Historic Preservation Section, Div. of Archives and History, Dep. of Cultural Resources, 109 East Jones St., Raleigh, North Carolina 27611.

"Suggested wording for marker: "Gold from the soil: Oil was extracted from commercial soybeans at the Elizabeth City Oil & Fertilizer Co. in 1915. W.T. Culpepper local businessman was plant manager and promoted the operation.

Accompanying the application are two typewritten letters with signature: (1) From Meekins to Dr. Jerry Cashion, Research supervisor, dated 16 Nov. 1981. (2) To Bill Meekins from Edgar E. Hartwig, Research Agronomist, Stoneville, Mississippi, dated 23 Oct. 1981. Address: 1003 Woodruff Ave., Elizabeth City, North Carolina.

1118. *SoyaScan Notes.* 1981. Chronology of soybeans, soyfoods and natural foods in the United States 1981 (Overview). Dec. 31. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** Jan. *Soyfoods* magazine issue No. 4 published. Silver cover. 10,000 copies published. Steve Fiering loans SANA money for mailing it and agrees to make a loan for a test mailing.

Jan. Union activity begins at New England Soy Dairy.

Jan. Boxed tofu (1 lb. vacuum packed in a box with a window) first made by Zakhi Soyfoods in Fort Wayne, Indiana. This important innovation of packaging tofu in a box was later employed by New England Soy Dairy (1982), Quong Hop & Co. (1983), Swan Gardens (1983), and White Wave (1985).

Jan. Hain Food Co. starts nationwide color ads for Natural Onion and Jalapeno (Soy) Bean Dips.

Jan. Travis Burgeson of Pacific Tempeh near San Francisco, CA, introduces the world's first commercial tempeh burger.

Jan. Paul's Tofu & Tempeh, the first European tempeh company in Europe outside of the Netherlands, opens in England.

Jan 20. Ronald Reagan inaugurated as president of the United States. His Secretary of Agriculture is John R. Block. The regulatory climate in Washington, DC, begins to shift toward less federal regulation and more encouragement for industries to regulate themselves. The Republican administration favors free-market policies with less government involvement.

Jan. 23. Legume, run by Gary and Chandri Barat, is incorporated in New York, then that month moves to Verona, New Jersey.

Feb. 2. Island Spring in Washington state becomes America's first unionized tofu plant.

Feb. San-Jirushi International starts its first major American ad campaign using the slogan "San-J is the real tamari." The full-color, full-page national ads aim to clarify

the confusion between tamari and shoyu created by the macrobiotic movement.

Feb. Soyfoods Unlimited tempeh plant starts operation in San Francisco area. It is the most modern U.S. tempeh plant, although output is small.

Feb. Vitasoy soymilk and Morinaga tofu start to be imported and sold in the USA from Hong Kong and Japan respectively, immediately after the FDA lifts its ban on aseptic Tetra Pak type cartons. Morinaga tofu was sold by Beech Nut California Corporation, a joint venture with Beech Nuts Food Corp., established in 1977 in San Jose, California.

Feb. "Soyfoods Catching On" by Judith Brown published in *USDA National Food Review.* About tofu and tempeh.

Feb. Many tempeh plants switch to using GEM cultures tempeh starter.

March 1. Svadesha Pflanzen-Feinkost, West Germany's first commercial tofu company, starts production. Founded by Swami Anand Svadesha (Rudiger Urban) in Fuerth im Wald.

March. Institute of Food Technologists meeting at New England Soy Dairy. Tour, dinner, and speeches.

March. Richard Leviton on National Public Radio's "All Things Considered" talks for 10 minutes about soyfoods to 2 million people.

March. *The Book of Miso,* by Shurtleff and Aoyagi published by Ballantine Books in a mass market paperback edition.

April. USDA decides to establish tofu standards, then announce them in the Federal Register, but this plan is dropped in September, amid controversy over changes in the School Lunch Program.

April. Dr. Cook at Kansas State University publishes a paper on the possible inhibitory effects of soy proteins on nonheme iron absorption in humans. USDA becomes concerned.

April. *Tofu at Center Stage,* by Gary Landgrebe published by Fresh Press. First tofu cookbook containing many recipes calling for use of meat.

April. Bean Machines introduces new sanitary disintegrators/ grinders for tofu and soymilk production.

April. "The Miso-Master's Apprentice," by John Belleme published in *East West Journal.*

May. "The Amazing Tofumobile," by Janice Fillip, about Wildwood Natural Foods, published in *East West Journal.* Revival of interest in small tofu shops in areas where there is a high density of interest and high food consciousness, and rediscovery of soyfoods craftsmanship.

May. *Tofu Boken* by Ted Nordquist and Tim Ohlund published by Aros Sojaprodukter in Sweden. Europe's first book on tofu.

June. *Tofu Fever in New York,* by Megan B. Murray notes that David Mintz is making 275 gallons of tofu ice cream a week. This is the earliest known publication on his work with soy ice cream. He had been making it for 3-4 months.

June. "Surprise, It's Soy" by Barbara Bassett published in *Bestways.*

June. FIND/SVP survey of the U.S. tofu industry and tofu consumer survey published. 33% of respondents in major metropolitan areas were aware of tofu and 10% had purchased it. Predicts market will grow 32% a year for the next 6 years... an over-optimistic prediction.

June 29. "Trader Vic Bergeron Offers Timely Tips for Tofu" by Rose Dosti published in *Los Angeles Times.*

July. *Soyfoods* magazine is incorporated by Richard Leviton, and offers stock.

July 8-12. Fourth Annual Soycrafters Convention at Colorado State University. 240 people from 18 nations attend, 210 pay. First National Tofu Cheesecake Bakeoff and Soyfoods Equipment / Supplies Expo in the western world.

July. Mary Tolan selected Registered Young Dietitian of the Year by the American Dietetic Association. Invited to present speech on "Tofu–Food of the Future" at ADA convention in Philadelphia, Pennsylvania.

July. *Tofu Cookbook,* by Sally Sheppard published by Jack's Beanstalk.

July. "Soybean Ice Creams: Getting your Licks In" by Richard Leviton published in *Vegetarian Times.*

July. Soyfoods Center is working to build the world's largest library of documents on soyfoods, each with a bibliographic card, filed by author. Also building a large library of color slides on soyfoods.

Aug. "Tofu, Tofu Everywhere," by Karen Dukess published in *The New York Times'* Business section.

Aug. "Soyfoods: The Future Is Here but Are You Ready" by Alan Richman published by *Health Foods Business* as a cover story.

Aug. 12. "Soy Foods: Versatile, Cheap and on the Rise" by Lorna Sass, and "A Source of Quality Protein" by Jane Brody published in *The New York Times,* and syndicated nationwide.

Aug. "My Favorite Tempeh Recipes" by Aveline Kushi published in *East West Journal.*

Aug. *Delights of Tofu,* by Fox, O'Connor and Timmins published by New England Soy Dairy.

Aug. *Das Tofu Book,* by Shurtleff and Aoyagi published in Germany by Ahorn Verlag.

Sept. "Soyfoods Report" published by *Natural Food Merchandiser.*

Sept. *Home Soyfood Equipment,* by Ray Wolf published by Rodale Press.

Sept. 13. At SANA Board of Directors Meeting held near San Francisco, the Soycrafters Association of North America has its name changed to Soyfoods Association of North America to broaden scope and support base.

Sept. SANA and The Soyfoods Center do a major press

release on soyfoods production and consumption in America to 250 key media. Many magazines publish this report and conduct radio interviews.

Sept. Okita Enterprises takes 22 tofu and bean sprout makers to Japan for a 10-day tour. SANA executives Richard Leviton and Luke Lukoskie make important contacts with Japanese tofu trade officials and publications.

Sept. USDA publishes tofu regulations in the Federal Register, then withdraws entire school lunch revisions and revokes permission given to the Santa Cruz (Calif.) school system to use tofu in school lunches.

Sept. Dr. Hirayama of the National Cancer Center in Japan announces that miso soup is effective in combating stomach cancer and stroke.

Oct. "Things Go Better With Soyburgers: The New All-American Food" by Richard Leviton published in *East West Journal* as a cover story.

Oct. *Cook with Tofu,* by Christina Clarke published by Avon Books in mass market edition.

Oct. John Belleme's American Miso Corp. begins miso production in North Carolina.

Oct. Workers at Hinode Tofu Co. in Los Angeles go on strike for 2 weeks.

Oct. *Nasoya Tofu Cookbook,* published by Nasoya Foods.

Oct. *O Livro da Soja,* by Jane Cadwell published in Brazil by Editora Ground. One of the country's first books on soyfoods.

Nov. 10. Erewhon, America's natural foods pioneer, files for Chapter 11 reorganization under the U.S. bankruptcy laws. On 2 April 1982 Erewhon is sold to Nature Food Centers.

Nov. Autumn Press, publisher of *The Book of Tofu,* original edition, files for Chapter 11 bankruptcy.

Nov. New England Soy Dairy announces 28-Day Self Life Advantage Pasteurized Tofu in a 2/3 page ad in *Natural Foods Merchandiser.*

Nov. Soyfoods Unlimited advertises tempeh burgers in *Natural Foods Merchandiser.*

Nov. The Ministry of Agriculture and Forestry in Japan announces a Japanese Agricultural Standard (JAS) for soymilk. The soymilk boom in Japan starts.

Dec. *Juel Andersen's Tofu Kitchen* published by Bantam Books in mass- market paperback.

Dec. "World's Best Tofu Cheesecake" by Richard Leviton published in *Vegetarian Times.*

Dec. Food Protein Council, a trade association, changes its name to Soy Protein Council, since all of its members make only soy protein products.

Dec. *La Soya y Sus Derivados* (*Tofu, Tempeh, Miso*), by Shurtleff and Aoyagi published by Quadernos de Natura in Mexico.

Dec. *The Tofu-Miso High Efficiency Diet,* by Yoshiaki Omura M.D. published by Arco Publ.

Dec. *Cooking with Tofu.* by Mary Anna DuSablon published by Garden Way.

Dec. There are now 158 tofu manufacturers and 41 tempeh manufactures in the USA.

Dec. The Farm Vegetarian Cookbook published as *Soja Total* in German.

* Global economic activity is shifting from the Atlantic to the Pacific. In 1981 Asia passed Europe to become the largest market for U.S. agricultural products. In fiscal 1981 Japan bought $6,700 million worth of U.S. farm products.

* Soybean breeders, which have formerly focused their research efforts on increasing quantity (yield) of soybeans, now start to give more attention to quality (composition). Increasing total protein, methionine, and oil, and decreasing linolenic acid and antinutritional factors are priorities.

* U.S. soybean exports reach their peak this year of 25 million metric tons (tonnes). By 1987 they have fallen to 18 million tonnes, a 28% drop, due largely to competition from Brazil and Argentina, and to foreign subsidies. The market changes from a seller's to a buyer's market.

1119. McMurry, Linda O. 1981. George Washington Carver: Scientist and symbol. Oxford (England), New York, Toronto, Melbourne: Oxford University Press. x + 367 p. Index. 20 cm. [697* footnotes]

• ***Summary:*** An excellent, scholarly biography that separates the man from his myth. Carver emerges as "a gifted teacher, a gentle spirit, a keen intelligence and loving friend." His work with peanuts and his friendship with Henry Ford are discussed. In the index (which is poorly done), no mention is made of Carver's work with soybeans. However p. 91 states: "Soybeans and alfalfa were only two of several crops tested by Carver, often in cooperation with the USDA. Strangely, he failed in his attempt to cultivate kudzu, but he was especially delighted with the soybean results because the crop provided abundant forage 'of the nicest possible kind.' His interest was increased by the visit of a northern agriculturist to inspect Tuskegee's soybean work, and he was intrigued by the growing interest in soybeans as a source of vegetable oil. In 1914 he expanded his soybean experiments in cooperation with a New Jersey paint company and tested five varieties to determine the tonnage of forage, number of bushels of beans, quantity of oil, and fertilization properties each variety yielded." Of the 3 footnotes, one relates only to kudzu, and the others two are only in the Booker T. Washington Papers (edited by Louis R. Harlan); they are not on the microfilm of the George Washington Carver papers owned by the Library of Congress.

Booker T. Washington died on 14 Nov. 1914. "His death marked the end of an era both in race relations and in the career of George Washington Carver. During the next year a series of events brought Carver out of the shadows and into a place of national prominence that rivaled Washington's." After giving half a year's salary to the Booker T. Washington

Memorial Fund, Carver dejectedly wrote Washington's secretary, Emmett Scott, "I am sure Mr. Washington never knew how much I loved him and the cause for which he gave his life." Robert Russa Mouton, who took Washington's place as principal of Tuskegee brought brighter days for Carver. In the fall of 1915 Carver received two remarkable invitations and honors: One to serve on the advisory board of the National Agricultural Society, followed by one to become a fellow of the Royal Society for the Arts in Britain. In 1919 Moton gave Carver (now addressed with the prestigious title of "professor") an unsolicited increase in salary, Carver's first in 20 years. After 1916 Craver, now very busy and often traveling, gradually discontinued his classroom teaching, and by 1925 finished his plot work at the experiment station. He was becoming a "creative chemist." In Dec. 1916, in his continued quest for commercial success, Carver submitted to Emmett J. Scott a list of 15 products "now ready for the market." A rubber substitute derived from sweet potato and various wood stains seemed promising; soybeans were also on the list. But by 1919 he wished to remain unentangled in the "business end" of his discoveries.

Prior to 1919 Carver focused his research attention on sweet potatoes and seemed well on his way to becoming the "Sweet Potato Man." But in Sept. 1919 he discovered peanut milk–"a discovery that ultimately shaped the course of his career... The creation of the Peanut Man began with the discovery of peanut milk, and Carver had great hopes for its commercial success. He envisioned it not as a substitute for cow's milk, but as a 'distinct product in the diet of the human family" with unique qualities and uses... Carver also believed that peanut milk provided a cheap source of protein, for a pint could be made from only a '3 ounce glassful of peanuts.' Indeed he claimed his method of making milk was more efficient than that of a cow... Others seemed to agree that peanut milk was a viable commercial item, but Carver's dreams of finally providing a practical product were dashed when he learned that an Englishman had already patented a process for making peanut milk in 1917... In 1921 Carver considered taking 'out a patent over his by proving my process is superior in many ways,' but he never did, and the Englishman was unable to exploit the patent profitably, possibly because he demanded $150,000 and a 3 percent royalty."

In June 1923 Carver won the prestigious Spingarn Medal of the NAACP. (The NAACP had been organized in 1909 during the heyday of Jim Crow legislation as an alternative to Booker T. Washington's accomodationist program; by 1923 the NAACP was winning the battle for leadership.) In 1928 Carver received an honorary doctor of science degree from Simpson College in Iowa, which he had attended from Sept. 1890 to 1891 mainly to study art. This honorary degree was especially appreciated, since questions about the title "Doctor" had previously embarrassed Carver.

In 1933 Henry A. Wallace became Secretary of Agriculture under Franklin D. Roosevelt and served from 1933-1945, later becoming Vice President of the United States. A renowned plant breeder from Iowa State College, he had been a boy there when Carver was a student and he later credited Carver with giving him his first and lifelong interest in plants. He called Carver the "kindliest, most patient teacher I ever knew." An innovative leader, Wallace sought ways to help hard-hit farmers out of the Depression. He shifted USDA's policy away from increasing agricultural production toward decreasing production and increasing demand by finding new uses for crops. "Although utilization research had never been completely ignored by the USDA, the Depression marked a turning point, with more emphasis on the kind of research that Carver had focused on for forty years. But when the USDA turned serious attention to this field, it did so with a level of funding that quickly made Carver's work obsolete. Section 202 of the Agricultural Adjustment Act of 1938 provided for four regional research laboratories 'devoted primarily to those farm commodities in which there are regular or seasonal surpluses, and their products and by products.' Its enactment was a major victory for the chemurgic movement, which recognized Carver as a patron saint... Thus 1938 marked the end of one phase of Carver's career. His [declining] health and limited funds prevented any significant new research. More and more he came to see himself as a trailblazer who had shown the way and was now ready to step aside and let others follow his path."

In 1935 Austin W. Curtis, Jr. had come to Tuskegee and soon been accepted by Carver as his assistant. The year 1937 marked the beginning of what became a deluge of awards–thanks in part to help from Tuskegee and Curtis. That year Carver was invited to speak at a chemurgic conference hosted by Henry Ford in Dearborn, Michigan. His speech was well received. He was invited to the main banquet but, because of his feels concerning segregation, he made a point of sitting outside the hall until everyone had eaten, "even though Henry Ford considered him one of the most honored guests." "Ford's interest in the chemurgic movement drew him to Carver, and after they finally met at the Dearborn conference they corresponded and visited each other regularly. They shared eccentric genius and an enormous mutual respect." Carver admired Ford's policy of hiring blacks for both skilled and unskilled jobs in his automobile plants.

On 10 Feb. 1940 the George Washington Carver Foundation was officially incorporated–again with key help from Austin Curtis. As early as July 1937 a flyer soliciting contributions had been distributed, but it was mostly funded by Carver's life savings of $32,374. A museum became one of the foundation's main activities.

A photo (p. 288) shows Carver and Ford standing together. Carver was also a close friend of Henry A. Wallace.

In 1939 Carver, though his health had begun to decline

rapidly, traveled to Ways, Georgia, for the dedication of the George Washington Carver School, established by Henry Ford on his Ways plantation. Carver spent the entire day with Ford. In 1942 extensive press coverage attended a "tribute by Henry Ford, who erected a Carver memorial cabin at Greenfield Village and established a nutritional laboratory in Carver's honor at Dearborn. Carver went to Michigan for several weeks..." Address: Assoc. Prof. of History, North Carolina State Univ.

1120. *SoyaScan Notes.* 1981. When were small-seeded soybean varieties bred specifically for making natto first released or licensed, and by whom? (Overview). Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** 1915–*Ko-tsubu-daizu* ["small-seeded soybean"]. "40112. No. 7... used for *miso* and *natto."* Received 8 March 1915 'From an exhibition in Kawamata, near Fukushima City.' Source: USDA Bureau of Plant Industry, Inventory. 1918. "Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from January 1 to March 31, 1915. Nos. 39682 to 40388." No. 42. 123 p. April 17. See p. 69.

Traditional–Jizuka. Smallest, from Ibaraki prefecture. Source: Ontario Soya-Bean Growers' Marketing Board. 1982. "Canadian soyabean mission, South East Asia, Feb. 12th–27th, 1982: Mission member reports." Chatham, Ontario: Ontario Soya-Bean Growers' Marketing Board. 12 p. Feb.

Traditional–Suzuhime. Small, from Hokkaido. Source: Ontario Soya-Bean Growers' Marketing Board. 1982. "Canadian soyabean mission, South East Asia, Feb. 12th–27th, 1982: Mission member reports." Chatham, Ontario: Ontario Soya-Bean Growers' Marketing Board. 12 p. Feb.

Traditional -

1981–Nattawa. MG-0. Developed by Agriculture Canada, Ottawa. Source: Richard Bernard 1992. "Additions to Table 6 of USDA Technical Bulletin 1746."

1981–Hartz 936X. MG-6. Sources: Griffis and Widermann. 1992. *Ibid.* p. 6.

1983–Chico. MG-00. Source: Griffis, Gil; Wiedermann, Lars. 1992. "Marketing food-quality soybeans in Japan: A manual on how to profit from the niche market in Japan for value-added soybeans. 5th ed." St. Louis, Missouri: United Soybean Board. 25 p. (Report). See p. 5-6.

1985–Canatto. MG-000. Developed by Agriculture Canada, Ottawa. Source: Richard Bernard 1992. "Additions to Table 6 of USDA Technical Bulletin 1746."

1985–King Natto. MG1. Sources: Griffis and Widermann. 1992. *Ibid.*

1986–Nattoking 86. Developed in Canada by N.R. Bradner of King Grain. Source: Beversdorf, W.D.; Buzzell, R.I.; Ablett, G.R.; Voldeng, H.D. 1995. "Soybean." In: A.E. Slinkard and Douglas R. Knott, eds. 1995. Harvest of Gold: The History of Field Crop Breeding in Canada. Saskatoon, Saskatchewan: University Extension Press, Univ. of Saskatchewan. ix + 367 p. See p. 153-66. Chap. 13. See p. 9.

1986–Vance. MG-V. Sources: (1) Griffis and Widermann. 1992. *Ibid.* (2) University of Illinois, Dep. of Agronomy. 1993. "USDA Soybean Germplasm Collection: Public varieties (United States and Canada)." Urbana, Illinois. 3 p. Feb. 16. Unpublished typescript. Beversdorf, W.D.; Buzzell, R.I.; Ablett, G.R.; Voldeng, H.D. 1995. "Soybean." In: A.E. Slinkard and Douglas R. Knott, eds. 1995. Harvest of Gold: The History of Field Crop Breeding in Canada. Saskatoon, Saskatchewan: University Extension Press, Univ. of Saskatchewan. ix + 367 p. See p. 153-66. Chap. 13.

1987–Nattoking 87. Developed in Canada by N.R. Bradner of King Grain. Source: Beversdorf et al. 1995, p. 9

1988–NattoKing K87, Nattoking 88. MG-1. Developed in Canada by N.R. Bradner of King Grain. Source: Beversdorf et al. 1995, p. 9. Griffis & Widermann. 1992. *Ibid.*

1989–Camp. MG-V. Developed by Virginia Agricultural Experiment Station. Source: Richard Bernard 1992. "Additions to Table 6 of USDA Technical Bulletin 1746."

1989–IL1 and IL2. Developed by University of Illinois Agricultural Experiment Station. University of Illinois, Dep. of Agronomy. 1993. "USDA Soybean Germplasm Collection: Public varieties (United States and Canada)." Urbana, Illinois. 3 p. Feb. 16. Unpublished typescript.

1989–Minnatto. MG-0. Developed by Minnesota Agricultural Experiment Station. Source: Richard Bernard 1992. "Additions to Table 6 of USDA Technical Bulletin 1746."

1989–Nattosan. MG-0. Developed by Agriculture Canada, Ottawa. Source: Richard Bernard 1992. "Additions to Table 6 of USDA Technical Bulletin 1746."

1989–Hartz 914 and Hartz 922. MG-6. Sources: Griffis and Widermann. 1992. *Ibid.* p. 6.

1989–SS201 and SS202. Developed at Iowa Agricultural Experiment Station. Bernard, Richard L. 1999. "Summary of research & breeding programs for food type soybeans." Urbana, Illinois. 3 p. Feb. Unpublished typescript.

1989–Suzumaru [Suzu-maru]. Developed by the Hokkaido Central Agricultural Experiment Station, Hokkaido, Japan. Sources: (1) Biological Abstracts, Vol. 87. No. 9. It yielded 30.9 tonnes per hectare on average in performance tests during 1984-1987. (2) Hosoi, Tomohiro; Kiuchi, Kan. 2003. "Natto–A food made by fermenting cooked soybeans with *Bacillus subtilis* (*natto*)*."* In: Edward R. Farnworth. 2003. *Handbook of Fermented Functional Foods.* Boca Raton, Florida: CRC Press. 390 p. See p. 227-50. Natto makers prefer to use certain soybean varieties such as Suzuhime and Suzumaru which are grown in Hokkaido, Kosuzu in Iwate, Miyagi, and Akita Prefectures, and Natto-Shoryo [= Natto-kotsubu] in Ibaraki Prefecture. These Japanese cultivars are registered with the Ministry of

Agriculture, Forestry and Fisheries (MAFF).

1989–TNS. Developed in Canada by Harvey Voldeng at CES in Ottawa. Sources: (1) Source: Beversdorf et al. 1995, p. 9. (2) Bernard, Richard L. 1999. *Ibid.*

1989–Vanatto. Developed in Virginia, USA. Source: Chowning, Larry S. 1989. "Soybean marketing efforts in Japan earn state honor for local farming operation." *Southside Sentinel* (Urbanna, Virginia). Feb. 2. Recently, Montague Farms (owned by Bill Taliaferro of Center Cross in Essex County) introduced Vanatto (which stands for Virginia Natto), a brand of Virginia-grown soybeans for the specific purpose of making natto. For nearly 5 years, the Taliaferros worked to develop the market in Japan, knocking on doors. "Since establishing the market in Japan, the Taliaferros have over 40 growers in Maryland and Virginia growing the small variety of soybean used to make natto.

1994–Pearl. Developed by Thomas Carter, USDA plant breeder stationed at North Carolina State University (NCSU). Pearl is adapted to North Carolina growing conditions. Source: *Seed World.* 1994. "Soybean tailored to natto market." June. p. 58.

1995–Danatto. Bernard, Richard L. 1999. *Ibid.*

Pureunkong–1997. Plant Breeding Abstracts, Vol. 67 states: Pureunkong was selected from the cross between the local cultivar Chungsaek- namulkong (green seed coat) and L78-379 made in 1982.

2003–Natto-Shoryu. Grown in Ibaraki Prefecture. Source: Hosoi and Kiuchi, 2003.

Date unknown–Chohakuzan. Bernard, Richard L. 1999. *Ibid.* Chohakuzan is a small-seeded parent used for breeding natto-type soybeans. Address: Founder, Soyinfo Center, Lafayette, California.

1121. 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.

1122. Windish, Leo G. 1981. Dr. E.E. Hartwig, Research Agronomist, Crops Division, Agricultural Research Service, U.S. Department of Agriculture, Delta Branch Experiment Station, Stoneville, Mississippi (Document part). In: Leo Windish. 1981. The Soybean Pioneers: Trailblazers, Crusaders, Missionaries. Galva, Illinois: Published by the author. viii + 239 p. See p. 223-25. Chap. 43. • ***Summary:*** A good, detailed biography of this pioneering USDA soybean breeder and germplasm collection curator.

"No history of soybean pioneering would be complete without acclaiming the research work of Dr. E.E. Hartwig and his colleagues. Great credit is due all of the research personnel at the agricultural experimental stations in each of those states in the south. The use of soybeans throughout the south in a relatively short period of time spread like a 'prairie fire.' In fact, we might borrow a word from a popular TV show and term the growth of soybeans in the south as 'incredible.'

"Perhaps one the key factors in the rapid increase can be attributed to the introduction of new varieties, increased yields, phytophthora resistance, and Bedford, a new soybean resistant to cyst nematodes. Bedford is the result of the cooperative efforts of two ARS USDA research

workers, E.E. Hartwig located at the MAPES Delta Branch, Stoneville, Mississippi, and James Epps, located at the West Tennessee Experiment Station at Jackson.

"Dr. E.E. Hartwig's reply to our letter seeking information on the early use of soybeans in the south, is reprinted. Here is Dr. Hartwig's most interesting reply:

"Dear Mr. Windish: I have your letter of January 21 in which you state that you are working on a history of the soybean in the U.S. and would be interested in having additional background information on the soybeans in the south. I began my work with North Carolina in March, 1943. The major varieties being grown in North Carolina at that time were Haberlandt, Tokyo, and Woods Yellow. All shattered very readily as soon as they had reached maturity. We had a small increase of the variety Ogden which was developed in Tennessee. Ogden was a better producer than the older varieties, but also shattered very soon after reaching maturity and had green seed coats which were objected to by the Japanese buyers when they had indicated they were buying yellow soybeans.

"In 1943, there were still some one-row harvesters in operation in North Carolina. These harvesters were pulled by a pair of mules and had a beater which rotated and hit the plants and knocked out the seed. From this standpoint the shattering characteristic of the varieties made this method of harvest workable. However, seed flew in all directions and only a portion of the seed went into the container on the harvester.

"A moderate size acreage of soybeans to be harvested for hay was grown in many of the southern states. Many of these were black seeded and had a rather viney plant type. As growers later shifted to growing types of seed for harvest, the nodulating bacteria had already been established in the soil through the growing of hay varieties.

"Many of the varieties introduced from northwestern China, where soybeans were being grown for grain production, were well suited for production in the north central states. Consequently, production was started in that area through the growing of direct introductions from China. However, there was no comparable grain producing region in China or Korea having a latitude similar to the southern U.S. and, consequently, it was necessary to develop varieties for production in the south before the crop could gain acceptance.

"As I view the situation, shattering of seed at maturity was not a problem to the Asiatic farmer since he would usually have less than one acre as his total crop, which could be cut slightly green and, with the shattering characteristic, it was easier to tramp out the seed. For our mechanized harvesting it was essential to have seed holding.

"I transferred to Mississippi in 1949. At that time there was a small acreage of soybeans planted for harvest in the State of Mississippi. The Ogden variety was the best producer. However, growers regularly reported that harvested yield went down each day of harvest because of shattering. When we released the Lee variety in 1954, we stated it would hold its seed six weeks after it was ready for combine harvesting. Farmers were very skeptical and some left a few rows standing the first time they grew them just to see how long it might hold its seed.

"At the time we started our breeding program to develop improved types in 1943, we also initiated studies on cultural practices. By the time interest began to develop in soybean production in the mid-1950's, we had information showing that planting should not be made before day length reached 14½ hours in early May and also information on rate of planting, and so forth. Many of our growers had been interested in planting in early April in order to get the planting out of the way before they were to start cotton planting. These early plantings gave very poor results because of early flowering being initiated by the shorter days of early April.

"We have attempted to develop a series of varieties covering a range of maturity so that larger growers could plant a sequence of varieties covering a range of maturity of nearly one month. We have also developed varieties giving proper maturity for the different production regions. We have also had to give considerable attention to building in resistance to diseases and nematodes and now, also giving attention to building a resistance to leaf feeding insects.

"I am enclosing descriptive material of several of the varieties that we have released over the years. Should you have additional questions, I would be glad to attempt to answer them for you.

"Sincerely, Edgar E. Hartwig, Research Agronomist." Address: 101 Exchange St., Galva, Illinois 61434.

1123. Evans, Barry. 1982. Re: The American Miso Company announces the opening of its miso shop in North Carolina. Linden's Elf Works is sole agent in marketing and distribution. Letter to Friends of The American Miso Company, Jan. 4. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Friends–We at The American Miso Company are proud to announce the opening of our miso shop in Western North Carolina. This long awaited dream of making American miso has evolved from a genuine need here in the United States for an unpasteurized miso made with organic ingredients and fermented under natural conditions in large wooden vats."

"Through the joint efforts of producer John Belleme and his teacher, Takamichi Onozaki from Yaita, Japan, we are now making absolutely delicious miso that will strengthen the body and delight the palate.

"The Lindenself Foundation, doing their business as Linden's Elf Works, located in Piedmont, North Carolina, has been appointed as the sole agent in marketing and distribution of The American Miso Company brand products... Their address is Route 1, Box 43-D, Rougemont,

North Carolina. Your phone contact is John Troy at... 919/364-2723. Enclosed is the Linden's Elf Works distributor price sheet which includes all the pertinent information for your upcoming Spring catalogue. With kindest regards, Barry Evans, President."

Note 1. This letter was precipitated by Erewhon Trading Company's announcement in Nov. 1981 that it was filing for Chapter 11 bankruptcy.

Note 2. This is the earliest document seen (June 2017) that mentions the company's new name, "The American Miso Company."

Note 3. This is the earliest document seen (July 2017) that mentions John Troy of Elf Works in connection with miso or soy.

Note 4. Talk with Barry Evans, owner of American Miso Co. 2000. June 29. Linden's Elf Works never distributed any miso made by AMC; Great Eastern Sun, Barry's new company, was the distributor. During the first year or two, John Troy purchased a significant percentage of the miso made by AMC for his sauces and dressings. To this day, he remains an important friend and advisor, but the percentage of miso he buys is now quite small. Joel Dee, a pioneer with his Miso Cup, worked with John Troy. Joel lived in the little town Saluda, North Carolina, where John Belleme lives today. Last year, Joel introduced Organic Miso Cup using miso from AMC; he is now a significant customer. Address: President, The American Miso Company, Rutherfordton, North Carolina.

1124. Cashion, Jerry C. 1982. Re: North Carolina Highway historical marker in Elizabeth City, North Carolina: Honoring the soybean processing work of W.T. Culpepper. Letter to Mr. W.C. Meekins, Jr., Carolina Telephone and Telegraph Company, 103 South Road St., Elizabeth City, NC 27909, Feb. 2. 1 p. Typed, with signature on letterhead. [1 ref]

• ***Summary:*** "At its December 11, 1981 meeting, the North Carolina Highway Historical Marker Advisory Committee considered your request for a marker for Soybean Processing. I am pleased to inform you that the request was approved with the following inscription:

"Soybean Processing: "Commercial processing of domestic soybeans in U.S. began in 1915 at plant two miles north. Manager was W.T. Culpeper [sic, Culpepper]."

"The marker is to be located on U.S. 17 (corner of Ehringhaus and McMorrine streets) in Elizabeth City. This marker will be erected when funds permit.

"The committee, and we in Archives and History, appreciate your efforts to preserve our state and local history. If you have other proposals, I shall be happy to present them at a future meeting of the committee.

"Sincerely yours, Jerry C. Cashion." Address: Supervisor, Research Branch, Archaeology and Historic Preservation Section, North Carolina Dep. of Cultural Resources, Raleigh, NC 27611.

1125. Wollner, Joel. 1982. History of Erewhon, macrobiotics, and soyfoods in America (Interview). Conducted by William Shurtleff of Soyfoods Center, Feb. 2. 2 p. transcript.

• ***Summary:*** Evan Root was the first attendant at the Erewhon retail store, below street level at 303-B Newbury Street. He lacquered the walls with Michio. Evan is a great storyteller, very intelligent. The initial store was just one room, about10 by 20 feet. Very few people came in to buy food, so it was more like a stock room than a store. Some evenings there were lectures there. Redwing Books now occupies that space. Most of the food (a tin of miso, a keg of tamari) was just being sent by the Kushis' friends from Japan as gifts; it didn't go through customs.

The Kushis got nigari and made tofu at home. It was not for sale, but for dinner guests and cooking classes. Joel made some tofu using lemon juice when nigari was not available.

As tofu started to become more popular, Erewhon started to buy it from a tofu maker in Boston's Chinatown. First they just bought and sold that tofu, but before long (in about 1973-74) they convinced him to start making nigari tofu for them. They guaranteed to buy what he made, and they sold him the nigari at cost. This might have been the first nigari tofu made in USA. A lot of nigari tofu is still made in Boston's Chinatown. Joel thinks the tofu maker was located on Tyler, Street, perhaps Yah Kee. Nigari came in 66 pound sacks from Japan. Erewhon also sold small quantities of nigari in the retail store. Chinatown was Erewhon's main source of tofu until Laughing Grasshopper appeared.

What was the macrobiotic movement's contribution to the history of soyfoods in the United States? Macrobiotic teachers and students talked and wrote about them, ate them, and sold them. They felt soyfoods were an important part of a good diet. They educated people and developed a market for soyfoods. Few Americans had eaten miso and tofu at home before 1966–the year Erewhon started. Macrobiotics were the first Caucasian Americans to really use soyfoods regularly. Before that, soyfoods (except perhaps soy sauce) were just interesting oddities. Once could say that the macrobiotic movement introduced soyfoods to America.

As for tofu, Joel thinks that Michio Kushi's students misinterpreted his remarks about tofu being yin. Macrobiotics now eat tofu regularly, 3-4 times a week. There are endless ways to prepare it. It's been years since Joel has heard that tofu is "too yin."

What did *The Book of Tofu* (published in Dec. 1975) do for tofu? It expanded its relevance for the Western diet. Before that book, most of the tofu in the United States was consumed by people of East Asian ancestry.

Charles Kendall played a key role in making and introducing natto, mochi, and amazake to Caucasian Americans. He made these foods in his home and sold them locally. Initially, it was not a formal / legal business. But

today his business, Kendall Foods, sells $500 a week of these three foods. He has been making natto for 4-5 years. He was America's first Caucasian natto maker. Natto was served in macrobiotic restaurants in Boston.

The latest soyfood to hit Boston has been tempeh. It's been a phenomenal success. Macrobiotics are going crazy over it. Thom Leonard has been giving lots of tempeh classes for the past 1½ years. For more than a year, lots of sandwich makers in Boston have been making and selling tempeh sandwiches. Tempeh is made into cutlets, burgers, tempeh mock-tuna salad. Why is it so popular? Because it is rich and meaty in texture and flavor–the opposite of rice. Most macrobiotics crave rich, meaty foods.

Ron Kotzsch is very close to the Kushis. A very unpretentious person with a wonderful sense of humor, he is now teaching in North Carolina. He is friends with Helen and Scott Nearing. He toured China and Japan with John Denver, the singer and songwriter–who did a benefit for Michio's new college.

How does Joel see the future of Erewhon? He thinks the company will focus on manufacturing only. Now is the critical time. He'd give Erewhon a 30-70% chance of survival. Address: Boston, Massachusetts.

1126. Pukel, Sanford; Evans, Barry. 1982. Agreement for exchange of stock and resolution of corporate interests. Rutherfordton, North Carolina. 4 p. Feb. 26. Unpublished typescript. 36 cm.
• ***Summary:*** In this agreement Sandy Pukel gets out of Oak Feed Miso and Barry Evans gets out of Oak Feed Store and Oak Feed Restaurant by an exchange of stock.

Pukel and Evans have heretofore been shareholders in Oak Feed Store, Inc., Oak Feed Restaurant, Inc., and Oak Feed Miso, Inc. The parties agree that Barry Evans owns 50 shares of outstanding common stock (30% of total outstanding) in Oak Feed Store, and 100 shares of common stock (30% of total outstanding) in Oak Feed Restaurant. Sanford Pukel owns 1,500 shares of common stock in Oak Feed Miso. For the purposes of this agreement, the parties agree that the cost or other basis of Evans' stock was $180,000. and the cost of other basis of Pukel's stock was $91,500.

The parties desire to separate their above-stated stock interests by a mutual exchange of the shares of stock in the respective corporations. They agree that this transaction is effective as of 31 Jan. 1982, even though certain transfers and signing of documents may take place subsequent to that date.

Signed: Sandy Pukel and Barry E. Evans. Address: Rutherfordton, North Carolina.

1127. Edward & Sons Trading Co. 1982. Edward & Sons advances the theory of natural selection [Miso-Cup and Brown Rice Snaps] (Ad). *New Age Journal* (*Massachusetts*). Feb. Inside front cover.
• ***Summary:*** A large photo in this full-page color ad shows a bowl of steaming miso soup surrounded by Brown Rice Snaps.

Note: This ad also appeared in *Vegetarian Times* (March 1982, p. 31–black and white; and Nov. 1983, p. 27–color). Address: Saluda, North Carolina 28773.

1128. Belleme, John. 1982. Re: New developments at American Miso Co. Letter to William Shurtleff at Soyfoods Center, March 3. 2 p. Typed, without signature or letterhead.
• ***Summary:*** "We got a really good response from our light miso. People reported using it for dressings, dips and even desserts. We have decided to market our white miso through our wholesale company in bulk only during the winter. We also plan to market a mellow barley and a mellow rice miso, both of which should have a good shelflife.

"Mr. Onozaki just visited our factory for two weeks. He said our koji is some of the best he has ever seen. I was really worried about our koji and his comments settled my anxious mind. He also said our long-term miso is developing fine.

"The ownership of our factory is finally settled. The following will not be participating: Erewhon, Michio [Kushi], Mitoku, Johsen, Oak Feed and Sandy Pukel. This leaves only Barry Evans and myself, we are now the sole owners."

"I am sending you 10 pounds of Mr. Onozaki's rice miso. It is hopefully just like the miso we are making. We are getting a really good response from the East Coast macros; they love Mr. Onozaki's miso. Last year we imported 20,000 pounds.

"Barry and I are starting a wholesale company in Asheville. It's tentatively called Great Eastern Sun Trading Company. We are specializing in hard-to-get macrobiotic foods–will send you a catalog in a few weeks."

Note 1. This is the earliest document seen (June 2017) that mentions Great Eastern Sun, a macrobiotic trading company in North Carolina.

Note 2. On 31 May 1982 John wrote a 2-page typed letter to Dr. Hiroshi Ito at the National Food Research Institute asking for help in making a white miso. Address: Route 3, Box 541, Rutherfordton, North Carolina. Phone: (704) 287-2940.

1129. Meekins, William C. 1982. Re: Highway historical soybean marker in Elizabeth City, North Carolina. Role of Mr. Culpepper. Letter to Supervisor, Research Branch, Archaeology and Historic Preservation Section, North Carolina Dep. of Cultural Resources, 109 East Jones St., Raleigh, North Carolina 27611, March 3. 2 p. Typed, with signature.
• ***Summary:*** "Dear Dr. Cashion: There is no question about the authenticity of the proposed wording for the soybean

marker at Elizabeth City. However, there is some concern about the inference to W.T. Culpepper as being manager when his role was more than that. He pioneered the project at Elizabeth City.

"Jane Culpepper, who is W.T. Culpepper's daughter-in-law, has just produced the enclosed documents. One is a note from Lindsay Warren to the late Mrs. W.T. Culpepper and the other a news clipping from the *Daily Advance.* In each there is reference to a plaque which was awarded to Mr. Culpepper in recognition for his work with the soybean. According to the *Daily Advance* article, it was awarded to him by the U.S. Department of Agriculture. Jane Culpepper told me the plaque has been misplaced so the wording on it is not immediately available.

"With the research George Wood is doing on the soybean, should produce the wording on the plaque. This would further substantiate the fact of Mr. Culpepper's pioneering effort on the soybean. One thing about it, we want the information to be correct and the conveyance of thought as to Mr. Culpepper's connection with the program to be accurate.

"Now that the marker has been approved by your committee, you indicated same concern by some of the members about having Mr. Culpepper's name mentioned at all. It would be better to have it removed than leave the wording as is. Rather a reference to Mr. Culpepper's connection as a pioneer to the process would be the better.

"I am not certain how long it will take to determine the wording of the lost plaque. With the additional information which has developed these last few days would warrant consideration on the part of the committee to consider a change in reference to Mr. W.T. Culpepper. Rather than the proposed wording 'Manager was W.T. Culpepper', change it to 'W.T. Culpepper pioneered the project'. In my judgment the wording on the plaque, once it's known, will not add or distract but reinforce W.T. Culpepper's pioneering effort.

"It will be appreciated if you will poll the members as to the change and hopefully they will concur.

"I want to thank you again for your help.

"Sincerely, W.C. Meekins, Jr. WCM,JR/vg Attachments
"cc: Mr. J. F. Wilder, Executive Vice President, N.C. Soybean Producers Association, Inc., Raleigh, N.C.

"Honorable Vernon G. James, House of Representatives, Raleigh, N.C.

"Mr. Levin Culpepper, Postmaster, Elizabeth City, N.C.

"Mr. George M. Wood, Camden, N.C." Address: 1003 Woodruff Ave., Elizabeth City, NC 27909.

1130. Lauser, Greg C. 1982. History of Cargill's involvement in the soybean processing industry. Minneapolis, Minnesota. 5 p. March 15. Unpublished manuscript.

• ***Summary:*** Soybean processing: 1942–Cargill entered the soybean processing business with the acquisition of expeller plants in Springfield, Illinois (sold in 1950), and Cedar Rapids (east), Iowa. Note: These two plants were purchased from Ike Sinaiko and Joe Sinaiko respectively, but probably in 1943.

1943–Cargill acquired Plymouth Processing Company's plant and grain elevator at Ft. Dodge, Iowa (sold in 1971 [to Land O'Lakes]).

1945–The company acquired from Honeymead solvent extraction plants in Spencer and Cedar Rapids (west), Iowa. The solvent-extraction process is used in modern plants today.

1946–Cargill acquired the Washington, Iowa, soybean crushing plant and began crushing flax seed at a plant it built at Port Cargill in Savage, Minnesota. The same year, the company acquired from the Falk Corporation a flax processing plant in Minneapolis. Since 1967, that plant also has been crushing sunflower seeds.

1947–The company opened a soybean crushing plant at Savage, Minnesota.

1950–Cargill built its first plant specifically designed to crush soybeans in Chicago to serve domestic oil and meal markets. In 1956, a refinery was built adjacent to the crushing plant that produces industrial refined non-edible oil used in paints and other protective coatings and in vinyl products. Cargill also acquired a flax crushing plant in Philadelphia that was closed as a crushing plant in 1953.

1957–Cargill opened a soybean processing plant in Memphis, Tennessee. A second plant was added adjacent to the first in 1970.

1959–Cargill expanded the scope of its soybean crushing activities to the Southeast by opening a facility in Norfolk, Virginia, and acquired a plant in Sioux City, Iowa, from Sioux Industries.

1960–The Wichita, Kansas soybean crushing plant was acquired from the Soy Rich Company.

1961–The company acquired the Des Moines, Iowa soybean crushing plant from Spencer-Kellogg Co. In 1967, Cargill opened its first domestic salad oil refinery adjacent to this crushing plant.

1965–Cargill began crushing soybeans overseas at its new plant in Tarragona, Spain. The company opened a second crushing plant in 1968 in Amsterdam, the Netherlands. A third seed crushing plant [named Soja-France, with Dominique de Clerq as chairman of the board and general manager] was opened at St. Nazaire, France, in 1970. A crushing plant at Reus, Spain, also was added in 1970 and Australian cottonseed crushing operations were acquired in 1972.

1967–The company opened the Gainesville, Georgia, soybean processing plant. A refinery, Cargill's first to produce hydrogenated or "hardened" oil for the Southeastern food manufacturing industry, was built adjacent in 1979.

1970–Cargill built the Fayetteville, North Carolina, crushing plant and a refinery was added in 1976.

[1971–Soybean crushing plant at Fort Dodge, Iowa, sold

to Land O'Lakes.]

1973–Soybean processing complex began operations at Ponta Grossa, Brazil.

1975–Acquired plant in Osceola, Arkansas.

1976–Soybean plant was built at Barcelona, Spain.

1977–Soybean plant constructed and operations began at Brest, France.

1978–The company opened a soybean processing plant in Sidney, Ohio, to serve domestic meal and oil markets. This facility was the company's first soybean processing plant designed to burn coal as its source of power.

1980–Construction began on vegetable oil refinery adjacent to Wichita soybean crushing plant and operations started in late 1981. A crushing plant also was acquired in Antwerp, Belgium.

1981–Company acquired a soybean crushing and vegetable oil refinery complex in Hartsville, South Carolina.

1982–Cargill acquired a soybean crushing plant in Monte Alto, Brazil.

Summary. Soybean Crushing: The company now operates soybean processing plants in the United States, the Netherlands, Belgium, France, Spain, Brazil. The plants range in capacity from 20,000 to nearly 120,000 bushels a day. In the U.S., the company operates 15 plants in Iowa, Illinois, Minnesota, Kansas, Virginia, North Carolina, South Carolina, Tennessee, Georgia, Arkansas and Ohio. It operates 6 U.S. refineries located in Gainesville, Georgia; Fayetteville, North Carolina; Des Moines, Iowa; Hartsville, South Carolina; Chicago, Illinois and Wichita, Kansas. Address: Public relations, Cargill, P.O. Box 5625, Minneapolis, Minnesota 55440.

1131. *SoyaScan Notes.* 1982. Chronology of Great Eastern Sun Trading Company in North Carolina. 26 Jan. 1994. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** 1982 March–The company is founded by Barry Evans. Martin Roth is the first manager. The original purpose is to be a distributor for the miso made by American Miso Company. But the company soon decides to import Japanese macrobiotic products from Mitoku (the first order was placed in Jan. 1982) and later to become a manufacturer.

1984 July–Great Eastern Sun starts to import Ah Soy (soymilk, in chocolate, vanilla, and original flavors). Made in Japan by San-iku Foods, and sold in a stand-up foil retort pouch, it soon becomes very popular. Don DeBona is the first product manager. Address: 92 Macintosh Rd., Asheville, North Carolina 28806.

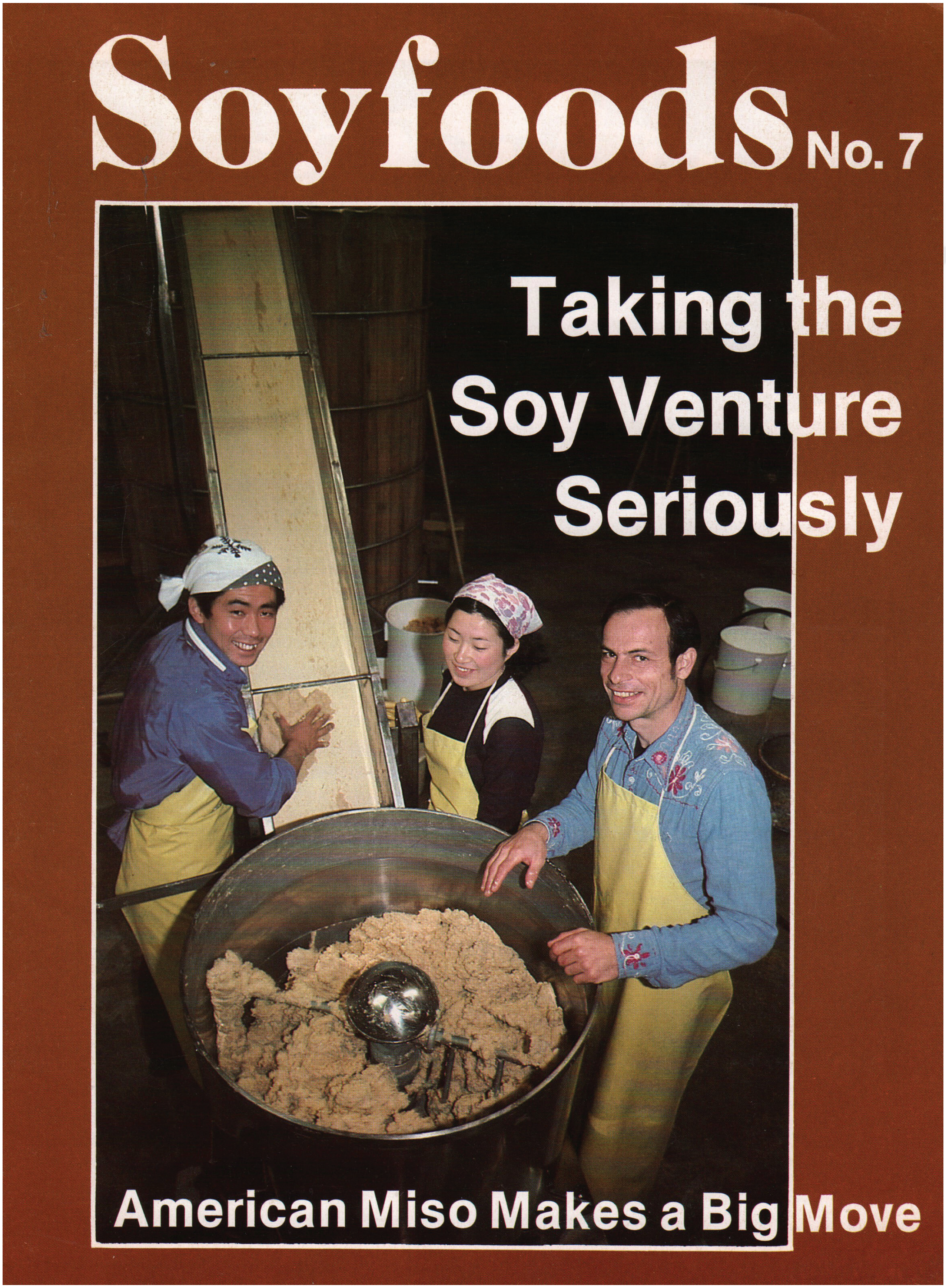
1132. Evans, Barry. 1982. Amendment to Articles of Incorporation of Oak Feed Miso, Inc. Dade County, Florida. 3 p. May 5. Unpublished typescript.
• ***Summary:*** This amendment officially changes the name of the corporation to American Miso Company from Oak Feed Miso, Inc. The change was approved by the stockholders and board of directors at the annual meeting of the shareholders held on 19 April 1982 at the North Carolina office of the company in Rutherfordton, North Carolina. Signed on 5 May 1982 by Barry Evans, President, and Janet Belleme, Secretary.

A separate one-page document on State of Florida letterhead shows that this Amendment was filed with the State of Florida Department of State on 19 May 1982. The charter number of this corporation is 613063. Address: Dade County, Florida.

1133. Leviton, Richard. 1982. Tour: April 21-28, 1982. Itinerary and notes from trip to study soyfoods on the East Coast and in the Midwest. Colrain, Massachusetts. 21 p. Unpublished typescript. 28 cm.
• ***Summary:*** Visited: Nature's Grace (Honesdale, Pennsylvania), Real Foods (Allentown, PA), Cricklewood Soyfoods (Mertztown, PA), Kingdom Foods (Washington, DC), Sam Sung Tofu Co. (Washington, DC), Edward & Sons Trading Co. (Saluda, North Carolina), American Miso Co. (Rutherfordton, NC; April 24), Blue Ridge Soyfoods (Fletcher, NC), The Farm (Summertown, Tennessee), Everybody's Restaurant (Nashville, TN), Soya Food Products (Cincinnati, Ohio), Rising Sun Soy Farms (Columbus, OH), Hip Pocket Tofu Deli (Columbus, OH), Legume (Verona, New Jersey), The Bridge (Middletown, Connecticut). Includes directions by car to each place. Address: 100 Heath Rd., Colrain, Massachusetts 01340. Phone: 413-624-5591.

1134. Leviton, Richard. 1982. American Miso makes a big move down south. *Soyfoods.* Summer. p. 18-22.
• ***Summary:*** A feature cover story about John and Jan Belleme and their American Miso Co. in North Carolina. Richard Leviton visited the company in April. "Jan and John Belleme are serious about making miso. After a strenuous 8 months apprenticeship in Japan with master misomaker Takamichi Onozaki and a $300,000 investment in buildings, land, and equipment, the Bellemes began fulltime, large scale miso production at their Rutherfordton, North Carolina, plant in August, 1981."

Situated on 100 acres in the rural southwestern corner of North Carolina, the miso operation occupies two buildings, including a 3,400 square foot Butler style metal-frame concrete base structure for miso processing and a smaller 1,000 square foot garage-style building for rice polishing and storage. The Bellemes live in a comfortable farmhouse up the hill, just a 5-minute walk away. Its important to be near the koji room when you are trying to carefully monitor the growth of 1,200 pounds of rice koji in a traditional koji room with no thermostat. The company "has struck a careful balance between the traditional approach (as with koji, which requires skill and personal attention) and labor-saving mechanization (as with bean washing, soaking, cooking,


Soyfoods No. 7
Taking the
Soy Venture
Seriously
American Miso Makes a Big Move

ROOTS OF THE AMERICAN MISO COMPANY

mixing," and moving). The company has the capacity to make 500,000 lb/year [226.8 metric tons/year] of miso. They presently make 3,000 to 4,800 lb/week of light and dark misos. A color photo on the cover shows John Belleme making miso with Kaoru Onozaki (Mr. Onozaki's eldest daughter) and Haruo (his adopted son–since he had no sons of his own).

Minnesota-grown Prize soybeans are mechanically washed, then transported by conveyor into a 200-gallon (400 lb capacity) pressure cooker, which is controlled by a push button. When done, the removable steamer basket inside the cooker is moved by overhead crane and the soybeans are discharged through the bottom onto a large cooling table, where they are spread by shovels then allowed to cool–with the aid of at least one electrical fan. A push button then causes the table to tilt; the beans are then run into an extruder, and ground to a paste, which is later mixed with the handmade koji. "Belleme's koji room combines both traditional and automatic features, from manually operated vents to complex humidity and temperature monitors. The koji room is actually two adjoining rooms with a connecting door."

This excellent article concludes: "For the American Miso Company, the immediate future is replete with energetic plans. The Bellemes will convert their present home into a summer residential center for students interested in studying fermented foods and natural living. Meanwhile John and Jan will build another house for themselves elsewhere on the property. A new plant for packaging prepared miso products is envisioned and there is much talk of shoyu production in a few years. With misomakers as serious about their venture as the Bellemes, the American Miso Company will certainly have a major influence on miso awareness in America."

Thirteen black-and-white photos show in detail how miso is made at American Miso Co.

A full-page sidebar (p. 22), titled "Roots of the American Miso Company," tells about the family of Takamichi Onozaki and a magnificent half-page black-and-white photo shows the family–16 members strong.

Talk with Barry Evans, owner of American Miso Co. 2000. July 6. In 1982 the company's capacity was far less than 500,000 lb/year; there were only eight vats, each of which held about 6,000 lb of miso (which took one year to mature), for a total capacity of about 50,000 lb/year–or roughly one-tenth of what the article says. Moreover Bellemes made much less than 3,000-4,800 pounds of miso per week. Nor did the company make any light miso during the first few years. Address: Colrain, Massachusetts.

1135. Leviton, Richard. 1982. Touring for soyfoods. *Soyfoods.* Summer. p. 32-37, 41.
• ***Summary:*** At The Farm in Tennessee, the soy dairy, managed by Chuck Haren, "operates 3 days a week, turning out 7,500 lb/week of calcium sulfate tofu for immediate consumption by the Farm's 1,300 soyfood lovers." They use a Sweco-Brown filtration system. The okara is composted. They make 600 gallons per week of fresh soymilk. Their tempeh shop makes 700 lb/week of fresh tempeh–the 7th largest in the USA. Both the tofu and tempeh plants have been used as training grounds for apprentices from Europe, South America, and Africa, who come to The Farm to stay for 6 month sessions. An ice cream manufacturer in Memphis makes their Ice Bean. Plenty is active in Haiti, where they are providing soymilk for malnourished children, and in Lesotho, South Africa, where they are aiding in the construction of a village soy dairy and demo site as part of the Motsemocha Village Technology Center. They recently conducted a Caribbean cruise with 8 soy technicians.

Legume: "Gary and Chandri Barat and Robert Shapiro have a booming company on their hands after 1 year of business with an impressive line of prepared frozen tofu entrees and desserts. Jan. 1981 rented facility in Verona, New Jersey. May 1981 Celantano started co-packing. Photos show: Chandri Barat, Gary Barat, and Robert Shapiro of Legume (see also photo on p. 3).

The following people and their companies are also discussed, with photos: Tim Nusser of Rising Sun Soy Farms (Columbus, Ohio). Jim Saunders of Real Foods (tofu shop in a supermarket in Allentown, Pennsylvania). Renate and Karl Krummenoehl of Cricklewood Soyfoods. Jamie and Nancy Stunkard of Nature's Grace. Joel Dee of Edward & Sons in Saluda, North Carolina (marketers of Miso-Cup). Henry Salazar of Sam Sung Tofu Co. Eileen Foote and Eileen Judge of Kingdom Foods. Bob Hunt of Blue Ridge Soyfoods. Soya Food Products in Cincinnati (Ben & Nina Yamaguchi). Rising Sun Soy Farms. Bill Lutz of Hip Pocket Tofu Deli (Columbus, Ohio). Robert Marrochessi and Bill Spear of The Bridge (Middletown, Connecticut, macrobiotic, run by Roberto Marrocchesi and Bill Spear. Began tofu production in March 1981). Suzy Jenkins and Laurie Praskin of Plenty (Summertown, Tennessee). Address: 100 Heath Rd., Colrain, Massachusetts 01340. Phone: 413-624-5591.

1136. *Coastland Times* (*North Carolina*). 1982. Soybean Festival planned for Elizabeth City Oct. 7-9. Aug. 17.
• ***Summary:*** "Elizabeth City–C. Wilson Hollowell probably did not realize the significance of it all when he cultivated the first domestically-produced soybeans in the United States at Bayside Plantation here in 1915. Nor did the Late W.T. Culpepper Sr., who squeezed the oil out of those beans that fall at the Elizabeth City Cotton Oil and Fertilizer Co. a few miles north on the Pasquotank River.

"The humble birth of the soybean in America will be commemorated during the harvest this fall with the North Carolina Soybean Festival Oct. 7-9 at the Albemarle 4-H Livestock Building south of here on U.S. 17... The state Division of Archives and History plans to install a marker on Eringhaus Street denoting the efforts of Hollowell and Culpepper."

1137. Meekins, William C. 1982. Re: Highway historical marker on A-70, Pasquotank County, for soybean processing in Elizabeth City, North Carolina: Honoring the work of W.T. Culpepper. Letter to Mr. George M. Wood, F.P. Wood & Son, Inc., P.O. Box 155, Camden, North Carolina 27921, Aug. 20. 2 p. Typed, with signature.
• ***Summary:*** "On February 2, 1982, I received a letter from Jerry Cashion, Supervisor, Research Branch, Archaeology and Historic Preservation Section of the North Carolina Department of Cultural Resources, Raleigh, North Carolina. In the letter was the approved wording for the soybean marker at Elizabeth City. It read: 'Soybean Processing–Commercial processing of domestic soybeans in U.S. began in 1915 at plant two miles north. Manager was W.T. Culpepper.'"

"Since then there has been more research on this project by the Archaeology and Historic Preservation Section and it was determined that Professor Charles B. Williams of Camden, North Carolina should receive recognition, if anyone should, for his pioneering effort in the soybean program."

The following handwritten note is enclosed: "William Thomas Culpepper (1884-1945) a native of Pasquotank County, is credited with being the first person to process soybeans commercially. This was done in 1915 at a site on Knobbs Creek, approximately 2 miles north of this location. Culpepper later served in the State House of Representatives, as postmaster of Elizabeth City, and was a state senator at the time of his death."

Note: This marker was placed on 19 Nov. 1982–according to a letter from W.C. Meekins, Jr. to W.R. Shurtleff dated 6 Jan. 1984. Address: 1003 Woodruff Ave., Elizabeth City, NC 27909.

1138. **Product Name:** Miso+Plus. All Natural Dip Mix [Chive, or Jalapeno].
Manufacturer's Name: Edward & Sons Trading Co.

(Importer). Made in Japan.
Manufacturer's Address: Route 1, Box 153, Saluda, NC 28773.
Date of Introduction: 1982 August.
Ingredients: Jalapeno: Miso (soybeans, rice, seasalt), onion, garlic, parsley, oregano, cumin, turmeric, jalapeno pepper. Chive: Miso, onion, parsley, garlic, chives, nutmeg, ginger, dill weed.
Wt/Vol., Packaging, Price: 6 oz (17 gm).
How Stored: Shelf stable.
New Product–Documentation: Spot in Soyfoods. 1983. Winter. p. 49. "Miso Dips Without Compromise." Slogan: "Convenience Without Compromise." Prepare by adding sour cream, yogurt, avocado, etc. Leaflet. 8½ by 11 inches, color. Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. Label. 1986. 8 by 6 inches. Plastic packet. Red, green, orange, yellow, black. Chive has an olive-green background. Jalapeno has a burgundy background. Both have color photo of vegetables surrounding dip. "No additives. No preservatives. Convenience without compromise." Gives serving ideas. "The story of Miso+Plus: Miso (pronounced mee'-so) is one of East Asia's most important soy foods. Recipes for this savory vegetarian delicacy date back over 2,000 years! Miso's flavor and versatility have been prized for centuries as the foundation for soups, stews, and many traditional dishes..."

1139. Hollowell, Frank W., Jr. 1982. To the editor: More on the Coast Guard Complex. *Daily Advance* (*The*) (*Elizabeth City, North Carolina*). Sept. 7.
• ***Summary:*** The Hollowell property has never been known as "Hollowell Plantation. The property which was to become known as Bay Side Plantation, was owned by John Hollowell and his predecessors in the 1700s and early 1800s.

"My grandfather, Christopher Wilson Hollowell, came from Perquimans County around 1830 to live and farm with his cousin, John. When John died, Wilson inherited the property.

"Wilson built 'Bay Side' in 1856. Around 1880 Mr. Hollowell planted the first soybeans with seeds obtained from China by a friend. Mr. Hollowell died in 1892."

"In 1939 Christopher Wilson Hollowell, Jr., Margaret Hollowell, and my father, Frank W. Hollowell, jointly sold to Pasquotank County and Elizabeth City 300 acres of the original plantation property. It was then donated to the federal government to establish the Coast Guard Air Station."

Note: This is the earliest document seen (June 2003) which gives the date "around 1880" as the date when Wilson Hollowell first planted soybeans in North Carolina, or which states that the seeds were "obtained from China by a friend." See also letter of 1984. Address: Elizabeth City, North Carolina.

1140. Mason, Delores. 1982. Festival may settle burning issue. *Daily Advance* (*The*) (*Elizabeth City, North Carolina*). Sept. 7. p. 1.
• ***Summary:*** The North Carolina Soybean Festival will be held on 7-9 Oct. 1982. A recent press release by the planners stated that "the late C. Wilson Hollowell grew America's first soybean in 1915 [sic] on the Hollowell farm, known as Bayside Plantation." In 1915 after the late W.T. Culpepper Sr. began to squeeze oil out of the beans, their use began to expand.

"The three-day affair will include a visit from Gov. James B. Hunt Jr., U.S. Rep. Walter B. Jones, Lt. Gov. Jimmy Green, North Carolina Agriculture Commissioner Jim Graham, along with local politicians." A photo shows a local soybean crop being harvested by a large harvester. Address: Advance staff writer.

1141. Quirk, Beatrice Taylor. 1982. Ah, so you want to try miso: A mountain couple is practicing the ancient art of making this Japanese food. *Carolina Lifestyle.* Sept. p. 23-25.
• ***Summary:*** Describes the work of John and Jan Belleme, and their American Miso Co. in Rutherford County, North Carolina. John Belleme is a 39-year-old Florida native who worked as a research biologist for the Veterans Administration in Miami, dealing mostly with cancer and chemotherapy. Thinking that there had to be a better way to deal with it, John started reading about natural foods, natural lifestyles, and traditional medicines in traditional cultures. In the mid-1970s the Bellemes adopted a macrobiotic diet, which is based on grains and includes only foods from the local environment. They eat no animal foods or dairy products, but they do eat fish.

Then in 1979 they left for Japan to study miso making with Takamichi Onozaki and his family, with whom they lived and worked for 8 months–in their 300-year-old home. They then returned to North Carolina, and spent almost a year building their miso factory, which began production in Sept. 1981. They made about 90,000 lb of light and dark miso in the first 9 months of operation.

A photo shows Jan Belleme and Japanese helpers preparing rice to make koji. Contains recipes for Light miso dressing for salad, Miso-broiled fish, and miso soup. Address: Charlotte, North Carolina.

1142. Leviton, Richard. 1982. The Perriers of soy foods: With large initial capital investments and national marketing plans, these companies are positioned for rapid growth. *In Business.* Sept/Oct. p. 53-56.
• ***Summary:*** Discusses three soyfoods companies: Legume, Soyfoods Unlimited, and American Miso Co. "While most companies in the industry operate on local or regional levels at best, these three progressive firms uphold nationwide market goals, have tied up large amounts of capital, and

nurture vigorous plans to capture the American mainstream market. Legume, located in Caldwell, New Jersey, and run by Gary and Chandri Barat, and Robert Shapiro, "distributes an impressive line of tastefully packaged, prepared convenience soyfoods in 40 states. Legume practically invented the product category, which includes tofu pizza, lasagna, ravioli, egg-plant Parmesan, tofu-vegetable pot pies, muffins, cakes, and tofu cheese-cakes. Currently the company, with weekly sales of $8,000, contracts out all its food production, thereby allowing its lean staff of three to concentrate on sales and marketing. The Barats expect 1982 sales to top $1 million with three employees, and $3 million by 1983 with only five workers." A good history of Legume begins: "Gary and Chandri Barat first caught wind of the swelling enthusiasm for soy products in July, 1979 at the Second Soycrafters Conference in Amherst, Massachusetts. They gathered over 500 pages of industry documentation and while uncertain of a specific product line, they were convinced that soyfoods, particularly prepared convenience offerings, were to be *the growth* area of the general food industry. Yet in their search for venture capital, holding only their prospectus as bait, they experienced difficulty... 'Let's taste the product,' potential investors demanded.

"The Barats lacked a track record in the food industry,... But today, investment money firmly in hand, Gary reflects: 'When raising money, make it a learning experience.' Ask a lot of questions. Find out why people say no, listen carefully, study their answers, then make adjustments to address their concerns. Then ask again. Never take the rejections personally. Developing a business plan is an ongoing venture; it never stops and never ends. In the summer of 1980 the Barats took their fledgling concept to the streets of New York City, where they served their new line of prepared tofu products to a series of street fairs. "They served over 10,00 meals of tempeh chili, tofu chocolate mousse, and tofu cutlets, and studied faces carefully for reactions. Buoyed by the positive response," they added tofu muffins, then vegetarian quiche to their line. The "R&D Taste Testing" at the street fairs eventually secured them $50,000 in capital and $100,00 in loans. They still managed to hang on to 51% ownership in their new company. They did careful market research using the influential SAMI (Standard Area Marketing Index) data, read reports, and interviewed industry leaders. They began to promote frozen tofu entrees but the profit margins were too slim. Their latest 1982 plan "calls for introducing six or eight boxed, frozen tofu entrees for national distribution."

Valerie, John and Gary Robertson launched Soyfoods Unlimited in San Leandro, California in Feb. 1981. They focus on making and marketing selling. A big break came when New England Soy Dairy in Massachusetts bid to distribute 2,700 lb/month of their tempeh burgers. Once a week Valerie delivers the cases of frozen tempeh to the San Francisco airport.

John and Jan Belleme started the American Miso Co. in Aug. 1981 in Rutherfordton, North Carolina, after a $300,000 investment in plant and equipment. They hope to produce 500,000 lb/year of miso. They did an 8-month apprenticeship in Japan with a master misomaker.

Photos (by Richard Leviton) show: (1) Valerie Robertson of Soyfoods Unlimited with a tray of freshly-made tempeh. (2) John, Valerie, and Gary Robertson; the two men are wearing masks. (3) John Belleme of American Miso Co. empties hot, steaming soybeans. Address: Colrain, Massachusetts.

1143. Belleme, John. 1982. Re: Developing a white miso. Letter to William Shurtleff at Soyfoods Center, Nov. 4. 1 p. Typed, without signature or letterhead.
• ***Summary:*** John would like to develop and sell white miso in a one-pound package, unrefrigerated, like Cold Mountain. John was a bit disappointed with the story about American Miso Co. that appeared recently in *East West Journal.* Richard Leviton had many good photos, but they used only one. Address: Route 3, Box 541, Rutherfordton, North Carolina. Phone: (704) 287-2940.

1144. Greenwood, Rebecca. 1982. Smokey Mountain miso: Traditional and modern methods unite to create a fine domestic miso. *East West Journal.* Nov. p. 50-53.
• ***Summary:*** About John and Jan Belleme and the American Miso Co., located in the Smokey Mountains [sic, Great Smoky Mountains] in the small town of Rutherfordton, North Carolina. The company started making miso in August 1981 and now makes 5,000 pounds a month. "John has a determined air about him. You get a sense that here is a man who, if he's going to do anything, is going to do it all the way." John's main interest is in making high-quality miso.

Almost all miso sold in the U.S. today is made by a fully automated process and pasteurized. The Bellemes spent seven strenuous months studying miso-making with Takamichi Onozaki in Japan. They now have three goals in making miso: (1) Sell unpasteurized miso–which should be refrigerated. (2) Produce miso using traditional methods, including wooden vats, handmade koji, and slow, natural fermentation–rather than the faster and more commonly used forced heat method. (3) Use the high quality ingredients, including certified organically grown soybeans and rice, unrefined sea salt, and deep well water. This miso will be distributed by Great Eastern Sun Trading Co. which is partially owned by the Bellemes' friend and fellow investor, Barry Evans, of Miami, Florida.

The American Miso Co. is located on 100 acres of rural land and consists of two buildings totalling some 3,400 square feet. The small building is used for storage and milling rice. The big one is where the miso is made and aged–for up to 18 months in huge, custom-made cypress vats which hold 8,000 pounds of miso each. When each vat

is full, it is topped with 1,000 pounds of rocks which add pressure during the fermentation. Presently three types of miso are aging here: three short term (Sweet White Miso, Mellow Rice Miso, and Mellow Barley Miso) and one long term (Red Brown Rice Miso).

The secret of good miso lies in making good koji–by hand. John removes up to 90% of the bran from the rice for short-term miso, but only 10-30% for long-term miso. The company's pride is its koji room.

The Bellemes' dream is greater than just making miso. They have started constructing another home on their rural property to accommodate students in a living and learning environment. Each summer they plan to hold workshops which will include miso-making, gardening, natural foods cooking, philosophy, and meditation. A large photo shows John Belleme standing by the soybean cooling table and as the huge steamer basket overhead discharges a load of freshly cooked soybeans.

Note: The Great Smoky Mountains (often shortened to Great Smokies) is a range of the Appalachian Mountains extending along the North Carolina-Tennessee boundary. A part has been set aside as Great Smoky Mountains National Park. Address: Co-director, Rocky Mountain Inst. of Macrobiotics, Boulder, Colorado.

1145. Raper, C. David, Jr. 1982. Plant growth in controlled environments in response to characteristics of nutrient solutions. Moffett Field, California: National Aeronautics and Space Administration (NASA). 103 p. Nov. 28 cm. Report No. NASA CR-166431. [25 ref]
• ***Summary:*** Prepared for Ames Research Center under NASA Cooperative Agreement NCC 2-1-1. CELSS. Contains 3 appendixes: 1. Fatty acid composition and nitrate uptake of soybean roots during acclimation to low temperatures, by Deanna L. Osmond, Richard F. Wilson, and C. David Raper, Jr. 2. Assimilation and internal partitioning of carbon by soybean plants in response to nitrogen stress, by Thomas W. Rufty, Jr., C. David Raper, Jr., and Stephen C. Huber. 3. Nitrogen assimilation by soybeans in response to ammonium and nitrate nutrition, by Thomas W. Rufty, Jr., C. David Raper, and William A. Jackson. Address: Dep. of Soil Science, North Carolina Agricultural Research Service, North Carolina State Univ., Raleigh, NC 27650.

1146. *SoyaScan Notes.* 1982. Chronology of soybeans, soyfoods and natural foods in the United States 1982 (Overview). Dec. 31. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Jan. White Wave in Colorado is the first company to get its tofu placed in the yogurt / dairy case in supermarkets.

Jan. Legume, Inc. launches Tofu Lasagna, frozen in a box. It is soon followed by Tofu Ravioli.

Jan. *The Incredible Tofu Cookbook, California Style,* by Immegart and Dansby self published.

Jan. New England Soy Dairy launches "Year of the Dog" Chinese New Year tofu promotion and nets 47% immediate sales increase.

Jan. Island Spring survives industry's first publicized tofu recall and the discovery of new tofu spoilage microorganism, *Yersinia enterolitica.*

Jan. ADM becomes sponsor of "This Week with David Brinkley" on Sunday ABC TV, with 4.4 million viewers.

Jan. Soyfoods Unlimited in California introduces tempeh burgers and ships them air freight to East Coast markets; Pacific Tempeh in California follows suit.

Feb. Yuba is first produced and sold commercially in the Western world by Ken Lee of Soyfoods of America, in Duarte, southern California. Trial production had begun in Nov. 1981.

Feb. *Soyfoods* magazine No. 6 (yellow cover) published.

Feb. Many large ads run by San-J (tamari), New England Soy Dairy, and Legume in major national trade journals.

Feb. Unicorn Restaurant in Miami, Florida, has $15,000 gourmet, soy / natural foods banquet to welcome chef Ron Pikarski, who makes elegant tofu dishes and carves a swan from soy butter.

Feb. Nasoya buys $50,000 Kutter vacuum-packaging machine, which helps to popularize this packaging style for tofu.

March. *Tofu Fantasies,* by Juel Andersen published by Creative Arts.

March. USDA issues new school lunch regulations, fails to approve tofu for use.

March. Inaccurate, damaging article on iron binding by soy proteins appears in San Francisco Chronicle and Los Angeles Times.

March. Fifteen soyfoods companies exhibit at Natural Foods Expo, Anaheim, CA. Richard Leviton gives key speech. 5,000 visitors see expo. Pacific Tempeh unveils new full-color tempeh burger poster.

March. Big increase in European soyfoods companies; there are now 11.

March. Name of *The Beanfield* newsletter changed to *Soyfoods Monthly.*

March. Great Eastern Sun trading company founded in North Carolina by Barry Evans.

April. At New York's International Food Show, Quong Hop, Yeo's, and President brand soymilks, and Veda's Bayou Delights (tofu / tempeh pot pies) exhibit. ADM serves soy isolate ice cream and soymilk.

April. Quong Hop unveils its new Soy Deli marketing concept for retail using posters and tofu entrees sold frozen.

April. Jack's Beanstalk in Utah does creative work at introducing tofu to institutions. Develops 30 bulk recipe cards scaled to 100 servings.

April. ADM unveils work with glucono delta-lactone

(GDL) and soy isolates in making tofu.

April. *Toyo Shimpo,* Japan's tofu newspaper, gives extensive coverage to upcoming Soyfoods Come West conference in Seattle, Washington.

May. Island Spring releases two 5-minute color video tapes demonstrating tofu cooking for showing in supermarkets.

May. Public schools in Hawaii are granted permission to use tofu in meals.

May. *Soyfoods Directory and Databook.* by Shurtleff and Aoyagi published by Soyfoods Center, the first book of its type listing all soyfoods companies and industry and market statistics, 21 pages. Second edition published in June as *Soyfoods Industry: Directory and Databook,* 52 p.

May. William Shurtleff and Mark Fruin receive a grant from Kikkoman to write a book on soy sauce.

May. *Cook with Tofu,* by Christina Clarke is 2nd runner-up in R.T. French's Tastemaker awards for cookbooks.

May. Clearway Tofu sponsors the first Mother's Day Tofu Fair in Santa Cruz, California, with tofu recipe competition, music, and prizes.

June. Vitasoy USA runs color display ads for soymilk on San Francisco buses.

June. Kibun of Japan exhibits four flavors of soymilk in Tetra Pak cartons at National Restaurant Show in Chicago, Illinois.

June 16. *The New York Times* runs an article on Dieter Hannig, Director of Food Research for Hilton Hotels. His many tofu recipes on microfiche are sent to 86 Hiltons worldwide.

June. Bestways magazine begins 3-part series on soyfoods by Bonnie Mandoe.

June. *The Soy Dairy: A Way to Save the Small Farm,* by MacCormack published by Sunbow Farm.

June. *The Book of Nigari Technique* (in English) published by Yoshikawa Kagaku in Japan.

June. Metta Tofu Products in Denman Island, B.C., Canada, introduces Frozen Buddha soymilk ice cream.

June. Haarmann & Reimer debuts flavors for tofu and okara at IFT convention in Las Vegas.

June. Royal American Foods is launched in Kansas City, Missouri, with $1 million startup capital to sell TVP entrees, tofu-like products via multi-level marketing system.

June. Granny Goose Potato Chips does extensive radio advertising in California for a new potato chip. Ad makes frequent, positive reference to tofu. First national radio ads mentioning tofu.

June. Farm Foods presents Ice Bean at American Booksellers Convention at Anaheim, California, along with previews of their new tofu cookbook.

July. "Discover Tofu" published by *Cosmopolitan* magazine.

July. Farm Foods receives a U.S. trademark for "Ice Bean" as a soy ice cream.

July. Light Foods excites NNFA convention in New Orleans, Louisiana, with debut of Light Links, the world's first tofu hot dogs.

July. Eden's Orchard tofu / soymilk ice cream introduced in New York by Heller Enterprises.

July. Richard Jennings announces a new formula for okara / barley tempeh; later purchases Southwest Soyfoods, relocates company in Santa Fe, New Mexico. Continued.

1147. Hennessey, Michael K.; Marston, Normal L. 1982. Ecological impact of parathion in soybeans. Soil arthropod fauna (Part II). *USDA Technical Bulletin* No. 1665. p. 9-23. Dec. [40 ref]

• ***Summary:*** Note: Parts I and II are part of the same bulletin, but the names of the authors are in reversed order.

Abstract: "A survey of soil arthropods inhabiting soybean fields in central Missouri was conducted by soil-core sampling and pitfall trapping during July through October 1974. Two 8-ha fields, separated by 20 m with equal cropping schedules and similar soil types, were sampled weekly. One field was sprayed with a single foliar application of parathion at 0.45 kg AI/ha [AI = active ingredients] at the midflowering stage, and the other was not treated. A total of 139 arthropod species were identified from the study. Populations of selected groups of soil arthropods were compared before and after treatment both within and between fields. Of 10 groups of arthropods sampled in soil cores, populations of 5 groups were reduced and 5 were unchanged within 1 to 3 months following treatment; populations of all groups were aggregated near the plants for most weeks, and 4 of the groups were aggregated in the upper 10.2 cm of soil during the study, irrespective of treatment. Pitfall trapping revealed that activity of three groups of arthropods was reduced, one was increased, and six were unchanged within 1 to 3 months following treatment.

Introduction: Comprehensive surveys of arthropod species associated with soybeans have been conducted in Ohio (1), Minnesota (20), Delaware (26), Maryland (29), Missouri (3), Arkansas (34), South Carolina (6), and North Carolina (9), but none included the soil fauna. A survey of the soil arthropod fauna in soybean fields in Iowa was conducted, and a list of 208 genera collected was presented (22). The only soil arthropod species that has been sampled extensively in soybean fields is the bean leaf beetle, *Ceratoma trifurcate* (Forster). A sampling regimen was developed for the eggs of the species in Illinois (36). The effects of foliar insecticide applications on populations of nontarget soil arthropods in soybean fields have not been recorded.

"Our studies at the Biological Control of Insects Research Unit in Missouri have focused on understanding the role of cultural practices in determining the species composition of the arthropod community in soybean fields.

One such cultural practice is the use of parathion in foliar spray treatments as recommended for outbreaks of some phytophagous insects.

"We conducted an experiment during the 1974 growing season to determine effects of parathion treatment on populations of nontarget arthropods living in the soil. This study identified soil arthropod species that were present in soybean fields, compared population patterns of soil arthropods in a parathion-treated and an untreated field, and measured the distribution of populations horizontally within and between plant rows and vertically in the soil." Address: 1. Graduate student, Dep. of Entomology, North Carolina State Univ., Raleigh, NC 27650; 2. Research Entomologist, Biological Control of Insects Research Unit, ARS/USDA, Columbia, Missouri.

1148. Marston, Normal L.; Hennessey, Michael K. 1982. Ecological impact of parathion in soybeans. Vegetative fauna (Part I). *USDA Technical Bulletin* No. 1665. p. iv + 1-8. Dec. [40 ref]

• ***Summary:*** Abstract: "An application of ethyl parathion to flowering soybeans reduced populations of predatory arthropods by 66 percent 6 days post-treatment. Egg and larval parasites of the green cloverworm, *Plathypena scabra* (F.), the most abundant caterpillar species, also were reduced. The green cloverworm population decreased by 83 percent 6 days after the application. Populations of secondary pests and detritus feeders similarly were affected. Most species made a remarkable comeback and reached checkfield levels or higher 4 weeks after treatment.

"The population of green cloverworms increased to a maximum level 2.3 times higher than in the check field during pod fill, apparently caused by decreased predation and parasitism of eggs and early instars. Survival of the resurgent population was low, however, and few 6th instars were noted in either the treated or check fields. Percent defoliation and yield did not differ in the two fields."

Note: An "instar" is a phase between two periods of molting in the development of an insect larva or other invertebrate animal.

"Introduction: Several studies demonstrate that applications of pesticides to soybeans can have detrimental effects that may outweigh their immediate benefit. Predators have been shown to be killed readily (4, 10, 22), and chemicals disrupt the natural epizootics of fungus diseases of pest species (7, 9). This often leads to resurgence of lepidopteran larvae to a level greater than that in untreated fields (15).

"Insecticides also may disrupt the soil ecosystem. Tests show that populations of surface-active predators may be reduced (13, 14), and those organisms responsible for the breakdown of organic debris may be affected as well (12).

"Our objective in this study was to monitor the effects of a parathion application on arthropods. We studied all aspects-plant, soil surface, and sub-soil-with emphasis on the beneficial organisms. We are reporting here the effect of the insecticide on arthropods on the plants." Address: 1. Graduate student, Dep. of Entomology, North Carolina State Univ., Raleigh, NC 27650; 2. Research Entomologist, Biological Control of Insects Research Unit, ARS/USDA, Columbia, Missouri.

1149. **Product Name:** Tofu.
Manufacturer's Name: Fertile Hills.
Manufacturer's Address: Route 1, Box 171-E (P.O. Box 34), Hillsborough, NC 27578. Phone: 919-732-6626.
Date of Introduction: 1982.
New Product–Documentation: Letter from Ken Dawson. This is a farm that also sells organic produce and grows sprouts; Soyfoods Center Computerized Mailing List. 1983. June 20. Owner: Ken Dawson.

1150. Ducharme, Gary Alan. 1982. Effect of soybean trypsin inhibitor on growth, protein digestibility, and pancreatic enzyme activity in the young calf. PhD thesis, North Carolina State University–Raleigh. 61 p. Page 1672 in volume 43/06-B Dissertation Abstracts International. * Address: North Carolina State Univ.–Raleigh.

1151. Forrestal, Dan J. 1982. The kernel & the bean: The 75-year story of the Staley Company. New York, NY: Simon and Schuster. xxv + 315 p. Illust. Index. 22 cm.

• ***Summary:*** This is the best (and only) history of the A.E. Staley Manufacturing Company. Contents: The kernel [corn]. The bean [soya]. 1. How it all began. 2. The high road to debt and Decatur. 3. Staley makes history in sports. 4. Soybeans come to the U.S. 5. What's good for Decatur is usually good for Staley and vice versa. 6. Trials and triumphs of the thirties (In 1938 Staley launched Sweetose corn syrup, made with enzyme technology). 7. Countdown for a weary pioneer. 8. New management and a new world war [World War II]. 9. Strictly business. 10. Smooth road ahead, except for the bumps. 11. The shock waves of the sixties. 12. That Shangri-La called retail. 13. The sweetest story ever told. 14. A little thing called fermentation. 15. The soaring seventies. 16. The new Staley Company. Directors and corporate officers (1951-1981). Honor roll of service.

Augustus Eugene Staley was born on 25 Feb. 1867 in a log cabin on a 265-acre farm near Julius, North Carolina. His father was William Staley [1840-1885] and his mother was Mary Jane Ledbetter Staley [1842-1906]. Augustus was the eldest child. The three other children in the family were Arthur E. Staley [1869-1930], Georgiana Staley [1872-1952], and Wilhelmina C. "Willa" Staley [1885-1950]. Growing up on a farm with many chores to attend to, little Gene had little time for primary school, except during the winter months; he was a self-taught and self-made man.

"At one camp meeting, in 1880, Gene Staley's father

met a Methodist [other accounts say Baptist] missionary who had recently returned from China and who had brought back a basket of strange beans called soybeans. Gene Staley later recalled, 'The missionary gave my father a handful of the beans. My father turned them over to me to play with. I planted two rows of the beans in the family vegetable garden. I was proud of them. I weeded them and picked them. Then I planted some more. The missionary said they would be good for the soil. I believed it–even if no one else did.'"

In 1881, at age 14, he began selling some produce from the family farm in Randleman, the nearest town; it contained 300 people and was 9 miles away. He drove the farm's wagon alone and barefoot, and by mid-day, having sold everything, he headed home and declared "I'm going to be a businessman."

In Sept. 1883 he saw a sign in Greensboro, North Carolina, that read "Boy Wanted–$15 a Month." He went to the Odell Hardware Company's retail store on South Elm Street and got the job. There he was given the hard work of lifting farm implements in the back room. He learned how to stretch $15 a month, of which $10 went for room and board. At Christmastime he was fired.

For the next 14 years, from 1883 to 1897, Gene Staley was a successful traveling salesman. He visited such distant places as Seattle, Washington. He made good money although he had to work long hours and had no fixed location to call home. In 1896, his net profit was $5,000–a fortune at the time. More important, he learned a great deal about how to be a successful salesman, and about business and people.

On 14 Dec. 1898 Gene Staley, age 31, was married to Emma Tressler, age 23, and the daughter of Andrew J. and Emeline Richardson Tressler of Bryan, Ohio. She was a fine pianist. She agreed to his proposal on the condition that he "Settle down in Baltimore and have a home I can share with you." They lived in a rented house at 1721 St. Paul Street. She continued her piano lessons at a Baltimore conservatory. Gene's starch suppliers were giving him a hard time, so he decided to start his own starch manufacturing company. On 12 Nov. 1906 the "A.E. Staley Starch Manufacturing Co. of Baltimore, Maryland, was incorporated under the favorable auspices of Delaware law, with Gene Staley as president and Charlie Schuster as secretary-treasurer." He found shareholders to fund his new operation among the roughly 2,600 starch retailers who knew him directly. The company was capitalized at $3.8 million. In early 1908 he learned that a 13-year-old starch manufacturing plant in Decatur, Illinois, was in receivership. The location he knew was ideal. In 1909 he bought it for $45,000 and began to fix it up. (p. 19, 25).

Though corn refining by the "wet milling" process would continue to be A.E. Staley's principal business, in 1922 founder Gene Staley declared: "The day will come when our plant will process more soybeans than corn." By 1950 this prediction had come true, as the Decatur facility handled 50 carloads daily of soybeans versus 30 of corn.

As early as 1918 Gene Staley had begun his own soybean investigations, and in 1920 he ordered two expellers from the V.D. Anderson Company of Cleveland, Ohio. The manufacturing equipment was ready by 1921 but two delays held up the commencement of soybean crushing: (1) A special ramp for trucks bringing soybeans into the plant needed to be built, and (2) 1921 was a year of economic depression for both the nation and the company; Staley's expenses exceeded income by $692,000. Finances were so tight that it was deemed prudent to delay the pioneering venture into soybean processing for another year.

In 1922 the company issued two formal announcements: (1) June 1922: "The A.E. Staley Manufacturing Company announces that in response to the general and urgent desire on the part of farmers in Central Illinois, it has been decided to install a soybean plant in conjunction with the Decatur starch and glucose manufactory.

"A satisfactory building is now in readiness. Several expellers have been purchased and delivered. Bean dryers are under construction. Storage for 150,000 bushels of beans is ready for use. The plant is planned so that large increases in capacity may be had without expensive changes. The first unit will have a capacity of about 500 bushels a day. It will be finished in ample time for the 1922 harvested crop."

(2) Oct. 1922: "On September 30, the new soybean plant of the A.E. Staley Manufacturing Company was put into operation, thus inaugurating a new industry for Central Illinois and providing the growers of this territory with a market for their beans."

Staley's first actual purchase of soybeans occurred on September 28, 1922, from the Andrews Grain Co. of Walker, Illinois. The transaction involved 1,547 bushels at $0.9975 per bushel. Subsequently 5,674 bushels were purchased from various sources. However after operating for only 16 days and producing 209,300 lb of soybean meal and 42,036 lb of oil, the expellers ran out of beans and had to be shut down. Later more beans were found but the new mill was in operation for a total of only 74 days in 1922 and 57 days in 1923. When the 1924 season approached, soybeans were rather plentiful–but at $1.50 a bushel. Although soybean production and acreage in Illinois were now growing rapidly, times were still hard for the company. A letter written by Gene Staley in May, 1924, in response to an inquiry from West Virginia, said, in part: "The result of our experience in the soybean industry so far has been both unprofitable and discouraging, but it is our intention to leave the machinery in our plant for another year. If the operations are not profitable, we'll dismantle the plant and discontinue the soybean business altogether... Our company refused to pay over $1.50 [a bushel; some new companies have paid up to $1.80] but on 34,000 bushels we lost more than $12,000."

Fortunately a major upswing came in 1925. The company bought almost 70,000 bushels of soybeans for $1.30 a bushel and stayed in operation for 7 months. This

increased to 8 months in 1926. Staley continued to buy all the soybeans that farmers brought him (p. 60-62).

Page 54: "Soybeans come to the U.S.: In 1922, the city fathers of Decatur, Illinois, never envisioned their community hosting such organizations as Soy Capital Bank & Trust Company, Soy Capital Electric Inc., Soy City Electric Supply Co., Soy City Marine Inc., Soy City Motel, Soy City Tire & Retreading Inc., Soy City Towing Co., Soyland Power Cooperative Inc., and Soyland Service Center, Inc.

"Not to mention radio station WSOY.

"Back in 1922, Decatur was a beanless sort of place, content to be in the heart of the Midwest's sprawling farm belt where corn ruled as king of the realm, and content to have the Staley company spearheading corn's golden era."

The term "The Castle in the Cornfields" is in the Index and appears on pages x, 83, 91, 93, 188, and 245. Page 87 states: "the editors [in 1929 and 1930] began to call it 'The Castle in the Cornfields.'" Note: This is the earliest document seen (Sept. 2016) that contains the term "Castle in the Cornfields" (or "Castle in the Cornfield") regardless of capitalization.

The amazing story of this building's construction appears on pages 83-91. The story of its sweltering interior and how air conditioning finally arrived is on pages 188-91. The ground was broken on 16 Feb. 1929 and the new offices were occupied on 19 April 1930 (p. 87). However the building was not finished until 1931.

Photos show: (a) A.E. Staley as a child with his parents and siblings in about 1880. (b) Mr. A.E. Staley at his prime. (d) The administrative building at Decatur in about 1930 (before p. 103). The Decatur Staleys, America's first professional football team, managed by George Halas starting in 1920; they won the national professional championship in 1920. In 1921 they moved from Decatur to Chicago to become the Chicago Bears. The Castle in the Cornfields (the A.E. Staley administration building); ground breaking was 6 Feb. 1939. The employees moved in on 19 April 1930, even though the building was not yet finished (before p. 103).

Note 1. We have included another view (aerial) of this Castle after it was finished (from Windish 1981, p. 68).

A.E. Staley, Jr. Many employees, officers, board members, and factories.

Note 2. Soyfoods Center believes that (in some areas) this book is more colorful than it is accurate. For example, the crucial "Peoria Plan" of 1928 is not mentioned. Address: Decatur, Illinois.

1152. Belleme, John. 1983. Re: Developing new products at American Miso Co. Letter to William Shurtleff at Soyfoods Center, Jan. 6. 1 p. Typed, without signature or letterhead.

• ***Summary:*** John is developing three new types of miso: (1) Traditional red miso (with less salt and more koji than the aka-miso currently imported from Sendai Miso-Shoyu under the Johsen brand). (2) Mellow barley miso (unpasteurized, it should be refrigerated for long-term storage). (3) Mellow White Miso (unpasteurized, it should be refrigerated for long-term storage). He sends a sample of each and asks for comments. Address: Route 3, Box 541, Rutherfordton, North Carolina. Phone: (704) 287-2940.

1153. *Soybean Update.* 1983. 1982 soybeans under loan. Jan. 24. p. 6.

• ***Summary:*** Gives the number of bushels "under loan" in all major soybean producing states (23 states, listed alphabetically) on three dates: 12 Jan. 1983, 5 Jan. 1982, and 13 Jan. 1982 [1981?].

In Jan. 1983 the number ranges from a high of 51.6 million bushels in Iowa to 1.9 million bushels in North Dakota.

The states are: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, South Carolina, South Dakota, Tennessee, Texas, Wisconsin, and total USA.

The US. total number of soybean bushels under loan increased from 156 million in 1981, to 307 million in 1982, to 324 million in 1983.

Note: For more on this subject see USDA FSA (Farm Service Agency) price support–commodity loans. At www.fsa.usda.gov/ FSA we read (Aug. 2011): "Marketing assistance loans provide producers interim financing at harvest time to meet cash flow needs without having to sell their commodities when market prices are typically at harvest-time lows. Allowing producers to store production at harvest facilitates more orderly marketing of commodities throughout the year."

1154. *Soybean Digest.* 1983. Move over Cola (Letter to the editor). April. p. 4.

• ***Summary:*** "On page 80 of the February 1983 issue of Soybean Digest, you reported the popularity of a soybean drink among the Japanese. As soybean producers, we were very interested and would like more information on this beverage.

"E.S. Reed, Elizabeth City, North Carolina.

"'Soymilk is an inexpensive and easy way for protein-deficient people to upgrade their diets,' says Steve Chen, ASA director of Taiwan. That's a major reason why the protein-rich drink is so popular in Eastern countries.

"Making soymilk is basically a three-step process: soaking soybeans and grinding them in water and straining the mixture. The process is an old one–discovered by the Chinese about 2000 years ago. Later modifications have added new flavors: vanilla, strawberry, peanut, chocolate, milk, coffee and apple.

"Japanese soymilk industry sources predict that by 1985

the soymilk industry in Japan will use 3.6 million bushels of soybeans. So the popular drink also provides a good market for US. soybean exports.–Ed."

At the lower left of this page is a very attractive cartoon of a "Mr. Soybean" standing next to a mail box, dressed in blue overalls and a blue cap, holding a pipe (for smoking tobacco) in his right hand, holding up his left hand

Note: ASA (American Soybean Association) is starting to get interested in soyfoods! But only overseas, so far.

1155. Edward & Sons Trading Co. 1983. "Go skinny dipping" (Ad). *New Age Journal* (*Boston, Massachusetts*). June. Inside rear cover.
• ***Summary:*** This full-page color ad is for Miso+Plus. All Natural Dip Mix, in chive or jalapeno flavors. Contains a recipe for using the mix, plus a photo showing a bowl of dip in the middle of a plate of sliced vegetables and crackers.

Note: This ad also appeared in the August issue of this magazine. The product is made in Japan and imported by Edward & Sons. Address: Route 1, Box 153, Saluda, North Carolina 28773.

1156. **Product Name:** Tofu.
Manufacturer's Name: Oriental House Restaurant.
Manufacturer's Address: 4403 Wrightsville Ave., Wilmington, NC 28403. Phone: 919-392-1620.
Date of Introduction: 1983 June.
New Product–Documentation: Soyfoods Center Computerized Mailing List. 1983. June 20. Owner: Mrs. Kyong Riddle.

1157. Van Duyn, John W.; McLeod, Paul J. 1983. Pesticide effects on natural enemies. *South Carolina* (*Clemson*) *Agricultural Experiment Station, Southern Cooperative Series, Bulletin* No. 285. p. 56-62. Chapt. 7. June. Regional Research Project S-74. Natural Enemy Subcommittee. [53 ref]
• ***Summary:*** Contents: Arthropod natural enemies. Entomopathogens: Fungi, viruses, bacteria, protozoans. Pest response to natural enemy decimation. Address: Dep. of Entomology, North Carolina State Univ., Raleigh, NC.

1158. 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.

1159. 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.

1160. Belleme, John. 1983. Re: Problems at American Miso Co. Progress on white miso. Letter to William Shurtleff at Soyfoods Center, Aug. 30. 1 p. Typed, with signature on letterhead.
• ***Summary:*** After a year of confusion and misunderstanding, the problems at American Miso Co. may be nearing a final resolution. About three months ago, John hired a lawyer. A draft of the final contract between him and the majority shareholder has been passed back and forth recently. He hopes it will be signed in the near future.

John has learned a great deal about white miso through constant experimentation–and very little from Japanese correspondence. He now understands the basic process for making unrefrigerated white miso. At present, Great Eastern Sun, the miso company's sole distributor, is selling about 50,000 pounds of white miso annually. It does very well unrefrigerated, but needs to be refrigerated for long-term storage. Address: Route 3, Box 541, Rutherfordton, North Carolina. Phone: (704) 287-2940.

1161. Perrin, R.K.; Kunnings, K.A.; Ihnen, L.A. 1983. Some effects of the U.S. Plant Variety Protection Act of 1970. *North Carolina State University, Department of Economics and Business, Economics Research Report* No. 46. 44 p. Aug. (Raleigh, NC). [12 ref]
• ***Summary:*** "Both the number of non-hybrid crop breeding programs and expenditures on them increased substantially during the 1970s as compared to the 1960s. It seems likely that these phenomena are due to the incentives created by the [PVP] Act. Examining the productivity of breeding efforts in soybeans, the study found a three-fold increase in the number of varieties submitted for yield tests in the 1970s as compared to the 1960s. It also found the rate of improvement in yields was greater for varieties released after 1970 than for those released before 1970." Address: Dep. of Economics and Business, North Carolina State Univ., Raleigh, NC.

1162. American Miso Co. 1983. Agreement. Rutherfordton, North Carolina. 4 p. Oct. 1. Unpublished typescript.
• ***Summary:*** This agreement is effective as of 1 Oct. 1983. Barry Evans desires to purchase and John and Janet Belleme desire to sell 900 shares of common stock in the American Miso Co. The price for the shares and for future consulting and training services will be $30,000. John will consult on a full-time basis for the first 3 months after the closing and on a part-time basis for the last 3 months. He will be responsible for training individuals to produce koji and miso and to operate the miso factory. Signed Barry E. Evans, John Belleme, and Janet Belleme. Address: Rutherfordton, North Carolina.

1163. Planter Cotton Oil Co. 1983. Fire or explosion in solvent extraction plant. Rocky Mountain, North Carolina.
• ***Summary:*** Kingsbaker, C. Louis. 2005. "List of fires and explosions in extraction plants." Atlanta, Georgia. 3 p. Aug. 4. Unpublished manuscript. The plant processes both

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

cottonseed and soybeans. Address: Rocky Mountain, North Carolina.

1164. Bernard, R.L. 1984. The past and the future in soybean breeding. *Soybean News* (*NSCIC*) 35(1):2, 6. Jan.

• ***Summary:*** "As a commercially significant crop in this country, soybeans have a short history and have been important in the north-central states only since 1922. 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.

1165. Hartwig, Edgar E. 1984. Some thoughts after thirty years of soybean research in the South. *Soybean News* (*NSCIC*) 35(1):5, 4. Jan.

• ***Summary:*** "As one travels across the South today and observes field after field of soybeans, one must respect the foresight and judgment of some of our research leaders who in the early 1940's initiated a program within the United States Department of Agriculture for developing soybeans for grain production in the South. I reported for duty March 1, 1943 to begin a cooperative program between USDA and the North Carolina Agricultural Experiment Station at Raleigh, North Carolina, with the responsibilities of developing soybean varieties suitable for grain production. At that time, there were probably no more than two or three hundred thousand acres of soybeans being planted for seed production in the South. Along with other production problems, severe shattering was a strong possibility if harvesting was not completed within a few days after the soybeans were mature. A staff member at North Carolina State University working with fertility and management problems with small grains informed me that he thought the decision of USDA officials who decided to place a man in the area to work with soybeans was about as stupid a decision as was possible to make. He recognized that soybeans had limited possibilities as a hay crop but saw no potential for them as a seed crop.

"Local workers who had some experience with soybeans advised me that I must get my plantings made by mid-April in order to obtain a stand. The general opinion also existed that soybeans needed no fertilizer. The soybean as a legume produced its own nitrogen. Nitrogen was more or less considered synonymous with fertilizer since the big response with corn or cotton was from nitrogen. About 50% of my plantings failed because of the early planting and lack of adequate nutrition for the plants. I decided that mid-April was too early to plant soybeans, and later research showed that we should delay planting until a 14½-hour day had been reached and for much of the South this day length was not reached until after early May.

"Dr. Ralph Cummings was then head of the Agronomy Department at North Carolina State University. I indicated to him that I did not believe that a breeding program with soybeans could succeed without additional fertility research. He was receptive to the idea and arranged for initiating a soybean fertility research program. In 1945, Dr. W.L. Nelson, now senior vice president with the Phosphate-Potash Institute, began work on the fertility program with soybeans. He also had responsibilities for two or three other crops. During the next several years we developed what I considered an excellent team research program to investigate the interaction of varieties with fertility. The importance of an adequate supply of potash was clearly demonstrated.

Results demonstrated that varieties differed in their response to higher fertility levels, and also that with adequate levels of fertility and high-yielding varieties, the most efficient use of the fertilizer was obtained. It is somewhat amazing to me how frequently low pH or lack of phosphate or potash are still limiting factors in the production of soybeans, especially when we realize how simple it is to take soil samples and obtain quite precise information as to the nutrient requirements of a particular soil. I like to think of the plant as a miniature factory that utilizes water and nutrients to produce the end product seed.

"In the fall of 1948, I began working at Stoneville, Mississippi, in a program cooperative with the Delta Branch of the Mississippi Agricultural and Forestry Experiment Station. In addition to the research program at Stoneville, I coordinated a program with state workers in the southern states to evaluate breeding lines that were being developed. At this time, cotton acreage had been reduced appreciably in the Delta area. Cotton was best suited to the better-drained sandy loam soils. A large acreage of low-lying, slowly-drained, heavy clays was available for other uses. Much of our soybean breeding work was therefore concentrated on types that would produce well on the clay. The variety `Ogden,' which had been developed at the Tennessee Agricultural Experiment Station, was available and produced better than some of the varieties that had been available. However, seed-holding qualities of Ogden were poor, and growers reported that harvested yield decreased with each day of harvest. Ogden had another disadvantage in that seed coats were green. Actually, there was nothing wrong with green seed coats except that market standards were set up for yellow soybeans, and buyers seriously objected to receiving green soybeans when they thought they were buying yellow soybeans. Although cotton acreage had been reduced appreciably, growers were primarily interested in cotton, and many considered it to be somewhat of a waste to have a research program for a crop for which there was no interest. I would like to again emphasize the importance of foresight by research leaders. Research does not give instant results. Having a period with no outside pressure permitted us to develop improved production practices, and by the time we had improved varieties available, we could make suggestions as to how the crop should be grown.

"A major impact upon soybean production in the South was the release of the variety 'Lee' in 1954. Lee had been evaluated in the cooperative regional tests and had shown adaptation over much of the South. A simultaneous release was made in each of the 12 southeastern states. At the time of its release, we stated that Lee would hold its seed satisfactorily for 6 weeks after it was ready for harvest. Thus, it was possible to ensure that the crop could be harvested if a crop was grown. Several growers were skeptical, and at the time they grew their first crop, they left a few rows unharvested to see for themselves whether or not it would hold its seed. In addition to having a good seed-holding quality, Lee was resistant to several foliar diseases that were causing severe losses. These included bacterial pustule and target spot. Resistance to these two diseases has been maintained in nearly all subsequent variety releases in the. South. Lee was well-suited for production on the low-lying, slowly-drained clays. At the time, we thought it was because of an ability to develop a root system in these soils. Later we learned that a major problem in the slowly-drained clays was the disease phytophthora rot. Lee-had what we described as a moderate level of resistance to the disease. Major genes giving higher levels of resistance have now been incorporated into other varieties. By 1957, a considerable acreage of Lee was being planted. A prolonged rainy period began in November and many fields were not harvested until in February. Growers were impressed with the fact that they still had marketable seed to be harvested.

"The variety 'Bragg' was released in 1963. Bragg had many of the same qualities as Lee, but was later in maturity and made more growth. It was particularly suited for the coastal plains soils of the Southeast. Bragg had a high level of resistance to root-knot nematodes which are common in many of the coastal plains soils. Because of its greater growth, Bragg competed better than Lee with the johnsongrass and cockelbur which were not being controlled in the soybean fields of the Delta. Bragg became a major variety in the Delta as well as in the Southeast.

"Herbicides to control johnsongrass and cocklebur have simplified soybean production in much of the South, but especially in the Delta area where these weeds grew so luxuriously. As cotton acreage was reduced, many of the fields had lain idle for several years before soybean were planted. Thus, there had been excellent opportunity for good development of johnsongrass and cocklebur. As soybeans were planted in these fields, it was sometimes difficult to recognize that soybeans were there. If one could see that the johnsongrass was in rows, one could then assume that there were also soybeans there." Continued. Address: Research Agronomist, USDA, ARS, Stoneville, Mississippi.

1166. 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.

1167. Harwood, Henrick J. 1984. Oleochemicals as a fuel: Mechanical and economic feasibility. *J. of the American Oil Chemists' Society* 61(2):315-24. Feb. [20 ref]
• ***Summary:*** The status of vegetable oils as diesel fuel substitutes is currently dubious. The present mechanical problems in long term use that have not yet been solved and they will probably not be price competitive in the near future, though the price differential is decreasing. Between 1950 and 1974, vegetable oil fuel would have cost 10-15 times more than diesel fuel. This ratio steadily decreased from 1975 on, until in 1981 vegetable oil fuel cost only about twice as much as diesel fuel, and in 1982 it cost only 75% more. In 1982 soy oil diesel fuel cost about $1.75/gallon. It is preferable to use these oils in small proportions blended with diesel fuels. Address: Research Triangle Inst., P.O. Box 12194, Research Triangle Park, North Carolina, 27514.

1168. Hollowell, Frank W. 1984. Re: Early growing of soybeans in North Carolina. Letters to William Shurtleff at Soyfoods Center, March 2 and Nov. 10. 1 p. Followed by a phone call on 28 July 1990.
• ***Summary:*** "The early Hollowells settled in Virginia

and Massachusetts in the early 1700s. They were prolific and migrated in many directions. Christopher W. [C.W.] Hollowell came to Pasquotank around 1830 from Belvedere, Perquimans County, North Carolina. His father, Nathan Hollowell, was from Edenton and came originally from Virginia. C.W. Hollowell first grew soybeans in Pasquotank County [whose county seat is Elizabeth City] in the 1880s. He died in 1892 and had been a semi-invalid and blind for the last 8 years of his life, hence my estimate of the date.

"There is no firm proof that C.W. Hollowell planted soybeans at this early date. However family stories concerning the history of our work with soybeans were told in the late 1920s and early 1930s by C.W. Hollowell Jr. (born 1871, son of the original grower), Margaret Hollowell (born 1872), and my father Frank W. Hollowell (born 1879). Also, sometime during the late 1920s, Margaret Hollowell, an historian, wrote about the planting of soybeans by C.W. Hollowell in a lengthy handwritten genealogy and family history titled 'Who am I,' which sets forth the story of the soybean and other stories related to the family in earlier times. The article was published in either the "Daily Advance" (which still exists) or "The Independent" (which stopped in the late 1930s). Both newspapers were published in Elizabeth City, North Carolina. The book follows a fixed, printed format, sort of like a scrap book or baby book, where each person fills in the blank spaces. My recollection of the story is that C.W. Hollowell obtained his soybeans from a friend who got them from China [sic, actually Japan; see Daily Advance, 2 Nov. 1929]. I think that C.W. Hollowell was the first to grow soybean in the Albemarle section (comprising about 16 counties around in northeast corner of North Carolina around Elizabeth City) of North Carolina.

"As noted above, C.W. Hollowell had a son named C.W. Hollowell Jr. and he in turn had a son named Frank D. Hollowell, who was born in about 1910 in Elizabeth City. He moved around several times and finally ended up in Savannah, Georgia, in about 1960. He lived there for the next 23 years and died there in July 1983. Other than being aware of the story of the soybean and being the grandson of C.W. Hollowell, he had nothing to do with soybeans. I am another grandson of C.W. Hollowell, and I own and live on the property where the soybean planting occurred first." Address: Route 4, Box 28, Elizabeth City, North Carolina 27909.

1169. 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.

1170. American Natural Foods, Inc. 1984. The love affair of miso and mustard (Ad). *East West Journal.* April. Inside rear cover.
• ***Summary:*** An elegant full-page color ad. The top half of this ad shows a photo of a jar of Naturally Preferred Miso Mustard in front of several heads of barley, a bowl of whole soybeans, and a wooden miso tub with braided bamboo hoops.

"Miso Mustard marries three carefully chosen mustard seeds–a high valued yellow seed, a robust dark seed and a pungent Oriental seed–with Amakuchi Miso, the prized barley miso from Japan, now made in America.

"The mustard seeds are stone ground, sensitively and sparingly, to release their flavor while protecting the delightful grainy texture.

"The Amakuchi Miso gently mellows the mustards, making the flavors rich and round with superb and memorable character.

"But Miso Mustard is more than an excellent new mustard. It doesn't just season other foods, it transforms them!"

This ad also appeared in the May issue (p. 19). Address: P.O. Box 2321, Chapel Hill, North Carolina 27515. Phone: (919) 929-0113.

1171. American Natural Foods, Inc. 1984. Elf Works merges with American Natural Foods (News release). Suite 21, The Courtyard, Chapel Hill, NC 27514. 1 p. May 1.
• ***Summary:*** Elf Works' primary brand was Wizard Baldour's Hot Stuff. ANF's president is John Troy. Address: Chapel Hill, North Carolina.

1172. Troy, John. 1984. Work with miso and American Natural Foods (Interview). *SoyaScan Notes.* May 9. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** John dropped out in the 1960s. He has always loved to eat. He does not remember when he first heard of miso, but he probably first tasted miso or used it in a recipe in about 1976. That was the year he met Joel Dee of Edward & Sons. John started using miso in about 1980, on spiritual retreats when he was the cook. He brought in all the visiting gurus. When John Belleme and Barry Evans set up their American Miso Company they called him and invited him to visit. He was very, very impressed and soon got involved. Hot Stuff, his first product that contained miso, was introduced in early 1981. Hot Stuff originated when one end of a little string of hot peppers fell into the blender. He thought, "I'm gonna make me a hot sauce," so he tossed in lots of macrobiotic ingredients that were on his lazy susan–including miso and umeboshi- and "hit it pretty close." He decided to bottle it, so he located a bottling company. Not long after that he met John Fogg, introduced him to the fascinating subject of marketing and changed his life forever.

John is now working with Jimmy Silver and Jeffrey Hilgert of Pure and Simple (San Jose, California) in developing Hot Chips, which will be made by using powdered Hot Stuff for dusting corn chips. John is now also doing a private offering in North Carolina to raise money; a public offering is 3-5 years away.

Update: Talk with John Troy. 2000. June 26. John was working at a little natural foods store named Beautiful Day (in Durham, North Carolina) one day when Joel Dee drove up in a car peddling Miso Cup, a new product, sold in little packets. This was the first time that John can recall ever seeing miso or Miso Cup. Address: Suite 21, The Courtyard, Chapel Hill, North Carolina 27514.

1173. American Natural Foods, Inc. 1984. Confidential private placement: Offering circular, May 1, 1984. Suite 21, The Courtyard, Chapel Hill, NC 27514. 40 p. 28 cm.
• ***Summary:*** Contents: American Natural Foods, Inc. (ANF)–Offering circular. Risk factors and capitalization (One million shares are offered for $150,000. Four million shares have been issued to the principals in this venture and 4 million shares have been issued to the former Shareholders of Elf Works, Ltd. If fully subscribed, the total proceeds from subscriptions and from investment by the principals will be as follows (in millions): John C. Troy $2.4. Jeffrey Hilgert

$1.040. James Silver $1.040. John Fogg $0.80. Hague C. Bowman $0.600. Ernest G. Golding $0.600. Thomas D. Higgins, III $0.600. etc.). Owners of shares in Elf Works Ltd. Capital leveraging. Application of proceeds. Terms of offering. Description of securities. Summary of the merger between American Natural Foods, and Elf Works, Ltd. Obligations of and to American Natural Foods, Inc. Legal options. Exhibit A: Corporate stock redemption agreement. Exhibit D: Employment agreement. Exhibit E: Contract between ANF and American Miso Company, Inc. Exhibit F: Contract between ANF and Mrs Campbell's Canning Co., which has a plant in Winston-Salem, North Carolina. Exhibit G: Exclusive distributorship agreement between ANF and U.S. Naturals (Novato, California). Product schedule. Addendum to exclusive distributorship agreement: Minimum purchase required. The natural foods industry. An overview of the market for health/natural foods (from *Business Trends Analysts = BTA*). Supermarket nutrition centers (from *BTA*). Health-natural food chains. The market for health/natural groceries (from *BTA*).

Tables (from BTA): (1) Retail sales of health/natural foods by product (shows soyfoods have grown from $26.1 million in 1977 to an estimated $163.0 million in 1983). (2) Manufacturers' shipments of health/natural foods by product (shows soyfoods have grown from $15.8 million in 1977 to an estimated $101.8 million in 1983). (3) Manufacturers' shipments of health/natural foods, 1977-1993P–dollars per year. (4) Retail sales of health/natural foods, 1977-1993P–dollars per year (Annual growth is about 25% a year). (5) Retail sales of grocery items in health food stores, by specific product category, 1981-1982. (6) Manufacturers' shipments of natural groceries, 1977-1993P–dollars per year. etc.

ANF financial objectives, by product and by year. ANF corporate strategy (create single brand identities). Distribution and sales strategy. ANF overall product strategy. ANF individual brand strategies for nine products: Hot Stuff, Hot Chips, Smoky Mountain Sizzlin', Naturally Preferred–Miso Mustard, Fiesta Salsa, Bee Nut Butter (for kids; peanut butter with a dab of miso and bee pollen), Bee Nut Butter Bar, Sea Sauce, The Works (for hamburgers and hot dogs). Management profiles: President John Fogg, Treasurer Hague Bowman, Vice President and General Counsel Thomas D. Higgins III, Secretary Eugene C. Brooks III, Marketing Director John Fogg. "Miso soup–Safeguard against cancer," by Bill Shurtleff (from *East West Journal*). "Ah, so you want to try miso: A mountain couple is practicing the ancient art of making this Japanese food," by Beatrice Taylor Quirk (from *Carolina Lifestyle,* Sept. 1982). Color poster titled "It's Hot Stuff." Address: Chapel Hill, North Carolina. Phone: (919) 929-1240.

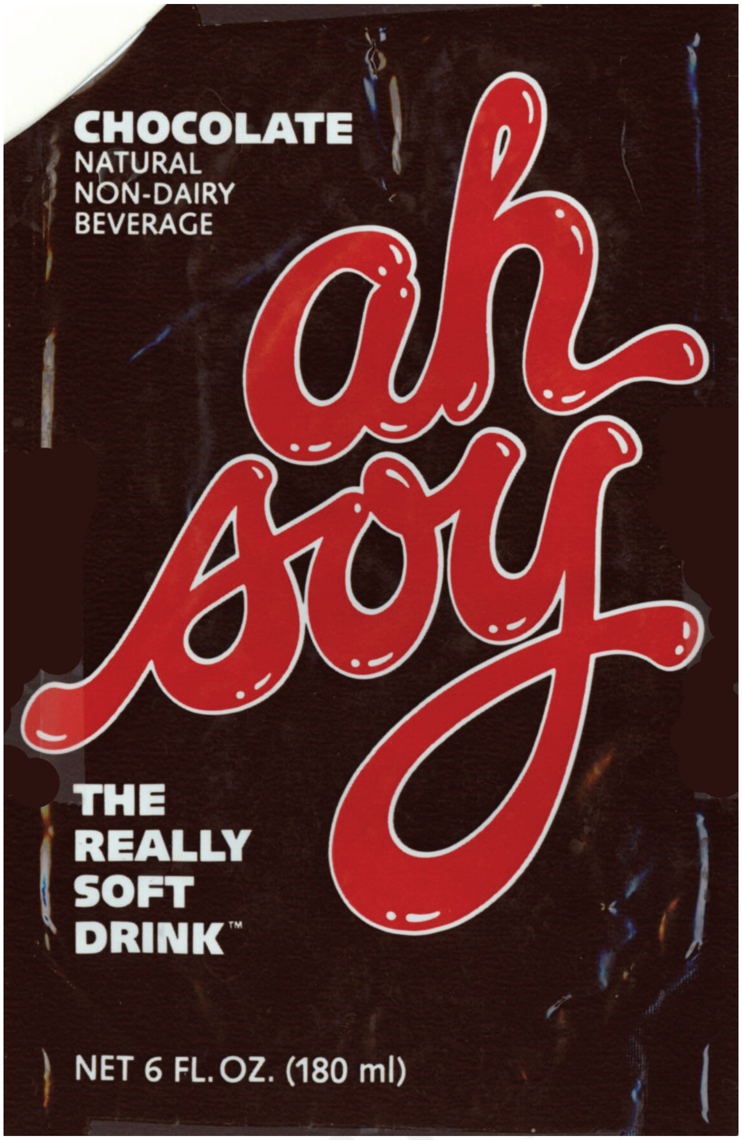
1174. Anand, S.C.; Shumway, C.R. 1984. Resistance to soybean cyst nematodes in *Glycine max.* L. In: S. Wong, et al., eds. 1984. Proceedings of the Second U.S.-China Soybean Symposium. Washington, DC: USDA OICD. xix + 464 p. See p. 378-80. [9 ref]
• ***Summary:*** In the United States, the soybean cyst nematode (SCN), *Heterodera glycines* Ichinohe, was first isolated in North Carolina in 1954 (Winstead et al. 1955), Missouri and Tennessee in 1956; and Arkansas, Kentucky, and Mississippi in 1957. It has now spread in 23 states and has become a major pest on soybean, *Glycine max* L., in southeastern, mid-south, and southern states. Address: Univ. of Missouri-Columbia.

1175. Elf Works, Ltd. 1984. It's hot stuff (Ad). *Natural Foods Merchandiser.* July.
• ***Summary:*** See next page. At the top of this large-format, full-page color ad is a hand pouring a bottle of Hot Stuff, a spicy seasoning. At the bottom of the ad are flames dancing up around vegetarian shish-kebobs. The background goes from black at the top to dark blue at the bottom. The text (black on gold in the middle, with sentences separated by red hearts) begins: "Now you can add sure-fire magic to all your favorite foods with Wizard Baldour's Hot Stuff. Shake it–wake up the dragon–and watch the magic make food disappear. Hot Stuff is much more than America's newest, best-tasting, all natural, all-purpose hot sauce. It's good for ya' too! Wizard Baldour doesn't just make Hot Stuff. He concocts it." Ingredients include "hearty organic miso" and Umeboshi plums from Japan. Hot Stuff comes in two intensities: Regular and Blazing. Distributed by U.S. Naturals Corp., 84 Galli Drive, Novato, California 94947. Address: Box 2321, Chapel Hill, North Carolina 27515. Phone: 919-929-0113.

1176. **Product Name:** Ah Soy: Natural Non-Dairy Beverage (Soymilk) [Chocolate, Vanilla, or Original].
Manufacturer's Name: Great Eastern Sun (Importer). Made in Japan by San-iku Foods.
Manufacturer's Address: Asheville, NC 28806. Phone: 704-252-3090.
Date of Introduction: 1984 July.
Ingredients: Original: Water, organically grown soybeans*, barley malt, pearl barley malt, cold pressed safflower oil, sea salt. * = Organically grown and processed in accordance with Section 26569.11 of the California Health and Safety Code.

Vanilla: Vanilla extract. Chocolate: Natural cocoa, natural vanilla extract.
Wt/Vol., Packaging, Price: 6 fluid oz (180 ml) in stand-up foil retort pouch.
How Stored: Shelf stable; refrigerate after opening.
Nutrition: Original: Per 6 oz.: Calories 100, protein 4.5 gm, carbohydrate 9.4 gm, fat 5 gm. Vanilla: Calories 142, protein 4.3 gm, carbohydrate 21.2 gm, fat 4.4 gm. Chocolate: Calories 149, protein 3.9 gm, carbohydrate 25.5 gm, fat 3.5 gm.


Now, you can add sure-fire magic to all your favorite foods with Wizard Baldour's Hot Stuff. Shake it—wake up the dragon—and watch the magic make food disappear. Hot Stuff is much more than America's newest, best-tasting, all natural, all-purpose hot sauce. It's good for ya' too! Wizard Baldour doesn't just make Hot Stuff. He concocts it. From the most wondrous places around the world he selects nutritious and delicious ingredients: real apple cider vinegar, pure honey, hearty organic miso, Indian cayenne, African bird peppers, Umeboshi plums from Japan and a magical blend of rare herbs and spices all mingled together and simmered in dragon's fire. And Hot Stuff tastes great on everything—chicken, fish, vegetables, rice, beans and greens and soups and salads. Kids love it on pizza and tacos. One fella' even puts it on peanut butter! Use your imagination with your favorite recipes. Create sizzling sautés, zippy dips and warm up your leftovers. Hot Stuff adds a 'Hot-tastic' new flavor sensation that you know is positively good for ya' too. Be sure to try **Blazing** Hot Stuff for a double dose of dragon fire! Hot Stuff is sure-fire magic. It makes food disappear!
IT'S HOT STUFF
Concocted by: Elf Works, Ltd., Box 2321, Chapel Hill, NC 27515 • 919-929-0113
Distributed by: U.S. Naturals Corp., 84 Galli Drive, Novato, CA 94947



New Product–Documentation: Labels. 1984. 4 by 6.25 inches. Plastic packs. Original: Red and white on blue. Vanilla: Red and white on tan. Chocolate: Red and white on dark brown. The words "ah soy" are written in script and look rounded, as if they were made from brightly colored round tubing. Text on front panel: "Made with organically grown soybeans." "The really soft drink." On back panel: "It drinks like a shake and you can use it to bake. Ah Soy is the most versatile, delicious and nutritious natural non-dairy soft drink you can buy. Can something so smooth, so rich, so refreshing, really be good for you? Ah Soy is. Ah Soy is full of protein, free of cholesterol, low in calories and has no cane, fruit or milk sugars. And of course, there are no chemical additives and no preservatives. Use Ah Soy on breakfast cereal, as the secret to spectacular sauces, to make extra fluffy pancakes, and as a healthy, all natural thirst quencher."

Note: This is the earliest commercial soymilk product seen with an English-language label (June 1999) that has a flavor named "Original." In March 1982 a Japanese company named Nagoya Seiraku introduced a soymilk in Japan named *Sujaata no Gen Tônyû,* which means "Sujaata Original Soymilk."

Shurtleff & Aoyagi. 1984. Soymilk Industry and Market, Update (Based on interview with Bob Ballard, 21 March 1985). This product has been a "fantastic success." During the period from 1 Nov. 1984 to 25 Jan. 1985 (just under 1 fiscal quarter), 525,000 unit packs of 4 flavors were sold.

Shurtleff & Aoyagi. 1985. Soymilk Industry and Market, Update. By March 1985 sales of Ah Soy are growing rapidly, now accounting for 15-20% of Great Eastern Sun's total sales. The favorite flavor is vanilla, followed by original [plain], carob, and chocolate, in that order. By 1987 Ah Soy was being made in the USA in quarts. Shurtleff & Aoyagi. 1986. Soymilk Industry and Market, Update. By March 1987 Ah Soy is selling about 270,000 units (10,906 gallons) per month. Sales by flavor are vanilla (35% of the total), original/plain (30%), carob (17.5%), chocolate (17.5%). Sales have been flat for the past year.

Letter from Bruce Sturgeon, Vice President, Great Eastern Sun, Enka, North Carolina, to East West Journal. 1989. Jan. p. 6. Convincingly refutes EWJ's award to Ah Soy for the "Most Questionable Beverage Label Claim."

1177. Flinders, Carol. 1984. Try homemade frozen yogurt or tofu ice cream. *Fayetteville Observer* (*North Carolina*). Aug. 1. p. 30.
• ***Summary:*** You can use an electric ice cream maker to make these recipes: (1) Apricot-orange frozen yogurt (with 1 quart plain lowfat yogurt). (2) Banana maple tofu ice cream (with 8 oz fresh tofu and 2 cups milk or soymilk). Address: California.

1178. Troy, John. 1984. American Natural Foods, Elf Works, and work with miso (Interview). *SoyaScan Notes.* Sept. 26. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** American Natural Foods (ANF) was formed in Jan. 1984 as its own company with its own investors; in March 1984 it acquired Elf Works, Ltd. Miso Mustard, BeeNut Butter, and Smoky Mountain Sizzlin' were all introduced formally for delivery in Sept. 1984. ANF had a private stock offering in May 1984 in North Carolina; the proceeds ($150,000) from 25 shareholders will be used mainly to develop new products. Some of the shareholders (such as John Fogg, marketing and design) are working with the company. Barry Evans, owner of American Miso Co. in North Carolina, is the company's miso supplier. The packer is also a shareholder. Hot Stuff is John's only commercial miso product with a sales record to date. The Works will

be out in about 2 weeks. He expects big revenues from it because people use much more per serving–dink dink vs. glug glug. Smoky Mountain Sizzlin' is getting rave reviews. It's super with tempeh. They are sampling it on grilled skewered tempeh and pineapple.

John's first commercial miso product, Hot Stuff, was first put on the market in early 1981 [about April]. John is trying to use miso to create natural foods for Americans. To date John has sold exclusively to U.S. Naturals, his distributor, run by Jeffrey Hilbert and Jimmy Silver. But he has had bad service and many problems from them, so he is considering a new distribution system. He may get regional warehouses and sell from there to distributors like K&L [Kahan & Lessin], cutting out any master distributors. Address: Suite 21, The Courtyard, Chapel Hill, North Carolina 27514.

1179. **Product Name:** Naturally Preferred Miso Mustard.
Manufacturer's Name: American Natural Foods, Inc.
Manufacturer's Address: P.O. Box 2321, Chapel Hill, NC 27514. Phone: (919) 929-0113.
Date of Introduction: 1984 September.
Ingredients: Mustard seeds [3 varieties, ground], vinegar, amakuchi miso (soybeans, barley, water, sea salt), natural herbs and spices, sea salt.
Wt/Vol., Packaging, Price: 9 oz jar (255 gm).
How Stored: Shelf stable.
New Product–Documentation: Ad in East West Journal. 1984. May. p. 19. "The Love Affair of Miso and Mustard." Full-page color. Spot in Adweek. 1984. Aug. 20. p. 37. Interview with John Troy, developer of this product. 1984. Sept. 26. Miso will be mustard ready to deliver in September 1984. Label. 1984, dated. 2.5 by 2.5 inches (smaller at top). Paper. Red, blue, black, and white on gold. "Rich and round, with a grainy texture, naturally preferred by gourmets and natural food cooks for its superior flavor and mellow character."

Natural Foods Merchandiser. 1985. May. p. 48. Gold medal award in 6th annual merchandising contest. Ad in East West Journal. 1985. May. p. 19. "Miso mustard–new." Spot in Chicago Tribune. 1985. Nov. 27. "Miso madness." Sec. 7, p. 12. A photo shows Miso mustard. Spot in Chilton's Food Engineering. 1985. Dec. "Miso: Superior flavor enhancer." A photo shows Miso Mustard. Spot in NASFT Showcase. 1985. Dec. "The taste of Japan: American Natural Foods." Published by the National Association for the Specialty Food Trade, Inc. A photo shows Miso Mustard.

Talk with John Troy, who now owns and runs a separate company. Miso Mustard is still on the market. It is made in Emeryville, California, for American Natural Foods, Inc.

1180. **Product Name:** BeeNut Butter [Smooth, or Crunchy].

1984

The Love Affair of Miso and Mustard

You know mustard. It's one of your favorites. But you may not know miso. Miso is an extraordinary source of essential nutrition, and a sensational seasoning too. And now, for the first time, you can enjoy these two fantastic flavors together. That's why Miso Mustard has gourmets and natural cooks more excited than they've been in years.

Miso Mustard marries three carefully chosen mustard seeds–a highly valued yellow seed, a robust, dark seed and a pungent Oriental seed–with Amakuchi Miso, the prized barley miso from Japan, now made in America.

The mustard seeds are stone ground, sensitively and sparingly, to release their flavor while protecting the delightful grainy texture.

The Amakuchi Miso gently mellows the mustards, making the flavors rich and round with superb and memorable character.

But Miso Mustard is more than an excellent new mustard. It doesn't just season other foods, it transforms them! It makes the most of all your favorite flavors and helps you discover new tastes you never knew existed. Deviled eggs themselves actually taste better, tempeh and sandwiches taste better than ever before. No other mustard does this.

Healthful, delicious Naturally Preferred Miso Mustard. It's more than just another kind of mustard. It's a love affair.

American Natural Foods, Inc.
P.O. Box 2321
Chapel Hill, N.C. 27515
(919) 929-0113

Manufacturer's Name: American Natural Foods, Inc.
Manufacturer's Address: Box 2321, Chapel Hill, NC 27514.
Date of Introduction: 1984 September.
Ingredients: Peanut butter, honey, miso, bee pollen.
Wt/Vol., Packaging, Price: 12 oz reusable glass jar.
How Stored: Shelf stable; refrigerate after opening.
New Product–Documentation: This is peanut butter, sweetened with honey, and lightly seasoned with miso. Label. 1984, dated. 9.5 by 3 inches. Paper. Orange, yellow and black. Little bees on honeycomb background. Poem from "Buddy Bee" on back: "When you feel like something yummy, And junk food just won't do, Try this Bee Nut Butter. It might be right for you..." Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. Spot in Whole Foods. 1985. March. p. 65. "Bee Spreader," A photo shows the jar.

1181. **Product Name:** Smoky Mountain Sizzlin'–"More than a barbecue sauce!"
Manufacturer's Name: American Natural Foods, Inc.
Manufacturer's Address: P.O. Box Box 2321, Chapel Hill, NC 27514.
Date of Introduction: 1984 September.
Ingredients: Tomato paste, apple cider vinegar, pure water, red miso, peanut oil, tamari soy sauce (soybeans, water, sea salt), honey, molasses, garlic juice, onion juice, umesu (Japanese plum vinegar), natural herbs and spices, toasted sesame oil, tamarind, natural hickory smoke, natural seaweed extract.
Wt/Vol., Packaging, Price: 18 fluid oz (540 ml) glass jar.
How Stored: Shelf stable; refrigerate after opening.
New Product–Documentation: Label. 1984, dated. 10.25 by 2.5 inches. Paper. Yellow, green, red and white on black background. "All natural. For bastin', grillin' and table use. Made with miso." Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. Ad in Vegetarian Times. 1985. June. "You're gonna' love that Smoky Mountain twang."

1182. Great Eastern Sun. 1984. Ah soy: Finally a really soft drink (Ad). *Natural Foods Merchandiser.* Sept. p. 39. [1 ref]
• ***Summary:*** A full-page color ad. This natural, non-dairy beverage comes in vanilla, chocolate, and original flavors. Photos show: (1) Ah Soy being poured into a clear glass. (2) The front of each of 3 foil cartons.

This ad also appeared in *East West Journal.* Sept. p. 56-61. Address: P.O. Box 327, Enka, North Carolina 28728. Phone: (704) 252-3090.

1183. Just In Foods, Inc. 1984. Miso Master (Ad). *East West Journal.* Sept. p. 8. Expanded ad in East West Journal. 1986. Nov. p. 81.
• ***Summary:*** At the top of this one-third page black-and-white ad is the Miso Master logo, an illustration showing the head and shoulders of a Japanese miso master, with a knotted headband, in front of a large wooden vat of miso. The text reads: "The Miso Master is truly one of Japan's National Treasures. With roots that go back centuries, he is an intimate of the land, knowing its seasons and sharing its changes. He is artist and scientist, blending the best of both tradition and technology.

"The making of Miso is a way of life. To master this life requires hard work, long hours and great sensitivity. Miso is a living good. It is vital and strengthening, full of vitamins and minerals, beneficial bacteria and rich in the highest quality protein. Miso is an extraordinary source of essential nutrition.

"Miso Master products are dedicated to the spirit of the Miso Master. Our Miso is made by hand in the old, traditional way: aged in wood, unpasteurized, using only organic grains and beans, with pure water and salt form the sea. All of the ingredients in our products are the very best: like brown rice vinegar, natural mirin, and delicate grain sweeteners.

"Miso Master products are made with reverence for a way of life. They are both nutritious and delicious, because food that is truly best for you to eat–tastes best too."

Note 1. This ad also appeared in the October issue of this magazine (p. 21).

Note 2. This is the earliest ad seen run by Just In Foods or American Miso Co. It is also the earliest document seen that mentions "Just In Foods." But notice that American Miso Co. is not mentioned! Address: Box 541, Route 3, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1184. Ramsey, Harold A. 1984. Protein and amino acid nutrition in calves. In: 45th Minnesota Nutrition Conference. St. Paul, Minnesota: Minnesota Agricultural Extension Service. See p. 7-12. Held 17-18 Sept. 1984. [9 ref]
• ***Summary:*** Contents: Non-milk protein in milk replacers. Amino acid requirements of preruminant calves. Amino acid supplementation of milk replacers.

"The first attempt to use non-milk protein in the diet of the preruminant calf was reported nearly 50 years ago. Since then, especially during the past two decades, a great variety of non-milk products have been tested experimentally (Table 1). Of these, only two are being used presently in substantial amounts by the milk replacer industry: soy flour and soy protein concentrate. Soy flour and soy protein concentrate, though used for many years as milk replacer ingredients, are not utilized as effectively by the preruminant calf as they are by other animals. These products usually contain anti-nutritional factors (antigens and trypsin inhibitor) to which the calf is uncommonly sensitive." Address: Dep. of Animal Science, North Carolina State Univ.

1185. Shurtleff, William; Aoyagi, Akiko. 1984. Early

soy crushing. *J. of the American Oil Chemists' Society* 61(9):1437-38. Sept.

• ***Summary:*** "The first documented crushing of soybeans in the U.S. to obtain oil and meal took place in 1911 (probably not in 1910 as some accounts say) at Seattle, Washington. The soybeans were imported from Manchuria by the Albers Brothers Milling Co. and sold to Herman Meyer, who operated a small hydraulic press in Seattle. His establishment was later called Pacific Oil Mills. The crude soy oil was sold locally for use in making soap and paint, and the meal, brandnamed Proteina, was sold to farmers as a high-protein livestock fodder. It was found, however, that the oil and meal could be imported more cheaply than they could be produced domestically from imported soybeans. The crushing operations were, therefore, discontinued after the initial shipment of beans had been processed. Yet the pattern, based on the success of the European (and to a lesser extent, the Manchurian) patterns, was established from the very outset; it has dominated soybean utilization in the U.S. to this day.

"The earliest recorded crushing of American-grown soybeans took place in 1915 in North Carolina, which was then America's leading soybean producing state. At that time there was a surplus of soybeans in the state (many farmers had planted soybeans instead of cotton, since the latter's prices were often below production costs), a growing importation of and interest in soy oil nationwide, and the local cottonseed mills were searching for a way to prolong their operating season. From December 13 to 20, 1915, the cottonseed oil mill of the Elizabeth City Oil and Fertilizer Co. in Elizabeth City, North Carolina, did a test run in which 272 tonnes (10,000 bushels) of soybeans were crushed and the oil expelled in the mill's six Anderson expellers. Soon another run of the same quantity was completed under the direction of W.T. Culpepper, manager of the firm, as part of his efforts to encourage local soybean production. From each ton (2,000 pounds) of soybeans, the mill was able to obtain 247 to 270 pounds (32-35 gallons, weighing 7.72 pounds of each) of crude soy oil and about 1,650 pounds of meal; the balance was processing loss. Before the tests the mill had contracted to sell all of the oil to a leading manufacturer at reasonable prices. Most of the resulting meal, reported to be of excellent quality and containing 5.0 to 5.5% oil, was sold to a fertilizer manufacturer. The experiment was so successful that the mill continued to crush local soybeans. Other North Carolina cottonseed oil mills soon followed suit, and by the spring of 1916 mills in at least nine North Carolina cities and towns had crushed about 80,000 to 100,000 bushels (2,177 to 2,722 tonnes) of soybeans. By 1917 some 150,000 bushels (4,050 tonnes) of local soybeans were crushed. The USDA played an important role in coordinating and studying the operations. Many more soybeans would have been processed but for the extremely high price of seed, which was in demand for planting and food. In 1916, for example, German interests are reported to have bought and exported the entire local supply at prices as high as $4.50 per bushel.

"Soon the idea of crushing locally grown soybeans spread to the southern states. By 1916 the boll weevil, which entered the U.S. in Texas in 1892 and rapidly spread eastward, had made cotton growing unprofitable in various parts of the south. Thus both soybeans and peanuts were welcomed by farmers and millers as alternative oilseed crops. In August 1916 *The New York Times* reported that the Louisiana Cottonseed Crushers Association had voted unanimously in favor of development of the soybean in that area for use as an oilseed, as soy oil was rapidly cutting into cottonseed oil sales. During the following months many cottonseed oil mills throughout the cotton belt, realizing the potential of the soybean as an oilseed, contracted with farmers for the seed of their 1917 crop; this led to a marked increase in southern soybean acreage. Soybeans imported from Manchuria were also processed in southern mills to meet the rapid growth in demand for oils.

"Soybeans grown in the Corn Belt were first crushed for oil and meal in late 1917 or early 1918 by the Chicago Heights Oil Manufacturing Cormpany (located just south of Chicago, Illinois), operated by George Brett and I. Clark Bradley. Using screw presses (expellers), which were generally used for crushing corn germs, they experimentally crushed a small amount of soybeans. In late 1920, since soybeans were in short supply and most of the crop was sold for planting, Brett and Bradley bought and crushed 10 carloads of soybeans from North Carolina and Virginia. Hydraulic presses were used for soy oil extraction in 1922 and 1923. The company sold the oil with some difficulty and had great difficulty selling the meal. Bradley noted that 'In the three years from 1920 we coaxed and forced feeders to try the meal. We hauled meal all over the state, gave it to them free. We sent it to experiment stations. We exhibited it at state and county fairs; we made soybean flour and sent samples to bakers, had it blended at a flour mill with wheat flour, and gave five-pound bags to hundreds of grocery stores who would consent to accept it.' Bradley and Brett continued their pioneering work toward the establishment of a soy oil processing industry in the Corn Belt until August 1923, when the company went out of business for lack of enough soybeans to keep the mill supplied.

"These four early experiments with soybean crushing in Seattle, North Carolina, the Cotton Belt, and Illinois, laid the foundation for America's soybean crushing industry that would emerge during the 1920s and 1930s, and also served as a key stimulus to U.S. soybean production." Address: Soyfoods Center, P.O. Box 234, Lafayette, California.

1186. 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.

1187. Macrobiotic Wholesale Co. (The). 1984. Catalog and price list [Mail order]. 92 McIntosh Road, Asheville, NC 28806. 63 p. 28 cm.

• ***Summary:*** The catalog, effective 15 Oct. 1984, contains 450 new products from 15 new vendors, plus 73 new books. The president of the company is Don DeBona. Soy-related products include miso, shoyu, tamari, nigari, kinako, natto and koji spores, black soy beans, tekka, Ah Soy soy drink (soymilk), and amasake.

One of the many suppliers is The Mitoku Co. Ltd., which "was founded in Tokyo [Japan] in 1968 by Mr. Kazama at the express behest of Michio and Aveline Kushi. In fact, the company was named after MI-chio and TO-moko (Aveline's real name; Aveline was given her name by George Ohsawa) KU-shi." Address: Asheville, North Carolina. Phone: 800/438-4730 or 704/655-1056.

1188. Hartwig, Edgar E. 1984. Re: History of soybeans in North Carolina draft. Letter to William Shurtleff at Soyfoods Center, Dec. 3. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Shurtleff: I am returning the draft of the chapter covering early history of soybeans in North Carolina with sane comments on the copy and will make a few more comments.

"I do not believe that there was a decline in interest in soybeans in North Carolina, but rather that there was increased interest and development in the central area of the U.S. The development of soybeans in the Illinois, Iowa, Indiana area can be related in part to the introduction of soybean varieties from northeast China which were well suited for production in that area. After 1932, corn acreage was reduced through acreage controls, and thus making land available for another crop. Also, a shift from animal agriculture to mechanized farming made land that was used to produce oats to feed horses available for other crops. The shift to tractors was not as rapid in North Carolina as in the northcentral area.

"In some of our discussions as to the origin of soybean production in North Carolina, it seemed quite logical that soybeans could have been brought in ships from Japan after Admiral Perry opened the ports of Japan in 1854. The variety Mammoth Yellow, which was one of major varieties grown in North Carolina in the early years, represents a type of soybean from Japan rather than from China. There are no records of an early introduction of a soybean type similar to Mammoth Yellow. Thus, it seemed very likely that in this early trading, a ship from Japan could have docked at Norfolk and had soybeans left over that may have been brought for use as food on the voyage. This would have provided a soybean adapted to the area of southeastern Virginia and northeastern North Carolina that could have stimulated production. Production in an area cannot get started without a variety reasonably well suited for production in the area.

"With regard to Herbert Johnson, he was hired as a USDA employee to work in cooperation with the North Carolina Agricultural Experiment Station when I transferred from North Carolina to Stoneville, Mississippi. He was at North Carolina from August, 1948 to the fall of 1953 when he transferred to Beltsville to become investigations leader for soybean research in the U.S.

"Sincerely,..." Address: Research Agronomist, Soybean Production Research, P.O. Box 196, Stoneville, Mississippi 38776.

1189. Associated Press (AP). 1984. Farmers upset at proposed soybean facility sale. *Morning Herald* (*Durham, North Carolina*). Nov. 20.

• ***Summary:*** North Carolina farmers say they are afraid that the proposed sale of a Ralston Purina Co. soybean crushing plant in Raleigh to Cargill might give Cargill a near monopoly on the state's soybean market.

Ralston Purina wants to sell soybean crushing plants in six states to Minnesota-based Cargill, which may be the world's largest agribusiness company. Address: Herald staff writer.

1190. Belleme, John; Belleme, Jan. 1984. Miso, the ABC's of an ageless food. *East West Journal.* Dec. p. 62-66. [1 ref]
• ***Summary:*** Miso is said to break down and discharge cholesterol. Scientists studying Japanese populations have discovered that those who regularly drink miso soup suffer significantly less from some forms of cancer and heart disease. Japan's Tohoku University has recently isolated chemicals from miso that cancel out the effects of some carcinogens.

A fine variety of traditionally-made miso is available in the refrigerator section of natural foods stores in small tubs or the recently introduced plastic bag with a one-way valve that prohibits the entrance of air. For the busy cook who wants to add flavor and protein, miso gives 22 grams of protein per tablespoon. Dark miso has a meat-like quality; light miso, a dairy-like quality. Light, sweet miso contains twice the niacin and 10 times the lactic acid bacteria as dark, saltier miso. Dark miso is higher in protein and because of its larger proportion of soybeans, contains more fatty acids, which have been shown effective as anti-carcinogenic agents.

Sweet miso can be used instead of milk in mashed potatoes or creamed soups, and with tofu and lemon and lemon or rice vinegar in place of sour cream, in salad dressings and sauces. Sweet miso and sake or mirin combine well in sauces. Address: Rutherfordton, North Carolina.

1191. Keeton, J.T.; Foegeding, E.A.; Patana-Anake, C. 1984. A comparison of nonmeat proteins, sodium tripolyphosphate and processing temperature effects on physical and sensory properties of frankfurters. *J. of Food Science* 49(6):1462-65, 1474. Nov/Dec. [35 ref]
• ***Summary:*** Vital wheat gluten (VWG) and soy protein concentrate (SPC) were among the nonmeat proteins added to frankfurters. Wheat gluten is a unique protein source in that it stays firm during canning. Thus, when added to frankfurters, it helps them to stay firm during and after canning; otherwise they tend to become mushy. VWG and SPC contributed slight to moderate off flavors and required alterations in the spice formulation of the products. Address: 1. Dep. of Animal Science, 346 Kleberg Center, Texas A&M Univ., College Station, Texas 77843-2471; 2-3. Dep. of Food Science, North Carolina State Univ., Raleigh, NC 27695-7624.

1192. **Product Name:** The Works. SuperNatural Condiment.
Manufacturer's Name: American Natural Foods, Inc.
Manufacturer's Address: Box 2321, Chapel Hill, NC 27514.
Date of Introduction: 1984.
Ingredients: Fresh onions, tomato paste, pure water, red miso, honey, garlic juice, celery juice, umesu (Japanese plum vinegar), tamari (whole soybeans, water, sea salt), natural herbs and spices, mustard, arrowroot powder, natural seaweed extract.
Wt/Vol., Packaging, Price: 12 oz (336 gm) jar.
How Stored: Shelf stable; refrigerate after opening.
New Product–Documentation: Label. 1984, dated. 8 by 4 inches. Paper. Red, blue, yellow, white on burgundy. Picture of wizard with staff. "New. Made with miso. Give 'em The Works... an all natural wonder. Everything you want on it–is in it! It's all you need to make historic hot dogs, brilliant burgers, spectacular sandwiches, outrageous omelets, terrific tempeh and fantastic fries!" Signed by Wizard Baldour. Label. 1985, dated. 8.25 by 4 inches. Paper. Red, yellow, black, and white on navy blue. Hamburger looking illustration. "New. For hot dogs, burgers, tacos, omelets and lots more! Made with miso." Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center.

1193. **Product Name:** Sea Sauce.
Manufacturer's Name: American Natural Foods, Inc.
Manufacturer's Address: Box 2321, Chapel Hill, NC 27514.
Date of Introduction: 1984.
Ingredients: Tomato paste, pure water, apple cider vinegar, red miso, rice syrup, horseradish, Japanese umeboshi plums, lemon juice, garlic juice, onion juice, natural herbs and spices, sea salt, natural seaweed extract.
Wt/Vol., Packaging, Price: 12 oz (336 gm) glass jar.
How Stored: Shelf stable; refrigerate after opening.
New Product–Documentation: Label. 1984, dated. 8.5 by 2.5 inches. Paper. Red, green, pink, white on tan. Picture of lobster and shellfish. "All natural. For seafood and shellfish. The natural gourmet compliment to all your shellfish and seafood favorites. With Sea Sauce you can create splendid shrimp cocktails, superior scallops and outrageous oysters. You can transform tuna salad, add charm to cherry stones, and enhance the flavors of all your favorite fish dishes. From clams to crabs, lobster to swordfish steaks." Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center.

1194. Wolcott, D.L.; Wolcott, T.G. 1984. Food quality and cannibalism in the red land crab, *Gecarcinus lateralis. Physiological Zoology* 57(3):318-324. [32 ref]*
Address: Dep. Marine, Earth and Atmospheric Science, North Carolina State Univ., Raleigh, North Carolina.

1195. Just In Foods, Inc. 1984. Cooking with miso–General principles (Card). Rutherfordton, North Carolina. 1 p. Front and back. 12 x 14 cm.
• ***Summary:*** This card, printed front and back, gives a brief, general description of miso. It begins: "Every morning millions of Japanese wake up to a hot, stimulating bowl of miso soup. Miso (pronounced 'mee-so') is a delicious, very versatile fermented soy food. Loaded with protein, high in vitamin B12, essential amino acids and minerals, but very low in fat and calories, miso is a concentrated source

of many nutrients." After describing the nutritional and medicinal value, varieties and colors, versatility, and use in miso soup, it concludes: "According to ancient Japanese mythology, miso is a gift from the Gods. We at the American Miso Company are striving to maintain the simplicity and purity of this previous gift."

On the front of the card: An illustration at the lower right shows a wooden keg of miso bound with three ropes that join at the top. The company logo of crossed sheaves of grain in a circle appears at the top right. Address: Box 541, Route 3, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1196. Peterman, Teresa Kaye. 1984. Soybean lipoxygenase: Molecular and physiological studies. PhD thesis, Duke University. 177 p. Page 2393 in volume 45/08-B of Dissertation Abstracts International. *
Address: Duke Univ., Durham, North Carolina.

1197. American Miso Co., Inc. 1985. The secret of Japanese miso comes to America (Ad). *East West Journal.* Jan. 4.
• ***Summary:*** This full-page, black-and-white ad begins: "At last! The ancient traditions of the Japanese miso-making art have been carefully and lovingly carried to America by the American Miso Company, the proud now caretaker of traditions passed down from Master to Miso-Master for many centuries." This miso is made from the finest ingredients, including organic rice, barley, and soybeans. "Last and perhaps most important, our miso is unpasteurized, unlike so many other misos. This leaves intact the beneficial lacto-bacillus and enzymes so essential for proper health and food digestion, and imparts the savory aroma, outstanding character, and mellow taste so prized in unpasteurized miso. The American Miso Company logo, crossed sheaths of grain in a circle, is at the bottom center of the ad.

Photos show: (1) A 1-lb package of the company's barley miso in a plastic bag with a one-way pressure release valve. (2) Jan Belleme, with a baby (Justin) on her back, mixing koji–her hands up to the wrists. (3) A bearded employee [Bob Zullo] moving a huge wooden vat of miso using an hydraulic dolly. Address: Box 541, Route 3, Rutherfordton, North Carolina 28139. Phone: (704) 287-2940.

1198. **Product Name:** Soybean Oil, and Soybean Meal.
Manufacturer's Name: Cargill, Inc.
Manufacturer's Address: Raleigh, North Carolina.
Date of Introduction: 1985 January.
Ingredients: Soybeans.
New Product–Documentation: *J. of the American Oil Chemists' Soc.* 1985. "Soy pioneer bows out, others grow bigger." March. p. 474, 476. On 2 Jan. 1985 Cargill finalized its purchase of six soybean processing plants from Ralston Purina Co. One of these was at Raleigh, North Carolina.

1199. Ballard, Bob. 1985. Ah-Soy! and Great Eastern Sun (Interview). *SoyaScan Notes.* March 21. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Ah-Soy was launched at the NNFA show in Atlanta, Georgia, in the summer of 1984. Initial flavors were vanilla, chocolate, and original (plain). It was made by Saniku Foods in Japan and imported via Mitoku. Carob flavor was introduced in the fall of 1984. Vanilla is now the best seller because it is the most unique. The product is a "fantastic success." The four flavors account for 15-20% of Great Eastern Sun's total sales from 1,100 products. GES only sells to distributors [i.e. it is a master distributor].

Sales reports for the period 1 Nov. 1984 to 25 Feb. 1985 show the following number of units sold (there are 30 units/ per case): Vanilla 210,000 units. Original/plain 110,000. Carob 105,000. Chocolate 100,000.

Other GES soyfoods that sell well: Mellow white miso (made by American Miso Co.), 35 lb tub, #9 best seller by dollar volume. Onozaki rice miso, 11 lb tub, #20 best. Mellow white miso, 15 lb tub, #20 best. Instant miso soup from Japan (ranking unknown). This month's sales are annualized. The company is now doing $4 million/year in sales. They used to import freeze-dried tofu; the FDA forced them to change the name to "dried tofu." Shurtleff notes that he prefers the term "dried-frozen tofu."

Another best seller (about #3-5) is their White Cloud Rice Syrup It is made from rice with sprouted barley for malt. Address: Great Eastern Sun, 92 Macintosh Rd., Asheville, North Carolina 28806. Phone: 808-438-4730 or 704 252-3090.

1200. *J. of the American Oil Chemists' Society.* 1985. Soy pioneer bows out, others grow bigger. 62(3):474, 476. March.
• ***Summary:*** The soybean crushing industry is undergoing major restructuring as A.E. Staley Manufacturing Co., a pioneer in soybean processing, leaves the business. On 2 Jan. 1985 Cargill finalized its purchase of six soybean processing facilities from Ralston Purina. At that time it probably passed ADM to become America's largest soybean crusher. The plants acquired by Cargill are in Bloomington, Illinois; Lafayette, Indiana; Iowa Falls, Iowa; Kansas City, Missouri; Louisville, Kentucky; and Raleigh, North Carolina. A 7th plant owned by Ralston Purina at Memphis, Tennessee, was not offered for sale, but was scheduled to be closed in February.

With this acquisition, Cargill now has 20 soybean crushing plants in the Midwest and Southeast. The location of each of Cargill's 14 other soybean crushing plants, with daily processing capacities ranging from 20,000 bushels to 120,000 bushels, are given.

Ten days later the A.E. Staley Manufacturing Co. announced it had sold its soybean crushing business to Illinois-based independent Soy Processors Co., owned by

a general partnership of individuals associated with Archer Daniels Midland (ADM) and including ADM as a minority partner. With this, ADM probably recaptured its lead, but only by a slight edge.

In October Staley agreed to buy CFC Continental Inc., the nation's second largest supplier to the food service business. Ralston Purina, meanwhile, in October acquired ITT's Continental Baking Co.

Central Soya Co. has 9 soybean crushing plants, 7 of them in the USA at: Gibson City. Illinois; Decatur and Indianapolis, Indiana; Bellevue, Delphos, and Marion, Ohio; and Chattanooga, Tennessee. These 7 U.S. plants are said to have a total capacity of about 10,000 tons/day of soybeans. The 2 plants outside the U.S. are in Utrecht, The Netherlands, and Victory Soya Mills in Toronto, Ontario, Canada.

Ag Processing, a cooperative based in Omaha, Nebraska, operates 6 soybean crushing plants in the USA at: Van Buren, Arkansas; Eagle Grove, Sergeant Bluff, and Sheldon, Iowa; Dawson, Minnesota; and St. Joseph, Missouri. Total crushing capacity is estimated at 11,000 tons/day of soybeans. Ag processing is now entering the edible oil refining business, constructing its first refinery adjacent to its soybean crushing plant at St. Joseph, Missouri. Expected to be completed in 1985, it is rated to have a refining capacity of 12 tank cars (720,000 pounds) of soybean oil per day.

Two poultry-related firms that are building oil refineries next to their soybean crushing plants are Perdue Inc. of Salisbury, Maryland, and Townsends of Millsboro, Delaware. Each refinery will have a capacity of 12 tank cars (720,000 pounds) of soybean oil per day.

According to the *Soya Bluebook,* the capacities of Perdue's two crushing plants are 700 tons/day at Salisbury, Maryland, and 600 tons/day at Cofield, North Carolina. Townsend's single crushing plant has a 1,200 tons/day capacity.

1201. Belleme, John. 1985. New developments at American Miso Co. (Interview). *SoyaScan Notes.* April 2. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** In Feb. 1984 (actually 1 Oct. 1983) John sold his ownership in the American Miso Co. to Barry Evans. Originally, John, Sandy Pukel, and Barry each owned one-third of the business. Before that, it had 6-7 owners. First Sandy (under pressure from Barry) sold his one-third to Barry, which made Barry the majority shareholder. After that, Barry let John run the company, which is doing very well in terms of productivity and profitability. They are selling all the miso they can possibly make.

At the time John sold his stock, he set up a new corporation named Just In Foods, Inc. (named after his son, Justin) to make second-generation miso products. John recently sold Just In Foods (which makes Miso Master brand products) to Barry Evans, because John doesn't own a miso plant. John is now a paid consultant for American Miso Co.

Miso Master is a marketing company for miso and miso products, and also a brand name. Chick Peaso is a mellow miso made with chick-peas instead of soybeans; it contains no soy. Introduced in May 1984, it was first sold in bulk from Great Eastern Sun but is now sold in 1-pound plastic bags.

Two tofu-miso dips were introduced in Nov. 1984; they are made by Nasoya using John's miso. They are both selling well, under the Miso Master label. Another new product is a delicious spaghetti sauce produced by Ventrillos in New York; it is made with a very mellow miso, low in salt. John sells John Troy about 35,000 lb/year of mellow miso; that's all Troy uses but Belleme does not make much money on this. Troy's miso mustard has 3-month amakuchi miso in it. John first saw this product in Fukuoka, Japan, made by Toshi Shiroozu, a man who makes mellow white miso for Eden Foods; it was in 1-pound packages, exported by Muso Shokuhin. John had a product named Mellow Ebony Miso, made with black soybeans. It was delicious but the color was grotesque, so he phased it out.

Another new non-profit organization is the Institute for Fermented Foods. Its logo is a pickle barrel with a rock on it borrowed from the book *Miso Daigaku.*

Pretty soon John is going to stop making miso. He is now training Don DeBona, who Barry sent to be trained. After that, John plans to run Barry's Just In Foods full time. John's wife, Jan, is writing a book on Japanese foods. John plans to go back to Japan for a while. Address: North Carolina.

1202. **Product Name:** Traditional Red Miso, Mellow White Miso, Sendai Genmai Miso, Traditional Barley Miso, Mellow Barley Miso, Amakuchi Mugi Miso, or Inaka Mugi Miso.
Manufacturer's Name: American Miso Co., Inc.
Manufacturer's Address: Box 541, Route 3, Rutherfordton, NC 28139.
Date of Introduction: 1985 April.
Ingredients: Barley: Soybeans, barley koji, sea salt, well water. Red: Soybeans, brown rice koji, sea salt, well water.
Wt/Vol., Packaging, Price: 1 lb.
How Stored: Refrigerated.
New Product–Documentation: Label. 1985. 3 by 4.5 inches. Self adhesive. Barley: Black and brown on white. Red: Red and black on white. "All natural. Unpasteurized. For over 400 delicious recipes, see *The Book of Miso* by William Shurtleff & Akiko Aoyagi." Label. 1985. 3.25 by 4 inches. Self adhesive. Blue and black on white. Fine line farm illustration. "Inaka Mugi Miso. Traditionally-made organic miso. Non-pasteurized. No preservatives. Country barley miso. Aged at least 24 months." Ad in Macromuse. 1984. No. 18. Winter. p. 47. And in East West Journal. 1985. April. p. 23. "Introducing Our 7 New Misos. Traditionally Made and Superbly Delicious." Leaflet. 8½ by 11 inches.

Labels (2-color) reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center.

Labels (plastic tubs for all 7 types) sent by American Miso Co. Each 1-pound tub is 4.5 inches across the top, and 3 inches deep. Black, brown, and one other bright color on yellowish beige. Several varieties (Traditional Red, Traditional Barley) have the Miso Master logo on the lid. Ingredients for each are listed but no nutritional composition is given, so the salt content is unknown. "Traditionally-made organic miso. All natural. Unpasteurized. Refrigerate. Naturally fermented soybean paste. Made with imported Lima sea salt." Circle K Kosher. On the side of each tub is a recipe, a statement about Miso Master, and a statement about this particular type of miso. Amakuchi Mugi Miso has been renamed Sweet Barley Miso, and Inaka Mugi Miso has been renamed Traditional Barley Miso.

Letter (fax) from Don DeBona. 1997. April 20. America Miso began selling its miso in plastic tubs soon after Don took over in 1985. Initially and before that it was sold in plastic bags. Since 1996 it has been available in glass jars (10 oz) as well.

1203. American Miso Co., Inc. 1985. Introducing our 5 misos. Traditionally made and superbly delicious (Ad). *East West Journal.* April. p. 23.
• ***Summary:*** This half-page, black-and-white ad begins: "The American Miso Company is proud to present its own domestic organic misos. From the choicest cultured organic rice or barley and whole organic soybeans, to our deep well water and pure sea salt, we use only the finest ingredients available. Then naturally aged in wood... Because all our misos are unpasteurized and high in enzymatic activity, refrigeration is recommended." The five are: Traditional red miso. Mellow white miso. Traditional barley miso. Mellow barley miso. Inaka mugi miso (Country barley miso). The American Miso Company logo, crossed sheaths of grain in a circle, is in the lower right corner. Address: Box 541, Route 3, Rutherfordton, North Carolina 28139. Phone: (704) 287-2940.

1204. Leffel, Robert. 1985. Report on the National Soybean Breeders Workshop and joint session with soybean physiologists (Memphis, TN: February 25-27, 1985). *Eurosoya* No. 3. p. 84. April. [Eng]
• ***Summary:*** "Public and Commercial Soybean Breeders of the United States and Canada and their guests, Soybean Physiologists, held a National Soybean Research Workshop with special emphasis on soybean physiology at Memphis, Tennessee, February 25-27, 1985.

"The Public Breeders Coordination Sessions on Monday afternoon, February 25 and Wednesday morning, February 27, included summaries of current soybean research in the areas of cold tolerance, heat tolerance, drought tolerance, length of seed fill, harvest index, nitrogen fixation, leaf physiology (leaf and canopy photosynthesis and specific–leaf weight), plant architecture (morphology), plant development / photoperiodic response, protein quantity and quality, oil quantity and quality, mineral nutrition, isozymic variation, and Phytophthora rot resistance.

"A copy of a summary report on a topic is available from European Soybean Cooperative Research Network Coordinator, Maurice Arnoux, upon request.

"The Joint Session between Soybean Breeders and Soybean Physiologists on Tuesday, February 26 included the following topics:

"Photoperiod and temperature effects on seed filling by Bob Patterson and David Raper, North Carolina State University

"A plant breeder's view of seed filling period by Todd Pfeifer, University of Kentucky

"Harvest index as a tool to study yield development by Steve Spaeth, Washington State University and Luis Salado-Navarro, University of Florida

"Physiology of flower development by Judy Thomas, North Carolina State University

"Mechanism of flower abortion by Dean Dybing, ARS/USDA and South Dakota State University

"Genetic responses to photoperiod by Perry Cregan, ARS/USDA Beltsville, Maryland

"Drought tolerance–a panel discussion moderated by Bill Schapaugh, Kansas State University

"Cold tolerance by David Hume, University of Guelph [Ontario, Canada]

"Genetic variation in nutrient uptake by Rufus Chaney, ARS/USDA Beltsville, MD

"Water and nitrogen limitations to soybean yield by Tom Sinclair, ARS/USDA and University of Florida

"Limitation of nitrogen in soybean productivity by Jim Harper, ARS/USDA and University of Illinois

"Increasing yield by selection for canopy photosynthesis by Roger Boerma, University of Georgia

"Biotechnology in soybean-cellular systems by Glenn Collins, University of Kentucky

"A practical look at plant breeding–a panel discussion moderated by John Schillinger, Asgrow Seed Company

"Summaries of these papers are not available but the reader is referred to the speakers and their research publications in the designated areas of research." Address: Agricultural Research Service, USDA, Beltsville, Maryland.

1205. American Natural Foods. 1985. You're gonna' love that Smoky Mountain twang (Ad). *Vegetarian Times.* June. Inside rear cover.
• ***Summary:*** This is a full-page color ad (copyright 1984) for Smoky Mountain Sizzlin', an all-natural barbecue sauce. The left half shows the large glass bottle and label, with the Great Smoky Mountains in the background. The right half of the ad talks (in colorful Appalachian hillbilly style)

about the origins of barbecue, and the product. "Probably the best barbecue in America comes from the Great Smoky Mountains. Ever since the Cherokee ladies were gracious enough to teach the new settlers their cookin' secrets, there's been some all-mighty sweet smoke mixin' down along the hollows with the mist and the mountain laurel. That's what new Smoky Mountain Sizzlin's all about. Mixin' sweet smells, good times and powerful fine eatin.'"

This sauce is "made from real special things–Red ripe tomatoes, virgin peanut oil, molasses, and a secret bunch of natural herbs and spices. And apple cider vinegar and red miso, both made and wood aged right here in the Great Smokies. It's all natural and all mighty delicious." Note: The fourth ingredient is red miso (made in North Carolina) and the sixth is tamari soy sauce. Address: Suite 21 The Courtyard, Chapel Hill, North Carolina 27514. Phone: (919) 929-0113.

1206. Belleme, John. 1985. Update on American Miso Co. (Interview). *SoyaScan Notes.* July 2. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** About 18 months ago [in Feb. 1984] John sold his interest in American Miso Co. to his partner, Barry Evans. Barry now owns all of the company; he is not interested in teaching interns. The company's core market is hard-core macros. They must sell 500,000 pounds/year just to break even. Address: P.O. Box 457, Saluda, North Carolina 28773.

1207. **Product Name:** Naturally Delicious Fried Rice Sandwich (With Tofu).
Manufacturer's Name: Naturally Delicious.
Manufacturer's Address: Asheville, North Carolina. Phone: 704-253-7656.
Date of Introduction: 1985 July.
Ingredients: Organic brown rice fried with scallions and soy sauce, wrapped in a whole wheat tortilla with steamed organic carrots, alfalfa sprouts, miso tahini sauce, tofu, green leaf lettuce.
Wt/Vol., Packaging, Price: 12 oz.
How Stored: Unrefrigerated and perishable.
New Product–Documentation: Label sent by Paul Duchesne. 1989. Aug. 11. Handwritten "Naturally delicious. Made fresh today. To eat; peel back wrapper from one end." Talk with Paul Duchesne. 1989. Aug. Barbara Svenning originally learned how to make this sandwich from Paul. She made it at the Natural Cafe in Santa Fe, New Mexico, with her husband Marty Roth. When she separated from Marty, she moved to Asheville, North Carolina, where Jack Garvey (a former husband) and her children were living. She made a line of at least 28 Fried Rice Sandwiches (many of which contain tofu) and whole meals, which she sold at various places.

Talk with Dinner for the Earth. 1989. Aug. 15. This is a natural food store and deli that has been in business for 13 years and has sold Barbara's line of sandwiches for 3-4 years. In April 1989 Barbara Svenning became manager of the Deli at Dinner for the Earth (160 Broadway St. Phone: 704-253-7656). She lives in Black Mountain, North Carolina.

Talk with Barbara Svenning. 1989. Aug. 21 and 23. It was a coincidence that Great Eastern Sun was established in Asheville. Barry Evans was partners with Sandy Pukel and Michio Kushi. They had a miso factory [American Miso Co.] in North Carolina and they wanted to establish GES near it. Marty suggested Asheville, since it was a good location and he could live their near his wife's children (Jack Garvey lived in Asheville). Barbara did not make her brown rice and tofu sandwiches while Marty was working at Great Eastern Sun. After Marty Roth had set up Great Eastern Sun in Asheville, North Carolina, he continued to live in nearby Black Mountain but worked for Chico-San for a while and set up the Ohsawa America mail order program for Bob Kennedy. Then he began working for Westbrae in California, where he and Barbara and her son relocated. After 2 years, in July 1985, when her son was age 3, she left Marty Roth (they had never been married), and returned by herself to Asheville, North Carolina to be with her two other children. In Asheville, she established a new company named Naturally Delicious. She ran it out of some else's kitchen and sold 12-15 sandwiches a day at only one store, Nothing But Natural, which promised to tell any health inspectors that the sandwich was made in their kitchen. During that time another woman, Barbara Hoffman, who now lives in Israel, sort of took over the sandwich business. When Nothing But Natural went out of business, she moved to Black Mountain (where she still lives), got her own kitchen, and sold the sandwich exclusively to Dinner for the Earth, where she now runs the deli. Yet she still owns the brown rice sandwich business. She makes them at home and sells them to Dinner for the Earth. "Its still my little baby, still an underground business. I make about 15 fresh each day and they are different every day. Only the chapati, fried rice, and lettuce are the same. I make a Mexican, and Indonesian, a Chinese, etc. Not all contain tofu. Sometimes its a tofu sauce, or barbecued or baked tofu. I guarantee the sale and take back any not sold that day. There is a profit of about $1 each. I also make another nice wheat-free tofu sandwich called Barbecued Tofu on Millet. It's on square slices of millet bread. It started it about 6 months ago."

1208. S&S Public Relations, Inc. 1985. Miso–Japan's 1,000 year old health and flavor secret now in America (News release). 40 Skokie Blvd., Suite 430, Northbrook, IL 60062. 3 p. + photo. Oct. 6.
• ***Summary:*** About miso, American Natural Foods, and their new line of four products. A black-and-white photo shows a bottle of The Works. An attachment, titled "Cooking

with miso–General principles," was developed by Just In Foods [American Miso Co.] in 1984. Note: This news release generated widespread publicity for ANF. Address: Northbrook, Illinois. Phone: 312/291-1616.

1209. King, Kathryn H. 1985. Company's product works for flavor. *Triangle Business* (*North Carolina*). Nov. 11-17.
• ***Summary:*** About John Troy and American Natural Foods. When John and his wife was producing natural candy bars, he learned that a miso plant was being built in Rutherfordton, North Carolina. He went to visit, and based on that visit he gathered together a group of investors to create American Natural Foods 18 months ago. The 30 shareholders collected $500,000 to start the company. Some of them also take an active part in running the company.

1210. *Shelby Report of the Southeast* (*Gainesville, Georgia*). 1985. What's new. 19(12): Dec.
• ***Summary:*** In Jan. 1984 John Troy teamed up with a group of investors to start American Natural Foods, based in Chapel Hill, North Carolina. Their products contain miso, a flavor enhancer made from soybeans and grains. For more information call (919) 929-1240.

1211. Edward & Sons Trading Co. 1985. What is miso? (Brochure). Saluda, North Carolina. 4 p. 28 cm.
• ***Summary:*** The inside two pages of this brochure each bear a full-page color ad. Three sections on the cover are titled: The history of miso. The benefits of miso. Miso today. On the back are four recipes using Edward & Sons miso products and other natural food products sold by the company. Address: Route 1, Box 153, Saluda, North Carolina 28773.

1212. Great Eastern Sun. 1985. All About AhSoy–The Really Soft Drink (Leaflet). Enka, North Carolina. 1 p. Front and rear. 28 cm.
• ***Summary:*** See next page. Questions and answers about this soymilk. It is made by San-iku Foods in Japan. "It drinks like a shake–and you can use it to bake." Address: Enka, North Carolina.

1213. **Product Name:** Miso [Chick Peaso (Chick Pea Miso), Yellow (Shinshu) Miso, Mellow Ebony Miso (with Black Soybeans), or Koji Miso].
Manufacturer's Name: Institute of Fermented Foods.
Manufacturer's Address: Rutherfordton, NC 28139.
Date of Introduction: 1985.
Ingredients: Yellow and Koji: Rice koji, soybeans, sea salt. Chick Pea: Rice koji, chick peas (garbanzo beans–no soybeans), barley, sea salt. Ebony: Rice koji, black soybeans, sea salt.
New Product–Documentation: Labels from Institute of Fermented Foods. 1985. 3.25 by 4 inches. Self adhesive. Two color labels for each miso type: Yellow and black, gold and black, red and black, orange and black, grey and black on white. "Non-pasteurized. No preservatives." Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center.

Talk with John Belleme. 1985. April 2. John introduced Chick Peaso in May 1984. It is a mellow miso made with chick-peas instead of soybeans; it contains no soy.

Talk with John Belleme of North Carolina. 1996. Aug. 27. John made Chick Peaso, but he got the idea from Muramoto Sensei (probably via Lino Stanchich in about 1982-83), who made and sold small batches of chick pea miso at his Asunaro Eastern Studies Institute, high on Mt. Veeder, in Glen Ellen, California. Muramoto's product, though sold mostly to his students and friends, was probably America's first (perhaps the world's first) commercial chick pea miso. However John thinks that the miso may have also contained some soybeans–although he has no idea what proportion.

Talk with John Belleme. 1999. Nov. 6. The Institute of Fermented Foods was an entity that John created out of the blue (it was never registered or official) as part of his ongoing struggle with Barry Evans.

Note: This is the earliest known commercial miso product made without soybeans; chick peas were used instead.

1214. **Product Name:** Miso Master Miso-Tofu Dips.
Manufacturer's Name: Just In Foods, Inc.
Manufacturer's Address: Box 541, Route 3, Rutherfordton, NC 28139.
Date of Introduction: 1985.
New Product–Documentation: Leaflet. Back to back, 8½ by 11 inch, 3 color. Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. Miso Master. You've got to try these two extraordinary new Miso-Tofu Dips from Miso Master.

1215. **Product Name:** Miso Master Gold Label Spaghetti Sauce.
Manufacturer's Name: Just In Foods, Inc.
Manufacturer's Address: Box 541, Route 3, Rutherfordton, NC 28139.
Date of Introduction: 1985.
New Product–Documentation: Leaflet. Back to back, 8½ by 11 inch, 3 color. Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. Introducing Miso Master. Gold Label Spaghetti Sauce. Its the perfect marriage of tomatoes and miso.

1216. **Product Name:** Onozaki Miso [Red Miso].
Manufacturer's Name: Just In Foods, Inc.
Manufacturer's Address: 92 MacIntosh Rd., Asheville, North Carolina 28806.
Date of Introduction: 1985.


ah soy™
It drinks like a shake – and you can use it to bake. Ah Soy is the most versatile, nutritious and delicious soft drink you can buy.
Is a soft drink so smooth, so creamy rich, so refreshing, really good for you?
Ah Soy is.
Ah Soy is all natural and non-dairy. It's full of essential amino acids and high quality proteins growing children need to build strong healthy bodies. It's free of cholesterol too, which makes it perfect for many dieters. Mothers like the fact that it's sweetened only with natural barley malt.
There is no milk sugar or white sugar in Ah Soy. And of course there are no chemicals, preservatives or artificial ingredients.
You can use Ah Soy on all your beloved breakfast cereals, as your secret to spectacular sauces, to make extra fluffy pancakes and waffles, for muffins, cookies, and as the perfect, healthful, all natural thirst quencher. Enjoy all your favorite flavors - Original, Vanilla, Carob and Chocolate too.
Finally A ~~THE~~ REALLY SOFT DRINK
Finally, you've got a Really Soft Drink.
Ah Soy.
Great Eastern Sun
P.O. Box 327
Enka, NC. 28728
(704) 252-3090
©1984 Great Eastern Sun
VANILLA NATURAL NON-DAIRY BEVERAGE
CHOCOLATE NATURAL NON-DAIRY BEVERAGE
ORIGINAL NATURAL NON-DAIRY BEVERAGE
ah soy
THE REALLY SOFT DRINK™
NET 6 FL. OZ. (180 ml)

Ingredients: Rice koji, soybeans, sea salt, well water.
Wt/Vol., Packaging, Price: 1 lb plastic bag with pressure-release valve.
How Stored: Refrigerated.
New Product–Documentation: This miso is imported in bulk from Onozaki Kojiten in Yaita, Japan. It is packaged by American Miso Co., Rutherfordton, North Carolina. Label sent by John Belleme. 1985. 3 by 3.5 inches. Gold and red on black–very stylish. Pressure sensitive on plastic bag with pressure release valve at top. Front panel text: "Handmade miso. Do not block valve. Non-pasteurized. No preservatives." Back panel text (black letters on white): "Onozaki miso is much more than just a great tasting miso. Its deep, rich flavor and subtle character is a vivid reminder of a vanishing Japanese tradition. And with good reason.

"For like Japan's ancient feudal miso masters, Takamichi Onozaki begins by personally growing, and carefully processing his own organic rice.

"Then, the Onozakis perform each time-proven step of old world miso-making in accordance with their own long family traditions. Finally, long aging in huge seasoned wood vats guarantees the superlative quality of their natural miso.

"Use Mr. Onozaki's wonderfully delicious miso to enhance the flavor and nutrition of soups, spreads, dressings and sauces.

"For more about the unique family and their work, see East West Journal, 'The Miso-Master's Apprentice,' April, 1981."

1217. Carver, Brett Frederick. 1985. Inheritance of oil quality traits in soybean seed. PhD thesis, North Carolina State University at Raleigh. 95 p. Page 2295 in volume 46/06-B of Dissertation Abstracts International. *
Address: North Carollina State Univ. at Raleigh.

1218. Schmitt, D.P. 1985. Plant-parasitic nematodes associated with soybeans. In: R. Shibles, ed. 1985. World Soybean Research Conference III: Proceedings. Boulder, Colorado: Westview Press. xxiii + 1262 p. See p. 541-46. [22 ref]
• ***Summary:*** "Over 100 species of plant-parasitic nematodes are associated with soybean plants. Most of these are efficient parasites and cause little or no damage to this crop. However, a few are highly virulent and cause considerable damage. The soybean cyst nematode, *Heterodera glycines* Ichinohe, poses the greatest threat of any species to the crop. (This nematode will be discussed in two other papers in these Proceedings: "Concept of Race in Soybean Cyst Nematode" by V. H. Dropkin, and "Strategies for Race Stabilization in Soybean Cyst Nematode" by R. D. Riggs.) Root-knot nematodes (*Meloidogyne* spp.) are important on a worldwide basis. Other nematodes of economic importance, but generally more regional, include the reniform (*Rotylenchulus reniformis* Linford & Oliveira), sting (*Belonolaimus longicaudatus* Rau), lesion (*Pratylenchus* spp.), and lance (*Hoplolaimus columbus* Sher) nematodes. Many other nematodes are associated with soybean plants, but their relationships to soybean growth and yield need to be characterized." Address: Dep. of Plant Pathology, North Carolina State Univ., Raleigh, NC 27607.

1219. Troy, John. 1985. American Natural Foods 1985 business plan. Chapel Hill, North Carolina: American Natural Foods. 52 p. 28 cm. [4 ref]
• ***Summary:*** Contents: Introduction: The president's letter, purpose, corporate vision. Background: The natural foods industry, American Natural Foods, Inc. Marketing: The markets, the consumers, marketing strategy, distribution and sales strategy. The products. Manufacturing plans, organizational plans, board of directors, management, current reality. Financial plans. Appendix.

John Troy was the creator of Elf Works, Ltd., whose first popular product was Wizard Baldour's Hot Stuff, introduced in April 1981. He later introduced a number of other popular products containing miso. This is the business plan for a new publicly owned corporation whose articles of incorporation were filed on 23 Jan. 1984 and which will make products containing miso such as Miso Mustard and Smoky Mountain Sizzlin'.

Note: The company went bankrupt from overextension several years after it began operation. Address: Suite 21 The Courtyard, Chapel Hill, North Carolina 27514. Phone: 919-929-0113.

1220. Sarda, Patricia T. 1986. Ancient Japanese foodstuff is key to company's new line of products. *Leader Newsmagazine* (*Raleigh, North Carolina*). Jan. 16-23. p. 14-15.
• ***Summary:*** Miso, a product that has little or no recognition in the Triangle area, is the key to the success of American Natural Foods in Chapel Hill. John Troy is president of the fledgling company, Carol Rego is a major shareholder, and Larry Sarling is operations manager. The company's miso based line of natural condiments are now available in over 3,000 specialty food stores and supermarkets across America.

Troy started his company (named Linden's Elfworks) 8 years ago out of his home in the Triangle. He began by marketing a nutritious candy bar. A few years later the company moved to its present quarters at Suite 21, The Courtyard, in Chapel Hill and began developing Wizard Baldour's Hot Stuff. The company now has four products: Miso Mustard, Wizard Baldour's Hot Stuff, The Works, and Smoky Mountain Miso Sauce. Two more are under development: Sea Sauce (a condiment for seafood) and Spark! (a spicy powder condiment). The Miso Mustard is produced in Emeryville, California; the other three are made in Winston-Salem at Mrs. Campbell's Canning company. A photo shows John Troy at his desk talking on the telephone.

On the wall behind him is a framed painting of a wizard; on his desk is a bottle of The Works.

1221. Crump, Emily. 1986. Miso: A new soybean food product is joining the natural foods arena. *Durham Morning Herald* (*North Carolina*). Jan. 30. p. 1C.
• ***Summary:*** A full-page article about American Natural Foods in Chapel Hill and American Miso Co. in Rutherfordton. The miso company produces about 200,000 lb/year of miso. Contains recipes for: Cheese and onion quiche (with red miso). Miso pate. Lentil or split pea soup with miso. Photos show: (1) Jan Belleme, with a baby on her back, hand-mixing cooked soybeans and koji. (2) Jan transferring the mixture into a giant wooden vat at the American Miso Co. in Rutherfordton, North Carolina. (3) Jars of Miso Mustard, Smoky Mountain Sizzlin', and BeeNut Butter [made with peanut butter, honey, and miso]–all made by American Natural Foods in Chapel Hill, North Carolina. Address: Staff writer.

1222. Burnett, Richard. 1986. Miso: MEE So–Japanese soybean foodstuff. Buddhist invention, secret behind John Troy's success [American Natural Foods]. *Chapel Hill Newspaper* (*North Carolina*). Feb. 23. p. 1D, 16D.
• ***Summary:*** A biography of John Troy, whose company buys some 50,000 lb of miso a year from the American Miso Co. in North Carolina. Miso is the oldest condiment known to civilization. About 15 years ago John Troy (a native of Durham, North Carolina) "dropped out" and spent almost 5 years with little or no money. He had previously founded a lucrative chain of stereo stores throughout the South and had all the money he needed. But he wasn't happy. He left it all to search for a deeper meaning in life. During his "dropout" years he got interested in what different religions and philosophies taught about higher states of awareness, and the role that food could play. Try got interested in the nutritional and spiritual benefits of alternative foods, especially soybean products.

Troy said that American Natural Foods, based in Hillsborough, North Carolina, will gross more than $500,000 in 1985-86, more than double the sales volume of the previous year, which was the company's first year in business.

Troy first learned about miso about five years ago while he was managing a health food store in Chapel Hill. He and his wife Carol, at the time, had been making and marketing a health food candy bar through their business called Elf Works Inc. They had been buying miso for themselves while trying to find a way to market it to the public. Troy describes miso as "the highest state of what you can do with a bean and a grain; it is the oldest known condiment in civilization." A photo shows John Troy with four of his products: Hot Stuff, Smoky Mountain Sizzlin', Miso Mustard, and BeeNut Butter. Each contains miso as a key ingredient. Photos show: (1) John Troy holding one of his miso products, and standing by many cases of these products. (2) A hand pouring a bottle of Hot Stuff. (3) Jars of Miso Mustard, Smoky Mountain Sizzlin', and BeeNut Butter. Address: Staff writer.

1223. Great Eastern Sun. 1986. Information packet on Miso Master miso (Leaflets). Enka, North Carolina. 5 p. 28 cm.
• ***Summary:*** Contains the following leaflets: (1) Miso Master miso main selling points. (2) Miso Master misos: Traditional red miso, Mellow white miso, Country barley miso, Mellow barley miso, Sweet white miso, Chick pea miso. (3) Miso Master nutritional information. Address: P.O. Box 327, Enka, North Carolina. Phone: (704) 252-3090 or (800) 334-5809.

1224. American Miso Co. 1986. Hand-crafted organic miso: Made in the USA (Ad). *East West.* March. p. 10.
• ***Summary:*** This one-third page vertical black-and-white ad begins: "Near the Smoky Mountains in the green, rolling country of western North Carolina, the Miso Master continues a centuries-old tradition of hand-crafted miso."

"Containing living cultures, they are truly a living food. Look for Miso Master in the refrigerated section of finer natural foods stores everywhere.

"With its velvety, creamy texture and its superb flavor, Miso Master miso is perfect for soups, dressings, dips, spreads and sauces. For free recipes using Miso Master miso, send a self-addressed, stamped envelope to: Great Eastern Sun, P.O. Box 327, Dept. H, Enka, NC 28728. From our kitchen to yours–traditional Japanese miso, made for you, in the USA."

At the top of the ad is an illustration (line drawing) of a traditional Japanese miso shop, with thatched straw roof and several wooden kegs and barrels outside. Near the bottom of the ad is the Miso Master logo, an illustration showing the head and shoulders of a Japanese miso master, with a knotted headband, in front of a large wooden vat of miso. Below it: "Distributed by Great Eastern Sun, 92 McIntosh Rd., Asheville, North Carolina 28806."

1225. **Product Name:** Miso Master Miso [Country Barley, Traditional Red, Mellow White, Mellow Barley, Sweet White, or Chickpea with Barley].
Manufacturer's Name: Great Eastern Sun (Marketer). Made in North Carolina by American Miso Co.
Manufacturer's Address: 92 McIntosh Rd., Asheville, NC 28806. Phone: 1-800-334-5809.
Date of Introduction: 1986 March.
Ingredients: 1996: Organic soybeans, organic partially polished brown rice, sun dried sea salt, well water. Organically grown/processed in accordance with the California Organic Foods Act of 1990.
Wt/Vol., Packaging, Price: 1996: 1 lb plastic tub. Retails for $6.59 (Lafayette, California).
How Stored: Refrigerated.

New Product–Documentation: Ad in East West. 1986. March. p. 10. Nov. p. 81; Soy Power. 1987. Catalog. All 16 oz. Product with Label purchased at Open Sesame in Lafayette, California. 1996. Dec. Price: $6.59. 4.25 inch diameter lid. Black, brown, and light green printed on clear plastic. An illustration shows the Miso Master logo. Text on the side of the tub reads: "The American Miso Company is proud to present domestic organic miso." Soyfoods Center taste test. 1996. Dec. Excellent flavor, color, and aroma.

1226. Sturgeon, Bruce. 1986. Great Eastern Sun, soymilk, and St. Peter Creamery (Interview). *SoyaScan Notes.* April 11. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** GES presently imports 3 containers a month of Ah-Soy. There are 3,000 cases/container and 30 packages/case. Each package is 180 ml. So this is 270,000 packages/month or 48,600 liters/month or 12,840 gallons/month or 154,081 gallons/year. Percentage of sales by flavor are vanilla 35%, original 30%, chocolate 18%, carob 17%. Sales have been flat for the last year due to increasing costs due to the poor exchange rate. They will soon make the product in the USA in Tetra Pak, but also continue to import some from Japan.

St. Peter Creamery in Minnesota has bought/licensed the Oberg patent. Their biggest customer is Ice Bean (soy ice cream, from The Farm in Summertown, Tennessee). They are a dairy company that also makes cheese for Kraft. They have three plants and will soon move to or start a new one in South Dakota. Address: Director of Marketing, Great Eastern Sun, 92 Macintosh Rd., Asheville, North Carolina 28806. Phone: 808-438-4730.

1227. Belleme, John; Belleme, Jan. 1986. Japanese foods. *Vegetarian Times.* April. p. 40-42, 49, 59.
• ***Summary:*** Adapted with permission from the book *Cooking with Japanese foods: A guide to the traditional natural foods of Japan.* Contains long sections on miso, shoyu, tamari, umeboshi, shiitake, and sea vegetables. Address: Rutherfordton, North Carolina.

1228. Goldstein, Nora. 1986. Small company with a big vision [John Troy and American Natural Foods in North Carolina]. *In Business.* April. p. 30-31.
• ***Summary:*** John Troy "is a partner in American Natural Foods, based in Hillsborough, North Carolina. The company was started two years ago to develop and market condiments made with miso, a soybean-derived flavor enhancer. According to Troy, miso is the oldest known condiment to man, and current research shows it may have properties that help to prevent cancer. It can also be used as a salt substitute.

"The first product in American Natural Food's line was developed by 'accident.' Troy, who gained valuable business experience by launching a major stereo chain in the South in the 1960s, became very involved with healthy eating and in the early 1970's, he founded a business with his wife making ginseng candy bars. One day, while taking a lunch break, a string of hot red peppers fell into a built-in food blender." From that emerged the company's first miso product named Hot Stuff.

"A source of miso was located in North Carolina, and Troy and his wife began producing and marketing Hot Stuff along with the ginseng candy bars. In 1984, they decided to sell the candy company and form another business–American Natural Foods (ANF)–to develop and market miso-based condiments. The company is uniquely managed, with the principals spread out around the country.

"'We have five people, all on the front line, who manage themselves,' says Troy. 'I do R & D and new product development, raise money, and keep the vision. Our director of marketing and advertising is in Boston [Massachusetts] and our manufacturing plant, owned and operated by another stock-holder, is located in Winston-Salem, North Carolina.'

"The partners sold 15 percent of the company's stock to raise $150,000 in initial capital. Since then, an additional $350,000 was raised by selling stock to outside investors. There are now eight products sold by ANF, including a barbecue sauce, peanut butter, relish, a ginger sea sauce and a dried spice. Sales for the first year were $250,000; for fiscal year 1985, which end in June, sales are expected to reach $500,000, with $1 million projected for fiscal year 1986." So far, ANF's products are sold mostly in natural- and health food stores–3,000 outlets nationwide. In the future, they plan to enter grocery stores, delivering their products direct to the store door, starting in North Carolina. "Troy describes the method as [bottom-up] guerilla marketing warfare. 'That's how the little guys get started in the grocery business,' he says. 'We are employing that strategy in North Carolina and after six months, our sales in the concentrated area between Raleigh and Charlotte are exceeding our sales nationwide.'" A photo shows Troy holding a bottle of Miso Mustard.

1229. Marking, Syl. 1986. New field for space age technology: Pest scouting. *Soybean Digest.* April. p. 12.
• ***Summary:*** A software program will enable farmers to find out what day to start scouting for insects. That's the next step in a process from the just-completed Consortium for Integrated Pest Management (CIPM).

One of the offshoots was a Soybean Integrated Crop Management model. Launched in 1979, the multi-university project (headed by Billy Caldwell at North Carolina State Univ.) was funded by the EPA and USDA.

1230. Belleme, Jan; Belleme, John. 1986. Cooking with Japanese foods: A guide to the traditional natural foods of Japan. East West Health Books, 17 Station St., Brookline, MA 02146. xi + 220 p. Illust. Index. 25 cm. [45 ref]
• ***Summary:*** A good study from a macrobiotic viewpoint, with more than 200 macrobiotic recipes. The authors

studied in Japan and speak Japanese. Contents: Foreword. Acknowledgements. Introduction. Fermented Foods: miso, shoyu, tamari, brown rice vinegar, sake, mirin, koji, amazake, pickles, umeboshi, ume su, medicinal teas, ume extract, bonito flakes, natto. Noodles: cooking noodles, udon, soba, somen, clear noodles. Grains, incl. rice, mochi, seitan, fu gluten cakes, hato mugi [*hatomugi*] (Job's tears), rice syrup, rice bran. Vegetables: shiitake, daikon, Hokkaido pumpkin, Chinese cabbage, burdock, jinenjo, lotus root. Sea vegetables: kombu, nori, wakame, hijiki and arame, kanten (agar). Beans: azuki beans, black soybeans, tofu. Condiments: kuzu, dark (toasted) sesame oil, goma (sesame seeds), tekka, shiso momiji (shiso leaf condiment), wasabi. Teas. Cooking utensils. Appendix: Composing meals, pronunciation guide, suppliers. Bibliography.

Amazake (p. 39-45). Contains a ½ page description plus good instructions for making basic amazake (thick "pudding" and thinner beverage), both from glutinous ("sweet") rice. Also recipes for Vanilla Amazake Pudding, Amazake Cream Puffs, Neapolitan Parfait, Carob Amazake Brownies, Bob's Coconut Amazake Macaroons, Amazake Bread (yeasted), and Unyeasted Amazake Bread. Perhaps the most lengthy information on amazake available in English up to this time.

Hato mugi ("Job's tears," p. 93) "resembles barley, but it is actually a member of the rice family. An easily digestible whole grain with only the tough outer husk removed, hato mugi contains less vitamin B-1 than brown rice but approximately twice as much protein, iron, vitamin B-2, fat, and slightly more calcium." It has long been used in China and Japan as a medicinal food, "for strengthening the stomach, purifying the blood, and restoring health. Since it is so effective in helping the body to discharge toxins, people who are sick and weak, and women who are pregnant, nursing a baby, or menstruating should eat it sparingly." Address: Rutherfordton, North Carolina.

1231. Troy, John. 1986. Update on work with American Natural Foods and miso (Interview). *SoyaScan Notes.* July 28. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** John is now $150,000 in debt. The natural foods market was much smaller than he had thought and than market studies indicated. There are only 200 good and fairly big natural foods stores in the USA. The biggest ones are: Bread and Circus, Alfalfa's, Mrs. Gooch's, Whole Foods in Texas, and Blue Bonnets in Texas.

John's products are now in 1,700 Kroger's stores. His three best-sellers are: (1) Miso Mustard, (2) Hot Stuff, and (3) Miso Sauce (a new product for chicken, with tahini and tamari). Address: North Carolina.

1232. *J. of the American Oil Chemists' Society.* 1986. Ozone damage in oil crops. 63(7):865. July.
• ***Summary:*** Observations in field test chambers and greenhouses have shown ozone has caused leaves of soybean, wheat, cotton, peanut and other agricultural crops to die prematurely, reducing yields and costing farmers money. Soybean yields decreased 12% when exposed to 0.05 parts per million of ozone in 1980-82. As ozone increased, yields declined for all the crops tested. At 0.06 ppm, for example, soybean yields were cut by 17%, and at 0.09 ppm the loss was 31%.

1233. **Product Name:** Smoky Mountain Miso Sauce.
Manufacturer's Name: American Natural Foods, Inc.
Manufacturer's Address: Box 2321, Chapel Hill, NC 27514.
Date of Introduction: 1986 August.
Ingredients: Incl. miso, tomatoes, tomato paste, apple cider vinegar, herbs and spices (cumin, oregano, cayenne peppers).
Wt/Vol., Packaging, Price: 12 oz glass bottle with red plastic twist-off cap. Retails for $2.39 (1986/08).
How Stored: Shelf stable.
New Product–Documentation: Label. 1986, undated. This is a miso-based barbecue sauce. "You'll love it on chicken!"

1234. Gist-brocades nv. 1986. We bring light to your need for starch processing enzymes (Ad). *Starch/Staerke* 38(9):Inside rear cover. Sept.
• ***Summary:*** Gist-brocades is headquartered in the Netherlands. Its slogan: "Biotechnology contributing to food, health and the environment." The company's U.S. office is: Gist-brocades USA, Inc., 5550 77 Center Drive, P.O. Box 241068, Charlotte, North Carolina 28224. Phone: 704-527-9000. Address: Industrial Enzymes Div., P.O. Box 1, 2600 MA, Delft, Holland. Phone: (015) 799111.

1235. **Product Name:** Sweet Cloud Sesame-Miso Munchies.
Manufacturer's Name: Great Eastern Sun (Marketer-Distributor). Made in North Miami, Florida, by Sprout Delights Bakery.
Manufacturer's Address: 92 McIntosh Rd., Asheville, NC 28806. Phone: 704-252-3090.
Date of Introduction: 1986 September.
Ingredients: Sweet Cloud Rice Syrup, crisp brown rice [like brown Rice Krispies], tahini, mellow white miso, pure vanilla, natural flavor.
Wt/Vol., Packaging, Price: 1.33 oz (38 gm) plastic bag. Retails for $0.69 (11/91).
How Stored: Shelf stable.
New Product–Documentation: Soya Newsletter. 1987. Nov/Dec. p. 7. Talk with Bruce Sturgeon of GES. 1988. Jan. 27. Gave manufacturer and introduction date.

Product with Label purchased from Smoky Mountain Natural Foods, Asheville, North Carolina. 1991. Nov. 15. 2.75 by 4.5 inches. Plastic bag. Tan, black, dark red, and white on pink. Illustration of white clouds against a pink sky. "All natural." Soyfoods Center product evaluation. 1991.

Nov. 28. Chewy and delicious.

Talk with Steve Bern of Sprout Delights. 1992. July 11. He introduced other flavors of these Munchies in about 1985 or 1986, then later Great Eastern Sun got interested in them shortly after GES introduced Sweet Cloud Rice Syrup in a jar. Only the sesame-miso flavor contains miso.

1236. Great Eastern Sun; American Miso Co. 1986. Miso Master (Ad). *East West.* Nov. p. 81.
• ***Summary:*** A full-page black, white and blue glossy ad for Miso Master products. "The miso master is truly one of Japan's national treasures." Address: Asheville, North Carolina 28806. Phone: (704) 252-3090.

1237. Dawes, Sonda. 1986. Sales were slow until Bob Waldo roasted his beans. *Delmarva Farmer* (*Easton, Maryland*). Dec. 2. Maryland ed.
• ***Summary:*** Bob Waldo is the enterprising owner of Holland Grain and Feed Co., Inc., a grain elevator in Suffolk, Virginia. Three years ago he began a side line business named Bean Sprout Inc., which sold dried soybeans directly to consumers. Sales were slow until friends convinced him to forget the dried beans and sell the roasted soybeans he had been preparing to demonstrate the product's versatility. Bean Sprout is currently filling orders for about 500 lb/month of roasted soybeans; in bulk they sell for $1.50/lb. Buyers include mail order customers, gift shops, and a North Carolina Company that supplies the crunchy beans to restaurants or their salad bars. "Waldo said the Virginia, Delaware and Maryland soybean boards have also placed orders with him for small 'introductory' packages to give away at their meetings." Taste tests have shown that Delta Pine 105 is the best soybean variety for making roasted beans. They look prettier and taste sweeter than other varieties. Photos show: (1) A local farmer helping himself to roasted soybeans kept in a handy gumball machine on the counter of Holland Grain and Feed Co. (2) Bob Waldo, with several packs of his roasted soybeans.

1238. Dunn, Carolyn; Liebman, Michael. 1986. Plasmid lipid alterations in vegetarian males resulting from the substitution of tofu for cheese. *Nutrition Research* 6(12):1343-52. Dec. Summarized in American Health, July 1987. p. 144.
• ***Summary:*** Blood cholesterol levels of 12 lacto-ovo vegetarian men, ages 20-48, were analyzed for 3 weeks as tofu was substituted for cheese. During another 3 weeks the volunteers passed up tofu for Monterey Jack cheese. In each period they ate a daily total of 2.5 oz cheese or 12 oz tofu, each containing about 240 calories. After the tofu phase, the subjects' mean cholesterol levels dropped an average of 16 mg/dl. No significant changes occurred during the cheese consumption phase. The increase in the ratio of polyunsaturated to saturated fatty acids from 0.9 (cheese period) to 1.8 (tofu period) appeared to be the primary mediator of the cholesterol lowering response associated with tofu consumption. Address: Dep. of Food & Nutrition, Univ. of North Carolina at Greensboro, Greensboro, NC 27412.

1239. Forsythe, W.A.; Green, M.S.; Anderson, J.J.B. 1986. Dietary protein effects on cholesterol and lipoprotein concentrations: A review. *J. of the American College of Nutrition* 5(6):533-49. Dec. [87* ref]
• ***Summary:*** Of the 30 animal studies reviewed, 27 showed significantly higher plasma total cholesterol levels in animals fed animal protein diets than on diets containing soy protein. Two studies did not demonstrate any significant difference and one was equivocal.

"Animal studies have shown that animal proteins, most notably casein, increase plasma total cholesterol concentrations compared with vegetable proteins, such as soy. Soy protein has been shown to be hypocholesterolemic in rats, swine, primates, and rabbits. Epidemiologic studies have disclosed that vegetarians have lower mean plasma cholesterol concentrations than populations consuming diets of mixed proteins... In human clinical experiments, substituting soy protein for mixed protein reduced plasma total cholesterol concentration in hypercholesterolemic subjects, but it causes only a small nonsignificant change in persons with normal plasma cholesterol concentrations. The mechanism responsible for the effects of different proteins on plasma cholesterol concentrations has not been established." Address: 1&3. Dep. of Nutrition, Univ. of North Carolina, Chapel Hill, NC 27514; 2. Rehov Otsar Hatsmahim 6/5, Herzlia, Israel.

1240. Oberlaender, Michaela. 1987. A sorcerer's sauce [John Troy and American Natural Foods miso condiments]. *Nation's Business.* Jan. p. 70.
• ***Summary:*** "Miso was available only as a raw material in health food stores–until John Troy came along. Now in hot sauce and 7 other Troy products, it is on the shelves of supermarkets." Before creating Hot Stuff, Troy and his wife, Carol, were making candy bars for Elf Works, a home business, in Chapel Hill, North Carolina. Two years ago he started American Natural Foods (ANF), raising $400,000 from 30 shareholders. Recently ANF moved to Hillsborough, where it leases offices and a warehouse.

The Hot Stuff and six other condiments are made at Mrs. Campbell's Canning Co. near Winston-Salem, North Carolina. Miso Mustard, the company's best-selling product, is made in Emeryville, California. American Natural Foods' products were initially sold only in natural- and health food stores. Last year the company's sales were $220,000–in its first fiscal year; they are expected to double next year. Recently they signed a contract with Kroger to try four products in the national chain's 1,600 stores. Troy, age 46, says wizard is his "alter ego." A college dropout, he started a

stereo retail business, became dissatisfied with retailing, then "took a sabbatical" to ponder what life was all about. During that time he became a vegetarian, but finding vegetarian food too bland, he began to experiment with new seasonings, including miso.

A color photo shows John Troy dressed in purple wizard's robes, with hat, rope belt, and twisted staff, standing in front of a caldron of his products–all in glass bottles.

1241. Foegeding, E. Allen; Lanier, Tyre C. 1987. The contribution of nonmuscle proteins to texture of gelled muscle protein foods. *Cereal Foods World* 32(2):202-05. Feb. [51 ref]
• ***Summary:*** Discusses: The excellent water-binding properties of soy protein isolate and concentrate in animal muscle food products. Soy-lipid interactions. Vital wheat gluten. Myosin-soy interactions.

Note: This paper won the IWGA-AACC Best Paper Award. Address: Dep. of Food Science, North Carolina State Univ., Raleigh, NC.

1242. Belleme, John. 1987. Making miso at home. Putting up your own batch is surprisingly easy and rewarding. *East West.* March. p. 14-21. [1 ref]
• ***Summary:*** Describes how to make miso at home. Belleme, founder of the American Miso Co., apprenticed in Japan with miso master Takamichi Onozaki. Since 1979 Belleme has made almost 1,000,000 pounds of miso. Address: North Carolina.

1243. Organized Kashruth Laboratories. 1987. Re: Certification for eight products made by American Miso Co., Inc., of North Carolina as Kosher and Pareve. Letter to American Miso Co., April 23. 1 p. Typed, with signature on letterhead (photocopy).
• ***Summary:*** The products are: Amakuchi mugi miso. Traditional red miso. Mellow white miso. Country barley miso. Sweet white miso. Chickpea miso with rice. Chickpea miso with barley. Sushi rice. "These products must bear our Circle-K seal of Kashruth on the label. This certification is valid until April 30, 1998 and is subject to renewal at that time." Rabbi Bernard Levy, Kashruth administrator. Address: P.O. Box 218, Brooklyn, New York 11204. Phone: 718-851-6428.

1244. Burton, J.W. 1987. Quantitative genetics: Results relevant to soybean breeding. In: J.R. Wilcox, ed. 1987. Soybeans: Improvement, Production, and Uses. 2nd ed. Madison, Wisconsin: American Society of Agronomy. xxii + 888 p. See p. 211-47. Chap. 6. [140 ref]
• ***Summary:*** Contents. 1. Partition of hereditary variance. 2. Heterosis. 3. Heritability. 4. Correlation among traits. 5. Selection. 6. Genotype X environment interaction. 7. Conclusion. Address: North Carolina State Univ., Raleigh, NC.

1245. Jordan, T.N.; Coble, H.D.; Wax, L.M. 1987. Weed control. In: J.R. Wilcox, ed. 1987. Soybeans: Improvement, Production, and Uses. 2nd ed. Madison, Wisconsin: American Society of Agronomy. xxii + 888 p. See p. 429-60. Chap. 11. [91 ref]
• ***Summary:*** 1. Weed distribution in the Mississippi delta region. 2. Weed distribution in the Southeast region. 3. Weed distribution in the Mid-Atlantic region. 4. Weed distribution in the North Central region. 5. Special weed problems. 6. Weed population shifts. 7. Losses due to weeds. 8. Control practices. 9. Tillage and cropping practices. 10. Integrated weed management. 11. Varietal response to herbicides. 12. Specialized equipment and techniques. Address: 1. Purdue Univ., W. Lafayette, Indiana; 2. North Carolina State Univ., Raleigh, NC; 3. USDA-ARS, Urbana, Illinois.

1246. Raper, C. David, Jr.; Kramer, Paul J. 1987. Stress physiology. In: J.R. Wilcox, ed. 1987. Soybeans: Improvement, Production, and Uses. 2nd ed. Madison, Wisconsin: American Society of Agronomy. xxii + 888 p. See p. 589-641. Chap. 15. [308 ref]
• ***Summary:*** Contents. Introduction. 1. Temperature stress. 2. Water stress. 3. Light. 4. Carbon dioxide. 5. Metal toxicity. 6. Stress tolerance. 7. Research needs.

"What constitutes a stress varies with the genotype and development stage of a plant. For example a temperature low enough to injure the soybean cultivar Ransom at flowering might not injure a more chilling-tolerant cultivar such as Fiskeby V, and a night temperature injurious during flowering of either cultivar might be harmless or even beneficial during seed filling." Address: 1. North Carolina State Univ., Raleigh, NC; 2. Duke Univ., Durham, North Carolina.

1247. Riggs, R.D.; Schmitt, D.P. 1987. Nematodes. In: J.R. Wilcox, ed. 1987. Soybeans: Improvement, Production, and Uses. 2nd ed. Madison, Wisconsin: American Society of Agronomy. xxii + 888 p. See p. 757-778. Chap. 19. [145 ref]
• ***Summary:*** Contents. 1. Soybean cyst nematode (*Heterodera glycines* Ichinohe). 2. Root-knot nematodes (*Meloidogyne* spp.). 3. Reniform nematode (*Rotylenchulus reniformis* and *R. macrodoratus*). 4. Lesion nematodes (*Pratylechus* spp.). 5. Lance nematodes (*Hopolaimus* spp.). 6. Sting nematodes (*Belonolaimus* spp.). 7. Other nematodes. 8. Nematode management. 9. Prospects for future control of soybean parasitic nematodes.

There are many different genera and species of nematodes, but soybean cyst nematode is the most damaging. Address: 1. Univ. of Arkansas, Fayetteville, AR; 2. North Carolina State Univ., Raleigh, NC.

1248. *News Herald* (*Suffolk, Virginia*). 1987. Processed soy

oil could be reduced. June 23.
• ***Summary:*** Crop scientists Burton and Wilson at North Carolina State University have developed three soybean breeding lines with about half the linolenic acid content of standard soybean varieties (3.3 to 4% vs. 7-8%). Linolenic acid causes short shelf life and off flavors in soy oil. Soybean oil low in linolenic acid would not need to be hydrogenated, saving about $720 million a year in the USA.

1249. **Product Name:** Ah Soy (Soymilk) [Original, Chocolate, or Vanilla].
Manufacturer's Name: Great Eastern Sun (Marketer-Distributor). Made in Minnesota by St. Peter Creamery.
Manufacturer's Address: 92 McIntosh Rd., Asheville, NC 28806. Phone: 704-252-3090.
Date of Introduction: 1987 August.
Ingredients: Incl. Soybeans, water, cold-pressed safflower oil, carrageenan, pure Bourbon vanilla, dried cane juice.
Wt/Vol., Packaging, Price: Quart Tetra Brik Aseptic carton. Packed 12 to a case. Wholesales for $12/case.
How Stored: Shelf stable; refrigerate after opening.
New Product–Documentation: Ad (full page, color) in East West Journal. 1985. Sept. p. 28. "Ah soy: Finally a really soft drink." Note: The flavors were later elaborated to American Original, Dutch Chocolate, and French Vanilla. Leaflet. 1987, undated. "Ah Soy. New Improved Flavor. Quart Size. Made in America. Popularly Priced. Sweetened with Organic Unrefined Cane Juice. The Ah Soy Story–Totally New Formula!!!" Tetra Pak Age. 1987. Summer. p. 12-13. Color photo of three quart Tetra Brik cartons. Red, blue, and yellow on white background.

1250. Belleme, John. 1987. Ken Burns (1934-1987). *East West Journal.* Sept. p. 116. [3 ref]
• ***Summary:*** A touching obituary to Ken Burns, who died this year of liver cancer in Tampa, Florida. John Belleme lived for a year (1976-77) at the macrobiotic study house run by Ken and Anne Burns in Boston. Ken was keenly interested in the natural world and its influence on human existence. He was deeply concerned that humans were destroying the natural world, leaving the natural way, and turning toward an unnuatural way dominated by technology and high-tech solutions to traditional problems. A photo shows Ken Burns, "A warrior for the natural world."

Note: John later said (Nov. 1999) that he thought this was the single best piece of writing he ever had published. Address: Rutherfordton, North Carolina.

1251. Marking, Syl. 1987. Computer weeds out herbicides. *Soybean Digest.* Aug/Sept. p. 36.
• ***Summary:*** This software program (whose name is not given) was developed by Harold Coble, North Carolina State Univ. weed scientist. The first of its kind, it will help you choose the best herbicide based on effectiveness and cost. The model figures what your losses would be from weeds with no treatment, then figures the most effective and economical treatment.

1252. American Miso Co. 1987. A living art: The American Miso story (Ad). *East West.* Oct. p. 8.
• ***Summary:*** This one-third page vertical black-and-white ad begins: "These days, even in Japan, 99% of the miso is commercially made. Mass production and high technology characterize today's miso. The timeless art of handmade miso is dying.

"However, near the Smoky Mountains in the green, rolling country of western North Carolina, the American Miso Company continues a centuries old tradition of hand-crafted miso." The Miso Master logo shows a Japanese miso master, with a knotted headband, in front of a large wooden vat of miso. Address: Rutherfordton, North Carolina 28139. Phone: 704/287-2940.

1253. Wizard's Cauldron, Ltd. 1987. [Hot news: Edward & Sons Trading Company to be exclusive distributor and marketer for Wizard Baldour trade marked condiments and sauces, including Hot Stuff] (News release). P.O. Box 969, 108 S. Church St., Hillsborough, NC 27278. 1 p. Oct.
• ***Summary:*** Other products in the line include Wizard Baldour's Sizzle, Catch Up, Woostershire, and White Magic. They are expected to be available by early 1988. Address: Hillsborough, North Carolina. Phone: 919-732-9445.

1254. 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.*

1255. American Miso Co. 1987. A miso primer: The American Miso story (Ad). *Vegetarian Times.* Dec. p. 18.
• ***Summary:*** This one-third page vertical black-and-white ad explains: "Generally, there are three types of miso: Sweet, Mellow, and the darker, Traditional misos. They differ in color, salt content, fermentation time, and the soybean/grain (koji) ratio." The company describes each of the misos it makes as one of these three types. Near the bottom of the ad is the Miso Master logo, an illustration showing the head and shoulders of a Japanese miso master, with a knotted headband, in front of a large wooden vat of miso. Below "Miso Master is produced by the American Miso Co. for Great Eastern Sun."

This ad also appeared in the April 1989 issue (p. 6) of this magazine. Address: Rutherfordton, North Carolina.

1256. *ASA Member Letter.* 1987. Research [on soyoil quality] yields results. Nov/Dec. p. 2.
• ***Summary:*** Research funded by the American Soybean Association "to improve soyoil quality resulted in researchers at Iowa State University, Purdue University, and North Carolina State University developing soybean lines with improved quality characteristics needed by the food industry. Better quality oil will increase the soybean's ability to compete against other oilseeds."

1257. Carter, Thomas E., Jr. 1987. Genetic alteration of seed size: Breeding strategies and market potential. In: Dolores Wilkinson, ed. 1987. Proceedings of the 17th Soybean Seed Research Conference 1987. Washington, DC: American Seed Trade Association. vii + 114 p. See p. 33-45. Held 9-10 Dec. 1987 in Chicago, Illinois. [21 ref]
• ***Summary:*** Contents: Introduction. Soyfood market size. Soyfood market trends–short and long range. Premiums and acreage, the breeder's perspective. Breeding special varieties. Future breeding goals. Conclusions.

"The expanding soyfood markets in Japan and the U.S. have generated considerable interest among American soybean producers in recent years. More than 60% of the soybeans used in these markets are grown in the U.S."

Table 1 (p. 34) shows "Soybean consumption as soyfoods in Japan and the U.S." In Japan about 851,000 metric tons of soybeans are used to make soyfoods such as tofu (532,000), miso (180,000), natto (99,000), soymilk (12,000), and soy sauce (5,000 [plus large amounts of defatted soybean meal]). Large-seeded soybeans grow in the U.S. have found acceptance in making tofu and soymilk, capturing 81 and 100% of the raw soybean sales respectively for these products.

"In survey results, 39 of 43 public breeders and 44 or 67 private breeders responded to questions regarding the breeding of specialty varieties. Twenty-four breeders reported that they are maintaining 36 separate projects for large- and small-seeded varieties (Table 3). Public and private breeders are represented equally in this effort with the majority of these projects underway in the Midwest. Eight public and eight private programs are developing varieties specifically for tofu while 13 public and 7 private programs are developing varieties for natto. One public breeder was interested in soy milk varieties but considered varieties for tofu and soymilk as the same. One private and two public breeders are interested in large-seeded garden types for the fresh market in urban areas with large oriental populations. One public and one private breeder expressed interest in small-seeded varieties for sprouts. Soybean sprouts are primarily a Korean soyfood; and, Koreans buy U.S. soybeans for making sprouts in some years." Address: Research Geneticist, USDA-ARS, North Carolina State Univ., Raleigh, NC. Phone: 919-737-2734.

1258. Anderson, J.J.B.; Thomsen, K.; Christiansen, C. 1987. High protein meals, insular hormones and urinary calcium excretion in human subjects. In: Claus Christiansen, J.S. Johansen, and B.J. Riis, eds. 1987. Osteoporosis 1987:

International Symposium on Osteoporosis. Copenhagen, Denmark: Osteopress. 2 vols. Illust. Index. See Vol. 1, p. 240-45. Based on Sept. 27 to Oct. 2, 1987 International Symposium on Osteoporosis (Denmark). [13 ref]
• ***Summary:*** This article is about protein-induced hypercalciuria. Address: 1. Dep. of Nutrition, School of Public Health, Univ. of North Carolina at Chapel Hill, USA.

1259. Landis, William Hathaway. 1987. Calcium balances of premenopausal women consuming cheese- compared to spinach- and tofu containing diets. PhD thesis, University of North Carolina at Greensboro. 113 p. Page 1307 in volume 48/05-B of Dissertation Abstracts International. *
Address: Univ. of North Carolina, Greensboro.

1260. Mian, Mushtaq A. 1987. Nutritional evaluation of soybean meal varying in urease and trypsin inhibitor activity. PhD thesis, North Carolina State University. 92 p. Page 2155 in volume 48/08-B of Dissertation Abstracts International. *
Address: North Carolina State Univ.

1261. Mangold, Grant. 1988. Pursuing super seed. *Soybean Digest.* Jan. p. 6-7.
• ***Summary:*** Herbicide resistance is the main focus now in soybean breeding using biotechnology [genetic engineering].

"Several organizations are staking lots of dollars on the coming reality of genetically superior seed. The list includes private biotechnology firms, seed companies, chemical companies and university researchers.

"But don't expect to plant super seed before the mid-1990s. Most scientists believe herbicide-resistant corn will be the first rowcrop derived from genetic engineering."

"We're working on a project to genetically engineer atrazine-tolerant soybeans," reports Georgia Helmer, a researcher in Ciba-Geigy's biotech facility in Research Triangle Park, North Carolina."

Nick Frey, with the biotech research program at Pioneer High-Bred International, Johnson, Iowa, reports, "In corn, we're backcrossing the herbicide-resistant gene..."

At Monsanto, Calgene and DeKalb-Pfizer Genetics, the search for corn herbicide resistance concentrates on Roundup." DeKalb-Pfizer works with both genetic engineering and tissue culture selection.

Note: This is the earliest article seen in *Soybean Digest* (as of Dec. 2014) that contains the word "biotech."

1262. Belleme, John. 1988. San-J's natural tamari-shoyu (Interview). *SoyaScan Notes.* Feb. 2. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** San-J uses the same ingredients to make tamari and tamari-shoyu (15% wheat) here and in Japan, but here they use temperature controlled fermentation. They do not make a regular shoyu with equal parts wheat and soybeans. The closest thing to it is their "tamari-shoyu" containing 15% wheat. This product is made like tamari, using koji-dama (koji balls). Their tamari sells for $6/gallon versus $3/gallon for Kikkoman shoyu. Yet many big food processors prefer tamari. [Probably because the higher amino acid content gives a higher flavor profile. Less flavor is lost from evaporation of alcohol during heating. And the salt content is lower]. Eden will be selling all of San-J's U.S.-made tamari-shoyu under their label. Off the subject: The first crop of U.S.-grown nori is now ready in Washington state. Joel Dee of Edward & Sons Trading just moved to California. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1263. Sturgeon, Bruce. 1988. Great Eastern Sun and the U.S. soymilk industry (Interview). *SoyaScan Notes.* Feb. 4. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** "Both Great Eastern Sun and Mitoku still import soymilk from Japan. Barry Evans (president) okayed my releasing our sales in terms of gallons of soymilk. Each of the following is our fiscal year from September 1 to August 31 the next year."

Year Gallons sold Percent Increase
1985-86 100,000 -
1986-87 106,000 6% New quart introduced
1987-88 148,000 40% Based on 5 months, annualized

The big increase in the current year is due almost entirely to the American soymilk. In the first 5 months of this year we've sold as much American-made soymilk as we sold in all of last year. We only make quarts in America. In New England, the low-price area, it retails for $1.59/quart average. A lot is sold in truckload quantities. During some sales, it goes for as little as $1.29/qt. On the West Coast it is typically $1.99 to $2.19. By comparison, the imported 6 oz product retails for $1.09 to $1.19, which is 3.8 times as much per fluid ounce, and this is not even a full margin. The product is made in Minnesota at St. Peter Creamery (which also makes spray-dried soymilk) then shipped in a stainless steel dairy tanker to Borden's in Pennsylvania. If that freight could be eliminated, it would allow significant reduction of the retail price. They are actively talking with St. Peter about getting a Tetra Pak machine there and sharing it. Edensoy's price is also high because of depreciation, and Sunsoy's because of exchange rate. There is considerable pressure on Vitasoy to float their currency. It will be interesting to see what happens to Vitasoy prices if that happens. Vitasoy has low overhead and plenty of excess capacity. Tetra Pak's sales of all products are way below their expectations; the main activity is in juices. Soymilk is doing well for them. Milk has not gotten off the ground, but it could with *Lysteria* scares and deaths. GES holds 1% of their product run for quality control. There are three routes of possible bacterial contamination in Tetra Pak cartons. 1. The spores that are not killed by the temperature/time combination. 2. Bacteria entering through a poorly sealed seam. 3. Bacteria entering

through a failed steam seal in the 40-foot pipe from the UHT unit and the packaging machine. The packages explode. Address: Director of Marketing, Great Eastern Sun, 92 Macintosh Rd., Asheville, North Carolina 28806. Phone: 808-438-4730.

1264. Belleme, John. 1988. Update on miso in America. How about amazake as a soymilk sweetener? (Interview). *SoyaScan Notes.* Feb. 23. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Mitoku (Mr. Kazama and Chris Dawson) is considering a joint venture with Sendai Miso Shoyu of a miso plant on the West Coast of the USA. This is still very tentative. They are also considering making amazake. But about 2 years ago Miyako Oriental Foods increased their miso production capacity. They can probably make over 1 million pounds a year now. It was about 600,000 lb/year. Fujiwara Brewing Co. in Okayama, which makes equipment for miso and soy sauce companies, supplied the equipment to Miyako. The company San-J finally used to build their tamari plant and supply the equipment was Fujiwara's competitor, Nagata. Steve Earle said this was the same company that had just helped expand the Miyako plant. According to the people at Ohsawa-America, Mr. Kitani, the Japanese man who makes Yamaki Shoyu, and Bob Kennedy, formerly of Chico-San are planning a miso plant in the USA, probably with automatic koji equipment.

John feels that sales of miso in America have slowed down and that if new companies enter the market, it will be oversupplied. At American Miso Co. his maximum capacity was about 400,000 lb/year. The volume hasn't changed much in the past few years. Christian Elwell at South River Miso Co. has a capacity for about 60,000 lb/year, which he hasn't reached. Both these are more expensive than Miyako ($4.49 for American Miso white miso, Christian's is more, and Miyako's is about $2.85/lb, or only 63% as much). He suggests: How about amazake as a sweetener for soymilk? It would replace barley malt and give the soymilk more body, kind of like a shake. Then you can put rice on the label. Great idea! Address: Route 5, Box 258, Rutherfordton, North Carolina 28139. Phone: 704-749-9537.

1265. Ballard, Bob. 1988. History of Great Eastern Sun (Interview). *SoyaScan Notes.* March 10. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** The company was founded in March 1982 by Barry Evans (who is now the sole owner and lives in Los Angeles). He may have been joined by Martin Roth and John Belleme. The original purpose was to be a distributor for the miso made by American Miso Company. But it soon decided to import Japanese macrobiotic products from Mitoku (the first order was placed in Jan. 1982) and later became a manufacturer. Address: 92 Macintosh Rd., Asheville, North Carolina 28806. Phone: 808-438-4730 or 704 252-3090.

1266. DeBona, Don. 1988. Re: History of The American Miso Co. Letter to Bob Carr at Cleveland East West Center, March 13. 6 p. Handwritten.
• ***Summary:*** "The American Miso Co. was begun in 1979 by Barry Evans, Sandy Pukel, Joe Carpenter, John Belleme, Michio Kushi, James Kenney, and several other partners. It was arranged for John Belleme and his wife to travel to Japan and study for 7-8 months with the Onozaki family of traditional miso makers. John Belleme returned and began making traditional miso for the then named Oak Feed Miso, Inc., previously called the Erewhon Miso Co., and presently the American Miso Co.

"Meanwhile, Barry Evans began a new company in order to distribute our miso. This company was, and still is, called The Great Eastern Sun Trading Co., located in nearby Asheville, North Carolina. Barry Evans eventually became the sole owner of the American Miso Co. I came to work for Great Eastern Sun in 1983. Prior to this I had worked for several years for Laurelbrook Foods, a large natural foods distributor in Maryland, and then on a Permaculture farm along the Maryland/Virginia border for two years growing organic winter wheat, barley, soybeans and summer produce according to the principles set forth in Masanobu Fukuoka's classic, *The One Straw Revolution...* We still do some farming and quite a bit of gardening on our 100 acres here at American Miso Co., in the foothills of the Blue Ridge Escarpment. I met my wife at a macrobiotic study house in 1980.

"We arrived at American Miso Co. in February 1985 and I took over the position of miso maker after John Belleme's departure in December 1985 [Note: Belleme was fired by Barry Evans.] I was trained to make miso by Akinori Takei, my Japanese teacher and friend, who had also studied with the Onozaki family in Japan. Takei-san remained with me for approximately another year; since then I have been on my own. We are a small enterprise and make approx. 250,000 lb of miso a year with only 3 employees and myself. We make all of our own koji (both barley and rice) by hand in a centuries-old fashion." Address: Route 3, Box 541, Rutherfordton, North Carolina 28139.

1267. DeBona, Don. 1988. Developments at American Miso Co. since 1985 (Interview). *SoyaScan Notes.* March 25. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Don left his job as general manager at Great Eastern Sun and began to work at American Miso Co. (AMC) in February 1985. He took over management of the company in December 1985 after John Belleme left. It was a difficult transition, as Belleme and Barry Evans (an absentee owner) did not get along well. Since then, production of miso has roughly doubled, from 9 to 20 large miso vats. His miso teacher, Akinori Takei, stayed until October 1986. Since then Don has run the company. Not much of their miso is

used any more in second generation products; they used to sell some mellow white and red miso to Nasoya and Simply Natural. Now 95-98% is sold for kitchen use in plastic tubs. The tubs replaced plastic bags 2 years ago. He also sells in bulk: 35 or 50 lb. He has always used all natural, organic ingredients, which makes his miso about twice as expensive as Cold Mountain. So they lost all their sales to food processors. But total volume has increased due to good sales work. His best-sellers are mellow white miso and traditional country (long-term) barley miso, followed by mellow barley, traditional red rice miso, and sweet white miso. He has ordered his koji starter through Mitoku for the last few years. Now he hopes to buy direct from Kojiya Sansanaemon in Aichi-ken. Don has studied macrobiotics for 12 years. AMC originally had 6 owners; Barry Evans now owns about 95%. Barry originally paid for John Belleme to study miso in Japan. Address: Route 3, Box 541, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1268. Filling a wooden vat of miso at American Miso Company (Photograph). 1988.
• ***Summary:*** This 4 by 6 inch color photo, dated March 1988, shows three workers (men) by a wooden vat of miso at the American Miso Co. in North Carolina. All are dressed in rugged yellow vinyl aprons and light shirts. One is standing on the floor, with his left arm held up against the ladder. The second is standing on the ladder. The third, Don DeBona, is hunkering down atop the vat.

1269. Dawson, D.P.; Morrill, J.L.; Reddy, P.G.; Minocha, H.C.; Ramsey, H.A. 1988. Soy protein concentrate and heated soy flours as protein sources in milk replacer for preruminant calves. *J. of Dairy Science* 71(5):1301-09. May. [19 ref]
• ***Summary:*** Growth, protein and dry matter digestibility, nitrogen retention, and morphology of the intestinal mucosa of calves on the all milk-protein die were superior to those of calves on diets containing a soy product. All soy-fed groups had a humoral but no cell-mediated immune reaction to soy proteins. Concentrate and the experimental heated soy flour were superior to the commercial heated soy flour as protein sources for milk replacer. Address: 1-4. Depts. of Animal Sciences and Industry, and Lab. Medicine, Kansas State Univ., Manhattan, Kansas 66506; 5. Dep. of Animal Science, North Carolina State Univ., Raleigh, North Carolina 27695.

1270. Kelly, F.M.; Ramsey, H.A. 1988. Effect of alkali treatment on the value of soy flour for preruminant calves. *J. of Dairy Science* 71(Supplement 1):125 (Abst. #P19). June. American Dairy Science Association 83rd Annual Meeting. Address: North Carolina State Univ., Raleigh, North Carolina.

1271. Bubny, Paul. 1988. Venerable soybean sprouts new uses. *Health Foods Business* 34(7):72, 74, 76, 108. July.
• ***Summary:*** Lonnie Stromnes, national sales manager of White Wave Soyfoods in Boulder, Colorado, reports that White Wave recently "upscaled" the packaging on its tempeh products; the new graphics depict tempeh in use, so that customers do not have to bring a thorough knowledge of the food into the store with them. Mitoku-USA, based in Albany, New York, imports some 20 varieties of miso. At least one manufacturer, the Asheville, North Carolina-based Great Eastern Sun, saw its miso sales increase by 20% last year. Bruce Sturgeon, the company's vice president, said Great Eastern Sun's volume on miso alone was $400,000 in 1987. Shoyu and tamari are frequently aimed at the gourmet market as well as the natural foods / specialty foods market. Owner Dale Kamibayshi of Alfalfa's Market in Boulder, Colorado said, "I think many people are still intimidated by (soyfood's) preparation." To help overcome the intimidation factor, Alfalfa's has scheduled a soyfood tasting fair for July 16; the first such fair which the store has devoted to soy.

Gary Barat, chairman of Legume, Inc. said, "I see the natural foods and gourmet markets coming together," said Barat. "And the smart marketers are realizing that." People who shop specialty stores have both eyes turned toward quality. Soy companies are increasingly making use of organically grown soybeans. There is also a trend toward using specific soybeans for specific products, a sign of a maturing industry. The trend is more prevalent in the U.S. than in Far East Asia. Westbrae, for example, uses Vinton beans for its Westsoy soy beverage. As the currency in Japan remains strong against the dollar, you're going to see more and more (soy) products produced in America. Also there will be greater growth in so-called "second-generation" soy products–dairy analogs with soymilk, soy cheese, soy ice cream and soy yogurt. Address: Associate Editor.

1272. **Product Name:** Emperor's Kitchen brand Johsen Shoyu, and Sakae Organic Shoyu.
Manufacturer's Name: Great Eastern Sun (Importer). Made in Japan.
Manufacturer's Address: 92 Macintosh Rd., Asheville, NC 28806. Phone: 704-252-3090.
Date of Introduction: 1988 July.
Ingredients: Sakae: Well water, organic* whole soybeans, organic* whole wheat, seasalt, koji (natural culture). * Organically grown and processed in accordance with Section 26569.11 of the California Health and Safety Code.
Wt/Vol., Packaging, Price: Both in 5 and 10 oz bottles. Johsen Shoyu also in 32 oz bottles.
How Stored: Shelf stable.
New Product–Documentation: Ad in Macromuse. 1988. June/July. p. 3. "The finest Japanese liquid seasonings. Identical to Mitoku & Mitoku Macrobiotic." No address or specific products are given. Talk with Barbara Holiday of Great Eastern Sun. 1989. Feb. 28. These products are

imported in drums from Japan via Mitoku. GES started bottling the drums in North Carolina in Oct. 1987 and the products were in the stores by late 1987 or Jan. 1988. The Johsen Shoyu and Wheat Free Mansan Tamari are not organic. There are also non-soy products in the line. Sakae Shoyu is made by Mr. Kiyoji Fukaya, Ogasawara-Gun, Shizuoka-ken, Japan. Mansan Shoten is run by Enichiro Oguri (President), Handa-shi, Aichi-ken, Japan.

Labels. 1989. 5.5 by 3 inches, and 6.25 by 3.5 inches. Pink and black on silver. Illustration of a symbolic tree with leaves. "In the Emperor's Kitchen you find only the finest seasonings. Johsen Shoyu is one of the world's best soy sauces. Traditionally brewed in cedar kegs for early 2 years, Johsen Shoyu is made using only whole soybeans and whole grain wheat. Split or defatted beans or wheat flour are never used... Use it for all your wok cooking or as a dipping sauce for sushi or sashimi."

1273. **Product Name:** Emperor's Kitchen brand Mansan Tamari [Organic, or Wheat Free].
Manufacturer's Name: Great Eastern Sun (Importer). Made in Japan.
Manufacturer's Address: 92 Macintosh Rd., Asheville, NC 28806. Phone: 704-252-3090.
Date of Introduction: 1988 July.
Ingredients: Wheat free: Water, whole soybeans, Mikawa mirin (water, sweet rice, koji), seasalt, koji (natural culture).
Wt/Vol., Packaging, Price: 5 and 10 oz bottles. Mansan Wheat Free Tamari also in 32 oz bottles.
How Stored: Shelf stable.
New Product–Documentation: Ad in Macromuse. 1988. June/July. p. 3. "The finest Japanese liquid seasonings. Identical to Mitoku & Mitoku Macrobiotic." No address or specific products are given. Talk with Barbara Holiday of Great Eastern Sun. 1989. Feb. 28. These products are imported in drums from Japan via Mitoku. GES started bottling the drums in North Carolina in Oct. 1987 and the products were in the stores by late 1987 or Jan. 1988. The Johsen Shoyu and Wheat Free Mansan Tamari are not organic. There are also non-soy products in the line. Sakae Shoyu is made by Mr. Kiyoji Fukaya, Ogasawara-Gun, Shizuoka-ken, Japan. Mansan Shoten is run by Enichiro Oguri (President), Handa-shi, Aichi-ken, Japan. Labels. 1989. 5.5 by 3 inches, and 6.25 by 3.5 inches. Pink and black on silver. "Mansan Tamari is an authentic tamari soy sauce that is traditionally brewed in cedar kegs for over a year. Real tamari was originally the liquid drawn from soybean miso... Mansan tamari is blended with 40% Mikawa Mirin which gives it a unique and subtly sweet savoriness. Use it as a glaze for baked foods, a basting sauce for broiled fish, or a dipping sauce for sushi."

1274. Carnes, Michael G.; Wright, Martha. 1988. Engineered soybean becomes a reality: Advances in science (Research paper analysis). *Bio/technology* 6(8):870. Aug. Summarized in San Francisco Examiner. Aug. 25. "Inserting non-soybean genes produces a superior soybean." [1 ref]
• ***Summary:*** Soybeans are the cover story for this issue, with the title "Soybean breakthrough: The first engineered staple crop." Researchers say they've inserted non-soybean genes into soybean plants, a first step toward helping the nation's No. 2 crop to better resist disease, insect and herbicides and improve its nutrition value. Some of the altered plants also passed on the new genes to some progeny, the research teams from Monsanto Co. and Agracetus reported. Monsanto researchers in St. Louis used bacteria called *Agrobacterium* to ferry foreign genes into soybean tissue cut from freshly germinated seeds. About 6% of the resulting plants took up functioning genes. Agracetus scientists in Middleton, Wisconsin, inserted genes into immature soybean tissue with essentially a scientific shotgun, which "shot" tiny gold particles coated with bacterial genes. About 2% of the resulting shoots showed evidence that the inserted genetic material was active.

"It has taken more than three years to progress from the first introduction of foreign genes into soybean tissue (Faciotti et al. 1985) to the successful production of the genetically modified soybean plants reported here."

Note: Altered soybean plants also have been produced at Iowa State University and by Pioneer Hi-Bred International, Walter Fehr, soybean breeder and biotechnology coordinator at Iowa State, said in a telephone interview with the *San Francisco Examiner.* Address: Senior Scientists, Biotechnology Div., CIBA-Geigy, Research Triangle Park, North Carolina.

1275. Sturgeon, Bruce. 1988. Early history of Great Eastern Sun, Oak Feed Miso, Inc., and American Miso Co. (Interview). *SoyaScan Notes.* Sept. 2. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Bruce is looking at documents from the company archives. Great Eastern Sun was founded in March 1982 by Barry Evans. He was the only principal/owner at the time. American Miso Co. was founded in March 1979 as the Oak Feed Miso, Inc. The principals were Sandy Pukel, John Belleme, and Barry Evans, but it is not clear who owned how much stock. It started doing business in 1981 as the American Miso Co. and officially became The American Miso Co. by law in May 1982. The principals of the American Miso Co. were John Belleme and Barry Evans. Sandy Pukel was somehow bought out and left and joined Oak Feed Co.; It seems to have become his. Barry Evans may have been the original president of Oak Feed Co. It was a store, probably a restaurant, and an import and distribution company. Barry and John went on to do the miso company. Great Eastern Sun was founded as a way to market and distribute the miso. They also became an importer and distributor of Mitoku products at about that same time.

Don DeBona was the first or second company president, after Marty Roth. Today Barry owns all the stock of both American Miso and GES. Barry treasures his privacy. Bob Ballard and Bruce run GES. Even they do not know Barry's address or phone number. He checks in about once a quarter to see how things are going.

Ah Soy now has about 5% of the U.S. soymilk market, and is trying desperately to hang onto that. The competition is fierce, but they have many loyal consumers. Their 6 oz size is still their best seller, even after introduction of the quart, and even with a price increase last Feb. to above $1.00. Sales are up compared with last year.

In 1984 Bruce was in Boulder, Colorado as a buyer for Pearl Street Market. They had been buying from GES at that time for about a year. Oak Feed came to Pearl Street Market with imports to sell. Address: 92 Macintosh Rd., Asheville, North Carolina 28806. Phone: 808-438-4730 or 704 252-3090.

1276. Fass, Bill. 1988. Brief history of Macrobiotic Wholesale Co. of Asheville, North Carolina (Interview). *SoyaScan Notes.* Sept. 15. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** This company was originally founded by Great Eastern Sun. In 1986 GES sold it to Kurt Schmitz [or Schmidt]; it was then located at 503 Haywood Rd. in Asheville. Schmitz in turn sold it to Bill Fass in August 1986. The company does not import. They distribute only macrobiotic products. Some 90% of the products they sell are imported from Japan, and 90% of these they buy from Great Eastern Sun, the importer. They also buy a few imported products from Eden Foods. Soyfood products they distribute include miso, shoyu, tamari, and koji. Address: 799 Old Leicester Hwy., Asheville, North Carolina 28806. Phone: 800-438-4730 or 704-252-1221.

1277. Duchesne, Paul. 1988. Development of the Brown Rice & Tofu Sandwich, and early history of Wildwood Natural Foods (Interview). *SoyaScan Notes.* Oct. 8 and Aug. 16, 1989. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Paul Duchesne developed the world's first "Fried Rice & Tofu Sandwich" in Fairfax, California. Duchesne's sandwich was one of America's early second generation tofu products. He deliberately called it a sandwich, even though it was made in a chapati, to make it sound more American. Today there are a surprisingly large number of U.S. companies making a Brown Rice & Tofu Sandwich. Duchesne started 3 of these companies and gave the basic recipe and production methods to the people who started most of the others. All descendants of the original BRTS have also been made in a chapati.

In late October or early November 1977, Duchesne sold the first 200 of them to participants at a macrobiotic seminar led by Michio Kushi in Marin County. Donna Gayle helped him make them. They were very popular; the key secret ingredient was a miso-sesame butter spread which Paul had learned of from George Ohsawa's book *Zen Cookery* (Miso Spread #203).

In Jan. 1978 he started making these sandwiches at the Sleeping Lady Cafe (a co-op started in about 1975 in Fairfax, Marin County) and selling them at the Good Earth Natural Food Store in Fairfax. He bought his tofu, made by Quong Hop & Co. off the shelf at the Good Earth. In Feb. 1978 he began to distribute them to many natural food stores throughout Marin County. Note: Billy Bramblett says (July 1998) that Paul was not licensed to make or sell food and had no business name.

While in California in 1978 Duchesne gave his recipe and production techniques to Roy Steevensz in Los Angeles. Roy was making Fried Rice & Tofu Sandwiches by May 1978 on a big table in his living room. He continued until about 1984. Roy is now claiming that he created the idea. Paul and others were bringing Roy to the Bay Area as a macrobiotic teacher in 1977. Originally Roy was making seitan in Los Angeles.

In September 1978 Paul went to Boston to study macrobiotics, so he gave his Fairfax sandwich business (which still had no name) to Chris Smith. A month later, in October 1978, Chris stopped frying the brown rice and renamed the product, coining the now-famous name "Brown Rice & Tofu Sandwich." At the same time he named his business Wildwood Natural Foods. In late 1978 Chris Smith taught Joe Nixdorff, who started the company City Samurai in Berkeley and made the Samurai Hero from 1978-1982. In Boston, Duchesne lived in The Garvey House, a macrobiotic study house. There he started to make his brown rice and tofu sandwiches. The operation soon grew into a business, which he named Rice House. He also taught his process to Marty Roth and Barbara Svenning Garvey Roth, who lived in the Garvey house; several years later Marty and Barbara moved to Santa Fe, New Mexico, where they started a business making the BRTS. Later Barbara made it near Asheville, North Carolina. Marty and Barbara in turn taught the sandwich to Jeff Fairhall, who started Essential Foods in Seattle and built it into a thriving business.

In May 1979 Duchesne and Chris Smith traded places and companies. Thus Chris took over Rice House in Boston, making the transition without missing a day of production and delivery to Brookline, Cambridge, and Boston. He renamed the product Brown Rice & Tofu Sandwich. Chris ran the company until 1981, when he sold it. It is still in operation and named Rice House. Paul left Boston for California, and took over the company he had started originally (now named Wildwood Natural Foods) in Fairfax.

In Oct. 1979 Bill Bramblett (a monied rock musician and part owner of the Sleeping Lady co-op) approached Duchesne and proposed that he invest in the company and

expand the sandwich business, including distribution to Sacramento. The company was making only about 100 sandwiches a day at the time. Duchesne declined, saying he wanted to build a traditional, cauldron-style tofu shop around the sandwich operation–an idea that he had conceived while in Boston. Bill said he couldn't afford that so Paul found two more people with money to invest. In May 1980 Duchesne, a sole proprietor, incorporated Wildwood. He gifted shares to Bill Bramblett, Paul Orbuch, and Frank Rosenmayr. Then they invested money so that of the 4 people so that ended up owning 25% of the stock. In Sept. 1980 the company moved out of The Sleeping Lady and down the road to 139 Bolinas Rd. They set up a tofu shop and started to make their own tofu. Duchesne's business plan showed that the operation would open in July. Instead opening was delayed until September 1980, which was the slower rainy season.

In late 1980 Richard Leviton visited Duchesne and Wildwood. In the Winter (Feb.) 1981 issue of *Soyfoods* magazine, in an article titled "Putting tofu in the lunch boxes of America" (p. 61), Leviton gave a detailed description of the shop: "which appears to fulfill the dreams of many soyfoods proprietors by combining both light tofu manufacture with light sandwich production in a clean, efficient, and industrious little shop. Mr. Duchesne designed his shop as a tofu showcase with broad wall-to-wall front windows so that passers-by may glimpse tofu production during the days. Wildwood produces a line of eight packaged vegetarian sandwiches including Brown Rice and Tofu Sandwich (with vegetables in a whole wheat bun), Tofu Vegetable Salad,..."

In late 1980 the business was operating in the red. Bramblett, Orbuch, and Rosenmayr attributed the delay to poor management and in Dec. they, controlling the board of directors, demoted Duchesne (who was working long hours) from general manager to president and sales manager, with a salary cut. There were bad feelings. The board then acted as general manager and met each Tuesday night. There were frequent conflicts between Duchesne and the other three. They wanted to expand faster than did Duchesne. By Feb. 1981 the business was operating at a profit. In Dec. 1981 Duchesne proposed that Wildwood start a distribution company (which he would head) to distribute products made by Wildwood and others. The other three disliked the idea, so a week later Duchesne quit (but kept all his Wildwood stock), bought a big new refrigerated truck, and in January 1982 started his own natural foods distribution company named Cauldron Express; it distributed products made by companies other than Wildwood–such as Brightsong Tofu, Pacific Tempeh, and Grain Dance Seitan. The Wildwood owners felt that Duchesne was competing with them so they repeatedly made life difficult for him, and they were a major factor in his bankruptcy 9 months later in September. (Later, Wildwood got into the business of distributing products made by other companies–with a fervor.) In April 1983 in bankruptcy court, Duchesne signed a covenant not to compete with Wildwood for 5 years and sold all his stock and rights to the other three; he ended up getting $5,000.

In about 1981, at the heyday of the brown rice and tofu sandwich, there were 5 companies in the San Francisco Bay area making 1,000 of them each day. Then the California Health Department began to wake up. When they realized that tofu was a perishable protein food that should be refrigerated, they decreed that all BRTSs be taken off the front counter of stores and sold out of the refrigerator. Sales dropped.

In Oct. 1988, after 5 long years, Duchesne returned to the soyfoods business making a BRTS and doing business as Bert's Place (Best Ever Rice & Tofu Sandwich). Wildwood challenged him for breach of the non-compete clause. The earlier agreement was not clearly written and The judge basically favored Duchesne in the arbitration. He had to rename his company to Paul's Place, which ended up in March 1989 as Paul's Organic Food Works. In early 1989 Duchesne developed a chronology of events relating to Wildwood's history, a chart showing the progeny of the original Fried Rice & Tofu Sandwich, and a collection of labels for these progeny.

Articles on Wildwood have been published in the *Pacific Sun* (16-22 Jan. 1981, Food & Drink Section by Linda Xiques, pronounced Zirksus), *Independent Journal* (San Rafael; about 1985-87), *The Fax* (Fairfax, Jan. or Feb. 1986, written by Lisa Alpine, who wrote an earlier article about Wildwood in about 1983-84). Duchesne has been married for 24 years to a nurse; they have 2 children. Address: Fairfax, California. Phone: 415-453-2360.

1278. Bernard, Richard L.; Juvik, Gail A.; Hartwig, Edgar E.; Edwards, Calton J., Jr. 1988. Origins and pedigrees of public soybean varieties in the United States and Canada. *USDA Technical Bulletin* No. 1746. 68 p. Oct. [20 ref]
• ***Summary:*** Contents: Old domestic varieties. Modern domestic varieties from public institutions. Germplasm resources information network. Tables: 1. Number of U.S. and Canadian soybean varieties by maturity group. 2. Number of U.S. and Canadian soybean varieties by country of origin. 3. Origins and pedigrees of old domestic soybean varieties. 4. Lost old domestic soybean varieties. 5. Literature on old domestic soybean varieties in chronological order. 6. Origins and pedigrees of modern domestic soybean varieties from public institutions. 7. Genetic information on backcross-derived public soybean varieties. 8. Genetic information on backcross-derived soybean parental lines. 9. Public soybean variety registrations and licenses. 10. Corrections to published pedigree information.

Abstract: "In this report are described the origins of the 440 U.S. and Canadian soybean varieties that are maintained in the USDA Germplasm Collection at Urbana, Illinois, and Stoneville, Mississippi. Varieties in commercial use before

the mid-1940's were mostly introductions, and this report includes for each the geographic place of origin, the person or institution that provided the seeds, the foreign variety name (if any), as well as information about when it was released and who released it in the United States or Canada. Modern varieties have been developed by hybridization and selection. In this bulletin, the pedigree is specified and where and when each variety was developed and released. This information allows researchers and breeders to trace modern soybean varieties back to their introduced ancestors and facilitates breeding plans and evaluation of the germplasm base of the current commercial soybean crop."

Table 4, titled "Lost old domestic varieties," lists the source of each: Acme–PI 14.954 from Shanghai, China, in 1905. Akasoya–From Japan via Indiana. Allison Black–D.T. Allison, Tennessee. Amherst–PI 4.913 (PI 17.275) from Japan in 1900. Arikara–O. Will Company, North Dakota. Arkan–PI 87.050 from Niummen, Keisho Nando, Korea, in 1930. Arksoy 2913–Arkansas Experiment Station, Marianna (similar to 'Arksoy'). Auburn–PI 21.079A from Tieling, Manchuria, China, in 1907. Baird–PI 6.414 (PI 22.333) from Pyongyang [P'yongyang], Korea, in 1901. Biltan–Selection from 'Otootan', South Africa.

Brindle–PI 20.407 from Merkoechofka, Siberia, in 1906. Brooks–PI 16.789 from Hangchow, China, in 1905. Brownie–PI 6.414 (PI 17.256) from Pyongyang, Korea, in 1901. Buckshot–PI 6.334 (PI 17.251) from Tokyo, Japan, in 1901. Burnette–From Farmville, North Carolina. Butterball–PI 8.433 (PI 17.273) from Japan in 1902, via Rhode Island AES [Agricultural Experiment Station] in 1903. Chame–PI 80.473 from Tokyo, Japan, in 1929. Chang–PI 54.610-2 from Changchun, Kirin, China, in 1921. Chernie–PI 18.227 from Khabarovsk, Siberia, in 1906. Chinaton Echo–From Harrow, Ontario, Canada.

Chiquita–PI 27.707 from Hankow, China, in 1910. Chuku–La Choy Company, Ohio. Cibao–From El Salvador. Delnoshat–Delta Station selection 6679, Mississippi. Delredo–From Mississippi. DeSoto–Ohio farmer. Dortchsoy No. 2–Dortch Seed Company, Arkansas (selected from 'Ogden', similar to 'Ogden'). Dortchsoy No. 6–Dortch Seed Company, Arkansas. Dortchsoy No. 7–Dortch See Company, Arkansas. Doxie–Georgia Experiment Station.

Duggar–PI 17.268C, a selection from 'Ito San.' Early Brown–PI 25.130 and PI 25.161 from Tennessee AES and Indiana AES in 1909. Eda–PI 17.257 from Japan in 1890. Edgecombe–R.P. Cocke, Williamsburg, Virginia. Edna–PI 6.312 (PI 17.252C) from Tokyo, Japan, in 1901. Edward–PI 14.953 from Shanghai, China, in 1905. Fairchild–PI 19.184 from Newchwang, Manchuria, China, in 1906. Farnham–PI 22.312 from Shanghai, China, in 1908. Feed All–A.M. Johnson, North Carolina. Flat King–PI 6.312 (PI 17.252) from Tokyo, Japan, in 1901.

Flava–PI 16.789A from Hangchow, China, in 1905. Gala–Georgia Experiment Station. Gem–P.B. Hutchins, Missouri. George Washington–From Virginia. Giant Yellow–PI 22.415 from Naples, Italy, in 1908. Golden–Harrow Experiment Station, Ontario, Canada. Goshen Prolific–Farmer selection, North Carolina. Hamilton–From USDA number 23 by Ohio Experiment Station in 1909. Hankow–PI 6.559 from beyond Chiu Niu, China, in 1901. Hansen–PI 20.409 from Merkoechofka, Siberia, in 1906.

Hay Boy–Farmer selection, North Carolina. Herman–From North Carolina. Hiro–PI 86.038 from Obihiro, Hokkaido, Japan, in 1930. Hope–PI 6.335 (PI 17.267) from Tokyo, Japan, in 1901. Ignotum–E.E. Evans, Michigan. Italian–Canada Experiment Station. Ito San–PI 17.268 from Japan in 1890. Jet–PI 17.861 from Sachon, China, in 1906. Johnsoy–A.E. Johnson, North Carolina. Kentucky A–Kentucky Experiment Station selection.

Kia–Illinois Experiment Station selection. Kungchuling–From Manchuria, China. Looney No. 2–Farmer selection, Tennessee. Lowrie–PI 22.898A from Paotingfu, Chihli, China, in 1908. Loxitan–Delta Experiment Station selection, Mississippi. Ludeke–Farmer selection, North Carolina. LZ–Louisiana Experiment Station selection. Mammoth Brown–Unknown. Manhattan–PI 6.333 (PI 17.277) from Tokyo, Japan, in 1901. Matthews–Farmer selection, Georgia.

Merko–PI 20.412 from Merkoechofka, Siberia, in 1906. Meyer–PI 17.852 from Peking, China, in 1906. Midunk–Funk Brothers Seed Company, Illinois. Mikado–Farmer selection, Indiana. Misstucky–Farmer selection, Kentucky. Morgan–PI 22.633 from Sheklung, Kwongtung [Kwangtung / Guangdong], China, in 1908. Mount Carmel–PI 70.218-2 from Wuchiatzu, Manchuria, China, in 1926. Mukden No. 4–Wisconsin Experiment Station selection. Nanking–PI 71.597 from Nanking, China, in 1927 (see CNS, p. 6). Nanksoy–PI 104.881 from Nanking, China, in 1934.

Nansemond Early–Farmer selection, Virginia. Natsu–PI 19.984 from Yokohama, Japan, in 1907. Nemo–PI 19.985 from Yokohama, Japan, in 1907. Nielsen–PI 22.644B from Hangchow, Chekiang, China, in 1908. Nigra–PI 22.407 from Hong Kong, China, in 1908. Nuttall–PI 6.416 (PI 17.253) from Pyongyang, Korea, in 1901. Okute–PI 19.986 from Yokohama, Japan, in 1907. Oloxi–Coker's Seed Company, South Carolina. Otoxi–From South Africa. Ozark–PI 37.272 from Kogen Province, Korea, in 1914.

Pee Dee–Coker's Seed Company, South Carolina. Pingsu–PI 18.259 from Tschang-ping-tsu, China, in 1906. Preston–Virginia Experiment Station selection. Quillian–Farmer selection, Oklahoma. Rattlesnake–Kentucky Experiment Station selection. Riceland–PI 20.797 from Shanghai, China, in 1907. Rila–Marsh Foundation, Ohio. Sainte Anne–Canada Experiment Station selection. Samarow–PI 17.260 from J.M. Thorburn and Company in 1902. Saskatoon–Farmer selection, Canada.

Sedo–PI 23.229 from Tientsin, Chihli, China, in 1908. Sherwood–PI 17.862 from Tientsin, China, in 1906. Southern Green–PI 62.839 from Nanking, China, in 1925.

Southern Prolific–PI 37.250 from Keiki Province, Korea, in 1914. Stuart–PI 22.644 from Hangchow, Chekiang, China, in 1908. Summerland–Canada Experiment Station selection [British Columbia]. Suru–PI 89.128 from Kyojo, Korea, in 1930. Swan–PI 22.379 from Canton, Kwangtung, China, in 1908. Taha–PI 21.999 from Boshan, Shantung, China, in 1907. Tanloxi–Delta Station selection 483, Mississippi.

Tashing–PI 20.854 from Harbin, Manchuria, China, in 1907. Tensas–PI 104.881 from Nanking, China, in 1934 (same as Nanksoy). Texoil–Farmer selection, Texas. Tinzan–From Australia. Trenton–PI 24.610, a selection from 'Mammoth (Yellow)' in Kentucky in 1904. Trinitaria–From El Salvador. U.S.-5–PI 54.563-5 from Jungchiangko, Shengking [Liaoning], China, in 1921. Vilnensis–From Poland. Vireo–PI 22.874 from Tokyo, Japan, in 1908. White Eyebrow–PI 30.745 from Wulukai, Kirin, China, in 1911.

Yellow Biloxi–North Carolina Experiment Station selection. Yokotenn–PI 19.981 from Yokohama, Japan, in 1907. Yosho–PI 6.314 (PI 17.262) from Tokyo, Japan, in 1901.

Talk with Dr. Richard Bernard. 1998. July 12. He considers this to be his best publication on this subject, but it is quite similar to *INTSOY Series* No. 30 titled "USDA soybean germplasm collection inventory. Vol. 1," published in August 1987. Address: 1-2. Urbana, Illinois; 3-4. Stoneville, Mississippi.

1279. *East West.* 1988. East West presents: Best & worst awards. 3rd annual. 100% natural. Oct. p. 65-72.
• ***Summary:*** Best Natural Soy Sauce: Lima Nama Shoyu from Ohsawa-Japan, imported by Ohsawa America of Chico, California. Twice brewed, lower in salt, and aged four years. "It is unique among shoyus, with exceptional smoothness and flavor."

Better Than It Sounds Award:" Tofu chocolate? Yes, Barat Bars by Legume Inc. of Montville, New Jersey, use tofu instead of dairy and no hydrogenated or fractionated palm kernel oil. Carob candies move over!"

Best Tasting Flavored Soy Drinks: "The Westbrae Malteds won this contest going away. Creamy, thick, and delicious, they are more of a dessert than a drink. Some devotees eat them frozen."

Least Healthful Line of Soy Drinks: "The Westbrae Malteds. The flip side of their great taste is their almost 400 calories and 15 grams of fat per 8 ounces."

Most Healthful Line of Soy Drinks: Edensoy. They are the only producers making a totally oil-free drink.

Worst Tasting Flavored Soy Drinks: "Vitasoys from San Francisco, Calif., seem to have few fans and finished last in our blind taste test."

Most Questionable Beverage Label Claim: "3 grams of fat per 6 ounces of Carob and Chocolate Ah Soy, by Great Eastern Sun of Enka, North Carolina. These soymilks are rich and creamy, yet 3 grams is a lower fat content than even Edensoys, made without oil. How is that possible guys?"

That's Progress? Award: "Mori-Nu Tofu by Morinaga Nutritional Foods of Los Angeles. Aseptic Tetrapacked tofu that has indefinite shelf life and can be shipped anywhere. Good for backpackers maybe but can't compare to fresh and local."

Best Fake Hot Dog: SoyBoy Tofu Not Dogs by Northern Soy of Rochester, N.Y. "Nice smoky flavor and smooth texture, almost as good as the real thing."

Worst Fake Hot Dog: Tofu Pups of Lightlife Foods of Greenfield, Massachusetts. "Dry and crumbly on the inside, with a lack of distinctive flavor. Won't fool anybody at the neighborhood cookout."

Best Tamari: San-J Traditionally Brewed Tamari from San-J International of Colonial Heights, Virginia. "No one else even came close. Question: Will they be able to retain their appeal when the first U.S.-brewed batch hits the shelves?"

1280. American Miso Co. 1988. Our two new misos!: The American Miso story (Ad). *Vegetarian Times.* Dec. p. 40.
• ***Summary:*** This one-third page vertical black-and-white ad begins: "Miso Master is proud to announce two new misos: Brown Rice Miso and Sweet Barley." Near the top of the ad is a logo of bound sheaves of grain. Near the bottom of the ad is the Miso Master logo, an illustration showing the head and shoulders of a Japanese miso master, with a knotted headband, in front of a large wooden vat of miso. Below "Miso Master is produced by the American Miso Co. for Great Eastern Sun." Address: Rutherfordton, North Carolina.

1281. Kloss, Jethro. 1988. Back to Eden: A human interest story of health and restoration to be found in herb, root, and bark. Revised and expanded second edition. Back to Eden Publishing Co., P.O. Box 1439, Loma Linda, CA 92354. xxviii + 1007 + 20 p. Illust. Index. 21 cm. Kloss Family Heirloom Edition. Index.
• ***Summary:*** One of the most creative and original sources of early soyfoods recipes, which include "Soybean Cream" and "Soybean Ice Cream." This revised edition contains all essential material from the original text of this classic work on healing herbs, home remedies, diet, and health, but it has been reorganized, re-typeset and re-indexed to make it easier to use and more contemporary. Three hundred pages of natural health information have been added. Old terms have been explained and updated. There are also 16 pages of photographs and 16 pages of new of family recollections by Jethro Kloss' daughter (especially interesting), son, and granddaughter. These add greatly to the story of his life and work. For example, his daughter, Promise, states (p. xv):

"Next the Klosses became interested in the self-supporting work being conducted in the south and they visited some of the schools in North Carolina and Tennessee. About 1911 they sold the sanitarium in Minnesota and

moved to Fountain Head, Tennessee, where their youngest daughter, Naomi, was born in 1913. Here they bought a 250-acre farm, built a large house and barn, and raised many kinds of fruits and vegetables. They also raised Shetland ponies for a time.

"A later development in good health was his creation of a significant health food manufacturing operation in Amqui, Tennessee after receiving a request from the owners to take charge of their food factory. While he was operating this factory he would be up at two, three, or four o'clock in the morning; as early as necessary to build the fires for the steam cooker or the large oven and whatever else needed to be done to have everything in readiness for the workers to begin the day processing, canning, or baking. When that big oven was hot, he would often pop into it some special weekend treat for his family–some delicious health coffee cake or raisin buns like no one else could make, for he was an excellent baker.

"Before this factory was sold to the Nashville Agricultural Normal Institute, he was shipping health foods all over the United States and Canada. It was also during this time and at this place that he originated many new health food recipes. This establishment later became a part of what has since become the well-known Madison College near Nashville, Tennessee."

Photos show: (1) Portraits of Wilhelm and Sofia Kloss, parents of Jethro Kloss. They had 11 children, born between 1848 and 1868. Jethro was the 9th child, born April 27, 1863. (2) Jethro Kloss in 1900 as a young minister, healer, and teacher. (3) Jethro Kloss with Carrie Stilson, his first wife whom he married in 1901. Tragically she died in 1905. (4) Promise Kloss, born to Carrie and Jethro in 1903, shown as a young girl with her father. (5) Amy Pettis Kloss, Jethro's second wife. They were married in 1907. (6) Children of Jethro and Amy: Lucille Kloss (1908-1929). Eden Pettis Kloss (1910-). (7) Naomi Joan Kloss at 17 months of age. Jethro's youngest child, she was born in 1913. (8) In 1907 Jethro and Amy opened this comprehensive health and medical center in St. Peter, Minnesota, which they named The Home Sanitarium. (9) Jethro Kloss giving a hydropathy treatment at The Home Sanitarium; it was open from 1907 to 1912. (10) Amy operating the women's hydropathy treatment room. (11) Manufacturing malta, the great cereal syrup from pure wheat starch and barley. (12) In 1915, from their food factory in Nashville, Tennessee, the Klosses shipped foods throughout the United States and Canada. Here 4 people are seen working at a table. (13) Patients, family and friends enjoyed health foods canned by the Klosses in this outdoor "factory," which was a commercial enterprise as well. (14) This interesting illustration shows an aerial view of the Nashville Sanitarium-Food Factory with a train and 3 sets of train tracks in front. (15) A 1920 advertisement for utensils (such as 2 hand grinders for flour or nuts) sold by the Jethro Kloss Health Food Company in Brooke, Virginia. (16) Menu for a demonstration vegetarian dinner given by Jethro Kloss at the Dodge Hotel in Washington, DC, on March 27, 1933. "Sprouted soy beans" are on the menu. "The pumpkin pie and strawberry sundae were made with soy milk" (p. xvii). (17) A 1926 photo of Promise Kloss (Moffett) at age 23. (18) A 1935 snapshot of Jethro's only son, Eden Pettis Kloss. (19) Jethro's daughter, Promise, with typewriters won in typing contests during the 1930s. (20) Proud grandfather, Jethro, holding his only grandchild, Doris Joyce, in 1929. (21) Jethro's youngest child, Naomi Kloss Engelhard, mother of Doris Joyce. (22) "Promise Kloss Moffet, Jethro's first child, shares food preparation tips with Doris Joyce, his granddaughter, in 1934. (23) "A group of letterheads dating back to 1904 showing some of the variety of enterprises engaged in by Jethro Kloss during his lifetime." 1922 Feb. 27–Jethro Kloss Health Foods Company (Brooke, Virginia). Undated–Brookside Mercantile Company (Brooke, Virginia). Undated. Branch of the Battle Creek (Michigan) Sanitarium (Superior, Wisconsin). A full line of Battle Creek Sanitarium Health Foods. J. Kloss & Co. Grove Contractors, Farmers and Truck Farmers. Jethro Kloss Publications (Washington, DC). Back to Eden Magazine. Jethro Kloss, Medical Evangelist. (24) Promise Kloss Moffet, with a large, framed photograph of her father, Jethro Kloss, on her 80th birthday, Aug. 16, 1983. (26) Great-grandchildren of Jethro Kloss: Stephen Kloss Gardiner. (27) Nancy Kloss (Bramlett).

The book has been published continuously by the Kloss family since 1946.

Contents: Section I: Natural health. 1. Personal experiences. 2. Soil preparation and farming. Section II: Herbs for healthful living. 1. History of herbal medicine. 2. Herbs. 3. General directions for preparation and use of herbs. 4. Tonic herbs. 5. Herbs used to treat disease. 6. Medicinal trees. 7. Specific herbs for various medical problems. Section III: Treating diseases with herbs. Treating diseases with herbs. Special notice. Section IV: Your body and its needs. The digestive section. 1. The importance of good nutrition. 2. Carbohydrates. 3. Fats. 4. Protein. 5. Mineral elements in the body. 6. Vitamins. 7. Water. 8. Fresh air, exercise, and sleep. Section V: Your foods. 1. Fruits. 2. Vegetables. 3. Fiber (to "help keep you regular"). 4. Oatmeal. 5. Nuts. 6. Breads and refined flour. 7. Meat and vegetarianism. 8. Milk. 9. Salt. 10. Garlic. 11. Healthful diets. 12. Obesity. 13. Fasting and healthful eating. Section VI: Food preparation. 1. Useful hints to preserve vitamins. 2. Kloss's favorite health recipes. 3. Cooking under steam pressure. 4. Aluminum cooking utensils. 5. Baking and breads. 6. Preparing wholesome desserts and beverages. Section VII: Effects of polluted and adulterated foods on the body. 1. Adulteration of food. 2. Health-destroying foods. 3. Dangers from disease in animals. Section VIII: Water and good health. 1. History of water cure. 2. Using water to preserve health. 3. Water's effects and use in treatment. 4. Water's effects on sickness. 5. Baths and water treatments. 6. Compresses and fomentations. Section

IX: Skills in caring for the sick. 1. Nursing. 2. Massage. 3. High enemas. 4. The value of charcoal. Appendix: Glossary of old-fashioned medical terms. Glossary of medical properties of herbs. General tables.

A press release accompanying the new revised, 2nd edition notes: Back to Eden was written by Jethro Kloss during the 1920s and 1930s, with help from Promise and Eden, his daughter and son. It was first published in 1939, when the author was 76 years old. It has since sold more than 3 million copies. Kloss died in 1946 after retiring to Tennessee. Message Press, a small business in a rural community not far from Chattanooga, continued to publish Back to Eden for more than 25 years after his death, under the direction of Promise, his daughter. Unfortunately in 1967 the copyright expired during the confusion attendant to the illness and death of the book's country publisher. Promise's attempt to renew the copyright in Jan. 1968 was too late. In 1971 other publishers pirated Back to Eden. Address: Loma Linda, California.

1282. Wilkinson, Dolores. ed. and pub. 1988. Proceedings of the Seventeenth Soybean Seed Research Conference 1987. Washington, DC: American Seed Trade Assoc. vii + 114 p. Held 9-10 Dec. 1987 in Chicago, Illinois. Publication No. 17. 23 cm. [100+ ref]

• ***Summary:*** Organized and sponsored by the Soybean Seed Division of the American Seed Trade Association (Asta). Program committee (p. ii). President's message, by Jim Carnes, President, ASTA (iii). Commentary, by H. Walker Kirby, Program Chairman (p. iv). Foreword, by Don Swanlund, Chairman, Soybean Division (p. v).

Contents: Prospects for the farm economy in 1988, by Darrel Good (Univ. of Illinois, Urbana). Buying expectations of the emerging farmer, by Bruce Rydeen (NAPB, Mission, Kansas). Analyzing your market, by Ronald P. Lipovsky (Maritz Marketing Research, Indianapolis). Developing marketing strategies, by Michael A. Jackson (Agri-Business Group, Indianapolis).

Genetic altering of seed size: breeding strategies and market potential, by Thomas E. Carter (USDA/ARS [Agricultural Research Service], Raleigh, North Carolina). Leadership and expectations in people management, by David R. Parker (Agri-Business Group, Indianapolis). Influencing your organization, by Robert W. Hopping (GROWMARK, Inc., Bloomington, Illinois). Exotic soybean diseases: a potential threat to the United States crop, by J.B. Sinclair (Univ. of Illinois, Urbana). New diagnostic approaches for soybean diseases, by Sally A. Miller (Agri-Diagnostics Associates, Cinnaminson, New Jersey).

Introduction: philosophical issues in public crop development and release policy, by Donald A. Holt (Univ. of Illinois, Urbana). Panel discussion: public variety release procedures Mississippi–different states, different approaches, by Roy G. Creech (Mississippi State University, Mississippi State). North Dakota–and some national, regional and state landmarks, by Jack F. Carter (North Dakota State University, Fargo). Indiana–variety release and use policies, by Vic L. Lechtenberg (Purdue University, West Lafayette). ASTA considerations, by William T. Schapaugh (American Seed Trade Assn., Washington, D.C.).

Patents: their impact on the seed industry, by Jack Porter (Lincoln, Nebraska). Award Presentation. Address: American Seed Trade Assoc., Washington, DC.

1283. Belleme, John. 1989. The imperial sauce: Rich, dark, and subtle, Japan's traditionally made shoyu is an outstanding and versatile seasoning. *East West.* Jan. p. 72-77. [2 ref]

• ***Summary:*** Westerners indiscriminately sprinkle soy sauce on everything from beef to popcorn. Almost half of the 60 million dollars spent annually by Americans on soy sauce goes for a product that is not even fermented. Kame, La Choy, and Chun King brands for example, are the result of a 1-day chemical process. The ingredients are soy extract, alcohol, sugar, salt, food coloring, and preservatives. Nearly all other soy sauce sold in the U.S.–such as Kikkoman, Yamasa, Marukin, Higashi-Maru, and Maruten–is made from chemically processed soy meal by a high-tech, accelerated method and temperature-controlled fermentation, and it usually contains sodium benzoate as a preservative.

Traditional shoyu products reach U.S. consumers in a roundabout way. For example, Muso buys traditional shoyu from the Marushima Brewing Co. of Shoda Shima, Japan, and exports it to Eden Foods, which sells it to American consumers under the Eden label. Ohsawa Japan buys from the Yamaki Brewing Co. of Tokyo, and sells to Ohsawa America, which bottles and sells it under the Lima label. The largest producer of traditional shoyu is the Sendai Shoyu and Miso Co. of Sendai, Japan. Sendai makes Johsen Shoyu, which is exported by Mitoku and is bottled in the U.S. under different brand names, including Westbrae, Tree of Life, Emperor's Kitchen, Mitoku-Johsen, and Mitoku Macrobiotic.

The author notes that, "My 8 years of miso-making in Japan and at American Miso Co. have taught me that miso aged in wood is superior to that aged in plastic... although Sendai shoyu and Miso Company started making high tech shoyu in 1950, Sasaki insisted that his company also continue to make traditional shoyu." Although at times Sasaki's pet project seemed a financial disaster, in 1970 he received a phone call from a Tokyo businessman, Akiyoshi Kazama. Kazama, a friend of macrobiotic teacher Michio Kushi, was looking for a supply of traditional shoyu for Kushi's students. When Sasaki showed Kazama his 12 2,000 gallon cedar casks of naturally aging whole soybean shoyu a few days later, Kazama knew his search was over. Kazama shipped Johsen Shoyu to the U.S. in 5 gallon wooden buckets at first.

Jubei Sasaki has passed away, but his 12 casks of traditional shoyu have grown to 100 and his son continues the whole soybean shoyu tradition.

4 recipes are given. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1284. Baldwin, F.L. 1989. The use of computer programs for weed control in soybeans. In: A.J. Pascale, ed. 1989. World Soybean Research Conference IV. Buenos Aires: Continuing Committee. xxviii + 2152 p. See p. 1620-24. [10 ref]
• ***Summary:*** "Development of computer programs for making weed management decisions in soybeans began with the Integrated Pest Management (IPM) movement in the 1970s. The first program released to the public was Herbicide Selection Program and Utility Program for Apple II from Purdue University [Indiana] in 1982. This program selected preplant, preemergence and postemergence herbicides based upon the user's response to questions about weed species, soil texture, environmental factors and crop rotation...

"The most useful function of the weed control computer programs currently available is economic threshold determinations. Because of the complex calculations required to determine the competitive effects of multispecies weed populations, the computer provides a service that cannot be matched by printed information. The most widely reviewed computer programs available in the U.S.A. to calculate the effects of multispecies weed competition and also to select recommended herbicides are The Herbicide Selection Program from the University of Arkansas and Herb (registered trademark) from North Carolina State University. These two programs form the basis of this presentation." Address: Univ. of Arkansas Cooperative Extension Service, P.O. Box 391, Little Rock, AR 72203.

1285. Eppley, David. 1989. Computer puts experts on call. *Soybean Digest.* Feb. p. 24a.
• ***Summary:*** "Expert systems are touted as the next generation of computer programs coming to agriculture... They're a form of artificial intelligence designed to emulate the decision-making process of an expert... Expert systems reach conclusions to complex problems in much the same manner as human experts do: by using rules of thumb" and asking questions... More than a dozen land grant universities are developing various expert systems. Most will be available through extension offices... Here's a summary of soybean programs available or soon to be released: Soybean Disease Diagnosis (summer 1986, Univ. of Illinois), Soybean Herbicide Selection Program (1987, Univ. of Arkansas), Postemergence Herbicide Selection for Soybeans (forthcoming, North Carolina State Univ.), SMARTSOY (calculates economic thresholds for insects, Univ. of Georgia), Insect Pest Management and Weed Control in Soybeans (1989, Univ. of Florida), SOYBUG (Univ. of Florida), SOYSEED (Univ. of Illinois).

1286. **Product Name:** Miso Master Miso [Brown Rice, or Sweet Barley].
Manufacturer's Name: Great Eastern Sun (Marketer). Made in North Carolina by American Miso Co.
Manufacturer's Address: 92 McIntosh Rd., Asheville, NC 28806.
Date of Introduction: 1989 February.
New Product–Documentation: Natural Foods Merchandiser. 1989. Feb. p. 14.

1287. Mitoku Co. Ltd. 1989. Food is medicine: Mitoku macrobiotic (Ad). *East West.* April. p. 33.
• ***Summary:*** The top half of this full-page ad contains a large square red seal with four Chinese characters, read *"Ishoku Dogen,* which literally means 'medicine and food (have the) same source.' It is an old traditional saying in Japan, and its not only Oriental philosophy. In the 4th and 5th centuries BC, a Greek physician spoke of letting food be our medicine. Hippocrates taught that the effects of occupation, climate and food, were where much of the cause of illness lay. Today, modern science and medicine have begun to agree with this ancient wisdom."

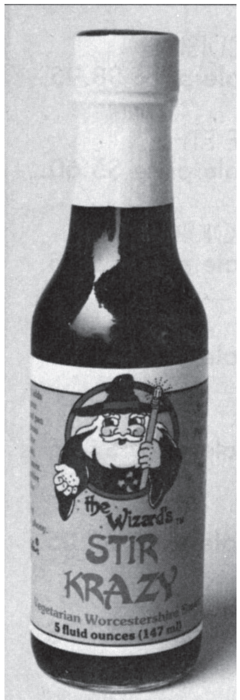
"Mitoku Macrobiotic products are a selection of some of the highest quality foods in the world; Miso, Tamari and Shoyu, premium seaweeds,... mochi."

USA wholesale distribution: Granum, Seattle, Washington 98105 (206) 525-0051. Spiral Foods Inc., Asheville, North Carolina 28814 (800) 633-2156. Address: CPO Box 780, Tokyo, Japan 100-91.

1288. Belleme, John. 1989. The soymilk face-off: Top brands differ widely in ingredients, nutrients, fat, and sugar. *East West.* June. p. 53-55, 58-59.
• ***Summary:*** Four brands of soymilk are now available in the USA: Edensoy (3 flavors), Vitasoy (4 flavors), Westsoy (6 flavors), and Sunsoy (2 flavors). Contains a nutritional analysis, ingredients, and other basic information about each product. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1289. Belleme, John. 1989. Soymilk's bum rap? The FDA comes down hard on Eden Foods. *East West.* July. p. 42, 44-45.
• ***Summary:*** The story from 1983 to the present of serious problems caused by a pamphlet stating that Edensoy is "Good for babies." Edensoy is expected to have 1989 retail sales of $12,000,000. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1290. **Product Name:** Wizard's Stir Krazy Vegetarian Worcestershire Sauce.
Manufacturer's Name: Edward & Sons Trading Co., Inc. (Distributor).



Manufacturer's Address: 1115 Lousons Rd., P.O. Box 3150, Union, NJ 07083. Made in Hillsborough, North Carolina. Phone: 201-964-8176.
Date of Introduction: 1989 July.
Ingredients: Incl. Apple cider vinegar, tamari soy sauce, deep well water, Barbados molasses, miso, honey, fresh ginger puree, salt, tamarind, cayenne pepper mash, garlic juice, honey, herbs and spices, sea salt, hickory smoke, natural seaweed extract.
Wt/Vol., Packaging, Price: 5 oz shaker bottle. Retails for $2.29 (12/89).
How Stored: Shelf stable.
New Product–Documentation: Spot in *Vegetarian Times.* 1989. "The VT shopper: We asked for it..." July. p. 69. "... and we got it. When 'The Wizard' (a.k.a. John Troy) read in *VT* that there is no such thing as vegetarian worcestershire sauce (all commercial brands now contain anchovies), he fired up his cauldron and–voila!–he invented one. The Wizard's Stir Krazy sauce is full of spicy, authentic, worcestershire flavor. Thanks, Wiz. Distributed by Edward & Sons Trading Co. In natural food stores." A small photo shows a bottle of the new sauce.

Note 1. This is the 2nd earliest known vegetarian worcestershire sauce made in the USA; see Bonneau 1972.

Note 2. Wizard Baldour makes this sauce in Hillsborough, North Carolina.

Soya Newsletter. 1989. Sept/Dec. p. 11.

News release from Edward & Sons Trading Co. 1989. Nov. "Stir-Krazy named 'Best New Sauce of 1989.'" *Vegetarian Times* likes this sauce "so much that they have featured it in their 'Best of 1989' awards. This is the first time the magazine has recognized new products in this way." The 5 oz shaker bottle, which "retails for $2.29, is the perfect 'fixin' for tofu, teriyaki, and wok dishes..."

Talk with John Troy of North Carolina. 2012. March 7. The basic ingredients in John's sauce worcestershire (probably not in the exact order) were vinegar, tamari soy sauce, lemon juice concentrate (purchased frozen), filtered water, miso, honey, garlic, and ginger, spices, xanthan gum, citrus extracts (orange oil, lemon oil), spice extract (rosemary extract, used as a stabilizer–not for its flavor). It was not organic. Lea & Perrins' Worcestershire Sauce is quite similar to Japanese Ponzu sauce, which is made by simmering rice vinegar, mirin, katsuobushi flakes, and konbu seaweed. The liquid is then cooled, strained to remove the katsuobushi flakes, and finally the juice of one or more of the following citrus fruits is added: yuzu, sudachi, daidai, kabosu, or lemon. *Ponzu-joyu* is based on equal parts soy sauce (shoyu) and lemon, lime, or yuzu juice. The Japanese use bonito flakes (*katsuobushi*) instead of anchovies, and sometimes *yuzu* (a citrus fruit) instead of lemon juice.

1291. Roth, Martin. 1989. Early history of Great Eastern Sun and subsequent work with soyfoods (Interview). *SoyaScan Notes.* Aug. 17. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Other records describe in detail Martin's pioneering work with commercial production of Brown Rice & Tofu Sandwiches, Sweet White Miso, Amasake, Amasake Shakes, and America's first Amasake Ice Cream. In 1982 he and his very close friend Barbara Svenning Garvey (they were never officially married) moved from Boulder, Colorado, to Miami, Florida, then to North Carolina. Martin met Barry Evens in Florida and Barry commissioned Martin to go to North Carolina and set up a macrobiotic distribution and import company near the American Miso Co., of which Barry was then the principal owner. "The beginning of that company was a wonderful experience. Everybody was thrilled. We were the first ones to actually take a full line of Japanese foods and present it to the health food stores in a big way. At that time Erewhon still had a much more limited selection of Japanese imports, such as miso, tamari, soba, etc. We had only imports, 200 to 300 esoteric items that many people never heard. We put together a nationwide sales force and went store to store, introducing the concept of a macrobiotic section. We put that on the map. We had great success, opening hundreds of accounts. I left in about 1984 because I got an opportunity to work for Westbrae as sales and marketing manager, and North Carolina was not my favorite place to live." Martin developed the concept, the name, and the graphics for the Westbrae Malteds and for Mitoku's Supersoy. Address: Berkeley, California. Phone: 415-527-7066.

1292. Belleme, John. 1989. Natural soy sauce: A brewing controversy. *Solstice* No. 37. Summer. p. 10-12. [1 ref]

• ***Summary:*** "A San-J placard [shelf talker] sent to thousands of retail stores [about 6 months before this article] says: 'You will notice that all San-J soy sauce has alcohol as an ingredient. As a result of fermentation, there is a small amount of naturally occurring alcohol in all soy sauces. We add a little more alcohol in order to inhibit the growth of naturally occurring aerobic yeast. While the addition of alcohol as a natural preservative is common practice for traditional soy sauce, often it is not listed on the label.'" The author contacted the three major suppliers of traditional imported soy sauce, they were unanimous is denying San-J's accusations. Likewise, the brewmasters of these products denied that any alcohol was added. (Note: Johsen shoyu is bottled under the Tree of Life, Koyo, Mitoku Macrobiotic, Emperor's Kitchen, and Westbrae labels. Marushima Shoyu supplies Eden Traditional Shoyu and Organic Shoyu). However Mansan Brewing Co. of Handa, Japan, adds 4% Mikawa Mirin (rice brandy) to its Mansan Tamari, which is marketed under the Mitoku Macrobiotic label. When Belleme asked San-J vice president Steve Zoller which brands of soy sauce have unlisted alcohol, Zoller could not give any specifics. "The soy sauce San-J imported until their domestic product became available last fall was labeled 'no artificial additives or preservatives.' When we asked Steve Zoller if this shoyu and tamari contained added alcohol and tamari, he replied, 'No comment.'"

Belleme was also concerned that San-J tamari made with hexane-extracted soybean meal using a modern temperature-controlled process would be called "traditionally brewed." Note: Belleme later admitted that the statement in this article about benzene being used by ADM to make food grade ethanol was incorrect. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1293. National Oilseed Processors Association. 1989. Yearbook and trading rules 1989-1990. Washington, DC. [iv] + 123 + 11 p. 23 cm.

• ***Summary:*** On the cover (but not the title page) is written: Effective August 1, 1989. Contents: Constitution and by-laws. Officers and directors. Executive office. Members. Associate members. Standing committees. Trading rules on soybean meal. Appendix to trading rules on soybean meal: Official methods of analysis (moisture, protein, crude fiber, oil {only method numbers listed}), sampling of soybean meal {at origin} (automatic mechanic sampler, pneumatic probe sampler, probe sampler), sampling of soybean meal (at barge loading transfer facilities), official weighmaster application, semi-annual scale report, certification of installation of automatic sampler & mechanical divider (at origin), semi-annual certification of automatic sampler & mechanical divider (at origin), certification of installation of automatic sampler & mechanical divider (at barge loading transfer facility), semi-annual certification of automatic sampler & mechanical divider (at barge loading transfer facility), official referee laboratories (meal), official NSPA soybean meal sample bag. Soybean meal export trading rules: Minimum blending procedures for export meal blended at ports, sampling of soybean meal (at vessel loading facilities), weighing of soybean meal (at vessel loading facilities), certification of installation of automatic sampler & mechanical divider (at vessel loading facility), semi-annual certification of automatic sampler & mechanical divider (at vessel loading facility), semi-annual certification of scales at vessel loading facilities. Trading rules on soybean oil. Sales contract. Definitions of grade and quality of export oils. Soybean lecithin specifications. Appendix to trading rules on soybean oil: Inspection, grading soybean oil for color (NSPA tentative method), methods of analysis (A.O.C.S. official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses; soap stock, acidulated soap stock and tank bottoms (only method numbers listed), official weighmaster application, semi-annual scale report, official referee chemists (oil). Soybean oil export trading rules. Uniform soybean oil export contract. Foreign trade definitions (for information purposes only) Appendix 1.

The section on officers, executive committee, and board of directors (p. 7-8) gives the name, company affiliation, and phone number of each person. Officers (executive committee)–Chairman: James W. Lindsay, Ag Processing Inc a cooperative [AGP], Vice Chairman: C. Lockwood Marine, Central Soya Co., Inc. Secretary: John March, Cargill, Inc. Treasurer: John Burritt, National Sun Industries, Inc. Immediate past chairman: John G. Reed, Jr., Archer Daniels Midland Co.

Executive staff: President: Sheldon J. Hauck. Executive vice president: Brose A. McVey.

Board of directors (alphabetically by company; each member company may have up to two representatives on the board; only the first of these may vote): James W. Lindsay & William C. Lester, Ag Processing Inc a cooperative. John G. Reed, Jr. & Michael D. Andreas, Archer Daniels Midland Co. John March & Thomas O. Palmby, Cargill, Inc. C. Lockwood Marine & David H. Swanson, Central Soya Co., Inc. David B. Mulhollem & Bernard Steinweg, Continental Grain Co. Ian White & Donald G. Foster, Elders Oilseeds Inc. Merritt E. Petersen & Stan Eichten, Honeymead Products Co. John Burritt & Jeff Berkow, National Sun Industries, Inc. John M. Wright & Henry E. O'Bryan, Owensboro Grain Co., Inc. Sewell L. Spedden & William Bohan, Perdue Incorporated. Paul D. Otto & J. Richard Galloway, Quincy Soybean Co. James K. Smith & Richard E. Bell, Riceland Foods, Inc. Thomas L. Harper, Southern Soya Corp. D. Daryl Houghton & P. Coleman Townsend, Townsends, Inc.

Executive office, Washington, DC: President, Sheldon J. Hauck. Executive vice president: Brose A. McVey. Administrative asst.: Steven C. Kemp. Legislative asst.:

Elizabeth A. Loudy. General counsel: Elroy H. Wolff, Sidley & Austin. Special counsel: Richard O. Cunningham, Steptoe & Johnson.

Members (listed alphabetically by company; within each company, first the name of the official Association representative {who is on the Board and votes}, followed by the other personal members listed alphabetically by surname. For example, Archer Daniels Midland Co., the company with the most personal members, has 34. After the name of each personal member is given with his address and phone number. In the listing below, the number of personal members is shown in parentheses after the name of each company, followed by city and state of the various locations): Ag Processing Inc a cooperative (21); Van Buren, Arkansas; Eagle Grove, Iowa; Manning, Iowa; Mason City, Iowa; Sergeant Bluff, Iowa; Sheldon, Iowa; Dawson, Minnesota; St. Joseph, Missouri. Omaha, Nebraska. Archer Daniels Midland Co. (23); Archer Daniels Midland Co. (24); Little Rock, Arkansas; Augusta, Georgia; Valdosta, Georgia; Decatur, Illinois; Galesburg, Illinois; Granite City, Illinois; Taylorville, Illinois; Frankfort, Indiana; Des Moines, Iowa; Fredonia, Kansas; Destrehan, Louisiana; Mankato, Minnesota; Red Wing, Minnesota; Kansas City, Missouri; Mexico, Missouri; Clarksdale, Mississippi; Fremont, Nebraska; Lincoln, Nebraska; Fostoria, Ohio; Kershaw, South Carolina; Memphis, Tennessee. Cargill, Inc. (20); Osceola, Arkansas; Gainesville, Georgia; Lafayette, Indiana; Cedar Rapids, Iowa; Des Moines, Iowa; Iowa Falls, Iowa; Sioux City, Iowa; Washington, Iowa; Bloomington, Illinois; Chicago, Illinois; Wichita, Kansas; Burnsville, Minnesota; Minneapolis, Minnesota; South Savage, Minnesota; Wayzata, Minnesota; Kansas City, Missouri; Fayetteville, North Carolina; Raleigh, North Carolina; Sidney, Ohio; Memphis, Tennessee; Chesapeake, Virginia. Central Soya Co., Inc. (13); Gibson City, Illinois; Decatur, Indiana; Fort Wayne, Indiana; Indianapolis, Indiana; Belmond, Iowa; Bellevue, Ohio; Marion, Ohio; Delphos, Ohio; Chattanooga, Tennessee. Continental Grain Co. (8); Guntersville, Alabama; Chicago, Illinois; New York City, New York. Elders Oilseeds Inc. (3); Culbertson, Montana; Blaine, Washington. Honeymead Products Co. (3); Mankato, Minnesota. National Sun Industries, Inc. (3); Minneapolis, Minnesota. Owensboro Grain Co., Inc. (4); Owensboro, Kentucky. Perdue Incorporated (4); Salisbury, Maryland; Cofield, North Carolina. Quincy Soybean Co. (6); Helena, Arkansas, Quincy, Illinois. Riceland Foods, Inc. (7); Stuttgart, Arkansas. Southern Soya Corp. (2); Estill, South Carolina. Townsend's Inc. (2); Millsboro, Delaware.

Associate Members: ADM Agri-Industries Ltd., Windsor, Ontario, Canada. Beatrice / Hunt-Wesson, Fullerton, California. Best Foods, a Unit of CPC International Inc., Englewood Cliffs, New Jersey. Bestel Inc., Minneapolis, Minnesota. C&T Refinery, Inc., Richmond, Virginia. Con Agra Poultry Co., El Dorado, Arkansas. Conti-Quincy Export Co., New York City, New York. Louis Dreyfus, Wilton, Connecticut. Empire Kosher Poultry, Inc., Mifflintown, Pennsylvania. Garnac Grain Co., Overland Park, Kansas. Goldman Sachs–J. Aron Div., New York City, New York. K&L Feeds, Inc., Selinsgrove, Pennsylvania. Kraft Food Ingredients Corp., Glenview, Illinois; Memphis, Tennessee. Krohn Trading Limited Partnership, New Orleans, Louisiana. Lever Bros Company, Inc., New York City, New York. Overseas Commodities Corp., Minneapolis, Minnesota. Pilgrim's Pride Corp., Pittsburg, Texas. Pillsbury Co. (The), Overland, Kansas; Minneapolis, Minnesota. Procter & Gamble Co., Cincinnati, Ohio. Purina Mills, Inc., St. Louis, Missouri. Ralston Purina Co., St. Louis, Missouri. Schouten International, Inc., Minneapolis, Minnesota. A.E. Staley Manufacturing, Decatur, Illinois. Alfred C. Toepfer International, Inc., New York City, New York (Knud Winkelman). Tradecom, Inc., Boca Raton, Florida. Van Den Bergh Foods Co., Chicago, Illinois.

Standing committees: For each committee, the function of the committee, the names of all members (with the chairman designated), with the company and company address of each are given–Crusher committees: Canola, flaxseed, safflower seed, sunflower seed. International trade policy. Soybean meal trading rules. Soybean oil trading rules. Safety, health, and loss prevention. Technical. Address: 1255 Twenty-Third St., N.W., Washington, DC 20037. Phone: 202/452-8040. Telex: 248959. Fax: 202/833-3636.

1294. Belleme, John. 1989. Natural soy sauce: A brewing controversy. Part II. *Solstice* No. 37. p. 25-26, 28-30. Sept/Oct. [1 ref]

• ***Summary:*** Discusses the differences between HVP unfermented soy sauce (such as La Choy, Chun King, and Kame) and fermented soy sauce, then between modern high-tech fermented soy sauce (such as that made by Kikkoman from hexane defatted soybean meal and fermented for less than 7 months in fiber glass or stainless steel temperature controlled tanks) and "traditionally brewed" soy sauce (such as the macrobiotic brands "made from whole soybeans and aged in wood for at least 4 seasons at the natural temperature of the region"). Manufacturers of modern-high tech soy sauce often refer to their product as naturally brewed to distinguish it from "synthetic" HVP sauces. Now Kikkoman and San-J have succeeded in placing their high-tech products in some natural foods stores. Belleme discusses the objections that can be raised against these products: (1) Substitution of hexane defatted soy meal for whole soybeans. "The FDA and solvent extraction industry have set acceptable limits for hexane in soy meal at 25 parts per million (ppm)." San-J and Kikkoman assert that their products test negative for hexane residues. "San-J brewmaster Yuji Yamamoto said that using soy meal rather than whole soy beans is more efficient because fermentation is faster, nitrogen yields are higher, and there is no crude

soy oil to dispense with, as in whole soy bean soy sauce." Belleme thinks that this oil can be used for soap. Because of the greater efficiency, soy meal soy sauce can be produced and sold less expensively than whole bean soy sauce.

(2) Heated non-wood vats. "San-J brewmaster Yamamoto says that their closed heated system is easier to clean, more efficient, and produces a clearer, milder, and better balanced soy sauce than the traditional method." Jubei Sasaki of Sendai Shoyu Co. disagrees, arguing that the effect of seasonal changes and the wooden vats improve the shoyu flavor. Wooden vats may also give a product with more vitamin B-12.

"Although whole soybeans are always proudly listed as such, soy meal is usually referred to as 'soybeans.' Ironically, San-J's black label soy meal tamari says 'traditionally brewed,' and makes no mention of defatted soybeans, thus making it difficult for the consumer to make an informed choice." Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1295. Belleme, John. 1989. Snow-dried tofu: The original convenience food offers flavor an nutrition. *East West.* Oct. p. 30-32.

• ***Summary:*** Each winter, high in the mountains of central Japan, Aki Takagi's small family is busy making snow-dried tofu [dried frozen tofu] for the world's natural foods stores.

Note. This is the earliest English-language document seen (April 2013) that uses the term "snow-dried tofu" to refer to traditionally-made dried-frozen tofu. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1296. Country Cousin's Committee. comp. 1989. Fouts family cookbook. Indiana. 36 p. + R1-R6. Illust. Index. 24 cm.

• ***Summary:*** On the cover is an illustration (a 1989 line drawing, by Lou Fouts, wife of the well-known humorist Tom Fouts–better known as "Captain Stubby") of the old Fouts cabin, erected in 1839 by Noah Fouts in Deer Creek Township, Cass County, Indiana. This Noah Fouts (born 1801) was the father of Solomon Fouts (born 1826). Noah was born in North Carolina, moved to Montgomery County, Ohio, in 1802, then to Indiana in 1833. Six years later he built the cabin. Page 1, titled "The old Fouts cabin," by Tom C. Fouts, explains that Deer Creek Township was part of the Miami Indian Reservation. "The old Fouts cabin now stands in France Park on Highway 24 west of Logansport, Indiana. It has been well preserved and has been leased to the Indiana State Archery Association." Page 2 is a brief Fouts genealogy, which stops with the children of Solomon Fouts and their spouses.

Contents: Appetizers. Salads. Breads. Vegetable. Dishes. Meat dishes. Dessert. Miscellaneous. Note: There are no soy recipes. Fouts family roster. Fouts genealogy (in brief). Note: Noah has the most living descendants (3 pages full), followed by Finis (1.5 pages), then Taylor (4 descendants).

Note: Talk with William Ragan, a Fouts family relative. 1999. June 12. In 1989 Bill was president of the Fouts family reunion. He asked family members to contribute recipes, from which he compiled this booklet. He coined the name Fouts Family Committee so as not to draw attention to himself. In 1989 he and his wife lived in nearby Carmel, Indiana–where they had lived for about 30 years. The old Fouts cabin, erected in 1839 by Noah Fouts in Deer Creek, has been moved to a park near Logansport, Indiana. The quotes in this booklet are some that Bill personally liked and collected over the years; they did not come from within the Fouts family. Address: 11416 Lakeshore Drive East, Carmel, Indiana 46032.

1297. Howard, James O.; Harness, Vernon; Minyard, Jimmy D.; Passig, Richard E. 1989. Partners in developing farm markets overseas: A history of the cooperative program between U.S. commodity agricultural organizations and the Foreign Agricultural Service. Washington, DC: U.S. Agricultural Export Development Council. v + 106 p. Illust. 28 cm. [75* endnotes]

• ***Summary:*** This extremely interesting and insightful book tells the story of Public Law 480 (P.L. 480, enacted 10 July 1954) and the launching of a new government function (using the USDA Foreign Agricultural Service), "to develop new markets for United States agricultural commodities on a mutually benefitting basis."

Contents related to soybeans: Soybeans in Spain: Introducing a new product into a hostile market (p. 10-11. "Howard L. Roach, the Soybean Council's new president and Chief Executive, went to Spain in Feb. 1957). "By the end of fiscal 1969 U.S. exports of soybeans and soybean products to Spain were approaching $100 million–an impressive figure in those days" (p. 11).

Years of reassessment and consolidation, 1963-67: Growth problems emerge: "The cooperators, with FAS approval, had moved rapidly to explore potential markets and to set up programs in the most promising areas. Both partners understood that this was to be a probing operation: successful efforts would be expanded, unsuccessful ones restructured or discontinued.

"By the early 1960s, leaders of FAS and the more conservative cooperator organizations realized that it was time to evaluate techniques and programs, to cut back and refocus where needed, and to improve administration. This need was being documented with disturbing frequency by FAS travelers and reports by USDA auditors. The soybean program, now FAS' largest, illustrated the challenge. Its spectacular success in Spain has been told. Following his start there in 1957, Soybean Council President Howard Roach in only six years had established country offices in 16 cities plus a worldwide administrative office in Rome.

In each place the Council rented offices, hired staff, and developed programs with local groups–virtually all paid for with FAS funds.

"Other commodity groups–wheat, cotton, rice, feed grains–had also grown rapidly, though not as fast as soybeans. Though FAS had approved each of the cooperators' major moves, the total effect was none the less becoming disturbing" (p. 37).

A photo (p. 37) shows Howard Roach.

A Congressional committee begins an investigation and drafts a critical report (p. 42-45. Starts in July 1963. Investigation led by Arthur Perlman. Perlman's criticisms and the final draft of his report completed in March 1964. FAS's reply. Program restructuring continues: FAS and cooperators' boards meet to agree on needed changes)

"Soybean Council of America: This program was completely revamped. Its headquarters were moved from Waterloo, Iowa, to Washington, D.C. The international Operations Office in Rome was gradually dismantled and all supervision of country offices centered in Washington. A full-time President, Glenn H. Pogeler, was chosen to succeed Howard Roach. The U.S. staff, paid with Soybean Council's funds, was strengthened.

"From a maximum of 16 country offices, operations were reorganized and consolidated to provide for 10 offices located in Colombia, Egypt, West Germany, India, Iran, Pakistan, Spain, Turkey, Morocco (a new office), and a Western European area office to be located in Italy or Belgium" (p. 45).

Soybeans: The formation of the Soybean Council of America to take on the market development job in Europe and later in South America and parts of Asia was a marriage of convenience to get the program started. But it contained a built-in conflict between the farmer and crusher sectors. Farmers wanted to push sales of beans and their products any place and in any form. They saw a big bean market in Japan for the conventional foods as well as for oil and meal. They saw a bigger market in Europe's existing and future crushing plants. George M. Strayer, head of the grower-run American Soybean Association (ASA), recalled later, 'I made myself very unpopular with the U.S. processors of soybeans, some of whom at that time took the very determined attitude that only end-products should be exported–no soybeans should leave the United States as such.'

"Europeans were as anxious to crush the beans in Europe as American crushers were to crush them in the United States. This conflict troubled Howard Roach and his colleagues as they operated the Soybean Council's market development work. The farmers' American Soybean Association was a small organization with little money, while the crushers through their National Soybean Processors Association could raise substantial funds to meet FAS requirements. The ASA launched and subsequently ran the program in the bean-oriented market of Japan; and the new Council ran it in the rest of the world.

"But even the crushers' added contribution was inadequate to meet the needs of a worldwide export promotion program. This fact, plus the continuing tension within the organization and ASA's arguments with FAS over the program's future in Japan, caused the growers to launch an expanded fund-raising program of their own through ASA.

"The growers began forming state and country organizations. Minnesota in 1962 was first, and by 1970, assisted by a growing ASA field staff, there were 16 other state organizations, involving 1,900 directors of country committees, state associations, and ASA itself.

"Spurred by the threat of a big soybean surplus, in 1968 ASA launched a program through these organizations for a voluntary farmer contribution of one-half cent a bushel on beans produced.

"With these farm organizations as a political base, ASA and the state groups also began to push for state checkoff legislation. But passing checkoff legislation hadn't been easy in some of the wheat states, and farm politics in the soybean growing states was more complex. There were the several general farm organizations that raised all of their money through voluntary contributions and which–from the beginning of market development–hesitated to see FAS help build up commodity organizations that might (and did) compete with the general organization for influence at the state and national level. Now soybean producers wanted to use state laws to collect funds for their organizations!

"But soybean checkoff legislation had already been passed in North Carolina in 1966. After some heated campaigns, laws were passed in Louisiana and South Carolina in 1969 but defeated in Minnesota and Missouri. In 1970, Texas, Virginia, and Mississippi passed legislation, followed the next year by Iowa, Arkansas, Florida, and Georgia. By early 1985 the list included 24 states.

"In 1969 a decision was made to disband the Soybean Council of America. A new organization was set up, American Soybean Institute, to fund the program; the processors were represented but the producers were dominant. The name American Soybean Association was retained for the action organization. For a brief period the National Soybean Processors had a separate contract with FAS to carry out market development in countries where the main export was soybean oil. This program was never large.

"It took time for the administrative mechanism to be set up in individual states and funds to reach ASA. The total cooperator cash contribution in the year following the reorganization–1970–dropped to $170,000 versus $275,000 the year earlier. Eventually, it began to grow rapidly. FAS records show $202,000 in fiscal year 1971, $389,000 in 1972, and almost doubling in 1973 t0 $653,000" (p. 63-64).

Soybeans (excellent overview and summary). The ASA's first overseas market development program was in Japan. On

7 Feb. 1956 George Strayer, as executive vice-president of ASA, signed a combination program/project agreement with FAS providing $100,000 for work in Japan and Germany.

When the Soybean Council of America was created in 1956, it received strong support from U.S. soybean crushers and limited contributions from other sectors of the soybean industry.

"The new Soybean Council was run by Howard Roach of Iowa-a farmer and proprietor of a farm management business. He was one of the more colorful persons in the history of market development. He was well organized, and possessed tremendous drive, imagination, and confidence in himself and his organization. When traveling abroad on Council business, he would rise early and by breakfast time would have typed out numerous letters and made telephone calls to associates in various parts of the world.

"Roach had little previous experience with the U.S. government and was disdainful of its role in the cooperative venture. To him the large, accumulating quantities of foreign currencies earmarked for market development provided an opportunity–almost a mandate–to move rapidly." Roach's "country directors had to have a slight touch of the riverboat gambler because their salaries and all other local costs were paid with FAS' foreign currency, and there was no assurance that the program would last indefinitely. Besides, some people in FAS and the local U.S. embassy frowned on Roach's expensive tastes."

"By the end of this first period of market development [1963], Roach and his Soybean Council had the largest program of any FAS cooperator. In addition to their Rome headquarters, the Council was operating in 16 country offices and conducting limited operations in some 28 others; ASA was still operating in Japan.

"By June 30, 1963, the two soybean cooperators, primarily the Council, employed 154 people. Twenty-three were in the United States and 131 abroad. During fiscal 1963 the two cooperators spent $1.4 million of FAS funds ($1.3 million by the Council and $107,000 by ASA). Their own contributions were reported at $284,000 in cash and $136,000 in goods and services. Foreign third parties were reported to have contributed $895,000.

"But they could point to spectacular growth in exports" (p. 88-90). Address: U.S. Agricultural Export Development Council, MacLean, Virginia.

1298. Raper, C. David, Jr.; Tolley-Henry, L. 1989. Regulation of nitrogen uptake and assimilation: Effects of nitrogen source, root-zone pH, and aerial carbon dioxide concentration on growth and productivity of soybeans. Moffett Field, California: National Aeronautics and Space Administration (NASA). 71 p. Dec. 28 cm. Report No. NASA CR-177546. [86 ref]
• ***Summary:*** Prepared for Ames Research Center, contract NCC2-101. CELSS. Address: 1. Dep. of Soil Science; 2. Dep. of Forestry. Both: North Carolina State Univ., Raleigh, NC 27650.

1299. Kaldas, Rami S.; Hughes, Claude L. 1989. Reproductive and general metabolic effects of phytoestrogens in mammals. *Reproductive Toxicology* 3(2):81-89. [38 ref]*
• ***Summary:*** "Phytoestrogens are defined as plant substances that are structurally and functionally similar to the gonadal steroid 17Beta-estradiol (E_2) or that produce estrogenic effects. There are three main groups of nonsteroidal dietary estrogens. Phytoestrogens include the isoflavones (i.e., genistein, genistin, daidzein, biochanin A, formononetin, and pratensein) and the coumestans (i.e., coumestrol and 4'-o-methylcoumestrol)." Diethylstilbestrol (DES) is a patent synthetic nonsteroidal estrogen. Address: Div. of Reproductive Endocrinology and Infertility, Dep. of Obstetrics and Gynecology, Duke Univ. Medical Center, Durham, North Carolina.

1300. Belleme, Jan. 1989. Traditional foods of Yaita: Life on a Japanese farm. *Palate Pleasers of Japan* (*Los Angeles, Calif.*) 8:65-70, 72-74.
• ***Summary:*** The story of how John and Jan Belleme learned as apprentices to make miso with the Onozaki family on the outskirts of Yaita, Japan–100 miles north of Tokyo. Photographs by John Belleme. Address: North Carolina.

1301. Kharouf, James. 1990. Festival introduces new people, new recipes. *Daily Advance* (*The*) (*Elizabeth City, North Carolina*). Jan. 23. p. 3.
• ***Summary:*** "Soybean cookies, cakes, and ice cream will be a part of the innovative 1990 Soybean Festival Thursday at the K.E. White Graduate Center at Elizabeth City State University." Michael Twiddy is chairman of this ninth annual festival, first established by the Pasquotank Agribusiness Council in 1981. Attendees will receive a free soybean cookbook. Keynote speaker Tom Smith is president of Food Lion, Inc.

1302. Belleme, John. 1990. Starting a new miso company in North Carolina (Interview). *SoyaScan Notes.* Jan. 26. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** John is in the process of starting a new miso manufacturing company named Smoky Mountain Miso Shop. It will be owned by a company named Traditional Foods Inc., which he and a partner started in about June 1989. Over the shop will be a non-profit organization named Institute of Traditional Foods, where people can come to live and study food preparation (tofu, tempeh, miso, seitan, tamari) both on a home and commercial scale, for short or long seminars. He will break ground for the plant in about 3 weeks. It will be attached to his home, 2,000 square feet, Japanese style and very compact, with a capacity of about

50,000 lb/year of miso. He hopes to find 2 distributors, one on each coast: Maybe Blake Rankin of Granum on the West Coast and Macrobiotic Wholesale Co. on the East Coast. Great Eastern Sun will be a competitor. His non-compete agreements with them have expired.

John's wife, Jan Belleme, (who works for Mitoku) is doing a story for *East West* about amazake. The new editor of *Solstice,* John Mann, has decided to focus on macrobiotics, and away from the environmental focus. He would like a story on amazake ($200). Solstice reaches 60,000 people. John spent the summer at an organic winery.

Note: As of June 1993, this company was never started. Instead, John started a company making traditional seitan. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1303. Belleme, John. 1990. Controversy concerning San-J tamari (Interview). *SoyaScan Notes.* Jan. 26. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** John recently wrote 2 articles about San-J tamari in *Solstice* magazine. After San-J was in operation he visited the plant and wrote a nice story about them. Then San-J came out with a shelf talker accusing most other soy sauce manufacturers of having alcohol in their products. They instigated this debate. They also sent literature to distributors in which they called their product "traditionally fermented," the same term they used on their imported product from Japan. They erased the line about "not made with chemically processed soybean meal." John started to get calls from retailers, so he contacted the other importers and asked them if they added alcohol to their soy sauce; all said they did not. So John published the results of his survey. He feels San-J was not clear about starting to sell tamari made with defatted soybean meal to companies that specialize in macrobiotic products. The ingredient listing on the label says simply "soybeans," which is deceptive. Moreover, when San-J used to import tamari from Japan, it contained added alcohol which was not listed on the label. This is illegal. John respects San-J and their products. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1304. Smith, Keith J. 1990. American Soybean Association: Recent developments (Interview). *SoyaScan Notes.* Feb. 14. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Dr. Kenneth Bader became ASA's chief executive on 1 Oct. 1976. He worked in Hudson, Iowa, for about 2 years, then he supervised ASA's move to St. Louis from Hudson, Iowa, in Dec. 1978.

ASA now has a research references program. From a database search via Washington University, they obtain and supply to certain researchers and coworkers about 200-250 research references every 3 months, mostly on soybean production.

ASA presently uses these following four terms interchangeably: soybean oil, soy oil, soya oil, and soyoil. Smith thinks that "soy oil" will eventually become the standard; the term "bean" is a negative when used with foods. However "soybean meal" will probably be used in preference to soymeal, primarily because there are soybean meal standards used by the feed trade and NSPA. However, if they eventually propose soybean meal with higher protein content they may call it "soymeal," to distinguish it from 44% meal, since protein is where they have the real advantage.

Concerning component pricing, Smith has spent about a third of his time on this subject during the past year. It is very frustrating. ASA encourages and funds soybean breeders to increase protein and oil levels, and it is almost certain that breeders will be paying increased attention to composition. But whether farmers will ever be officially paid on the basis of protein and oil is highly questionable. Many farmers in the north and northwest will be discounted on the basis of composition today, so they are really being paid on the basis of average component pricing. Smith anticipates that nothing will be done to change soybean trading and marketing rules, but there will be continued pressure on soybean breeders to at least consider composition as they release new varieties. Foreign matter is a major problem in the export markets. USDA's Federal Grain Inspection Service (FGIS) has proposed changing foreign matter requirements over the last several years but U.S. exporters and crushers have effectively opposed this (as well as blending of soybeans), and also oppose component pricing. The Japanese indicate that they are going to start purchasing based on component pricing; this may be a force accelerating pricing. FGIS only has to give information on oil and protein levels if the exporter requests it. In the original proposed ruling it was supposed to go from optional to mandatory in 1991, but the latter provision was deleted. ASA has repeatedly supported component pricing, so that soybeans are traded on their inherent quality characteristics, which is their true value. U.S. soybean crushers go out in early fall and analyze the composition of soybeans from counties in many geographical areas. They buy based on this data, and therefore are already doing a form of component pricing, on the average rather than by the individual load. They may not feel it is worth the extra price of getting the data on each load.

There is a lot of interest in value-added products in Washington, DC, nowadays. But ASA's main market is for soybean meal that becomes meat, milk, and eggs. Every state now has a program on breeding specialty soybeans (as for natto or tofu), and most are very optimistic that the program will benefit their state, but the market will soon get saturated. ASA promotes niche markets and encourages breeders to breed soybeans for those markets. The future of low-lipoxygenase soybeans looks good. The main reason ASA has not done much with the soyfoods market is because it is so small. ASA will support the use of soy proteins as meat

extenders (a niche market) as long as the red meat industry doesn't complain too much. In the future, this market could be much more important.

A number of state soybean associations such as Minnesota, North Carolina, South Dakota, and Illinois are promoting soyfoods such as soy ice cream and soynuts within the state in order to get growers involved and increase membership. They have found that in order to sell memberships and develop leadership, farmers have to do something. Farmers like to dip ice cream. ASA is supportive of anything that will increase membership and leadership in the states.

Concerning areas of potential cooperation between ASA and the U.S. soyfoods industry / association, ASA is concerned about the perception of soyfoods and would be interested in cooperating in any way possible to give soyfoods a more positive image, and to put them in the mainstream of consumer attitudes and foods. Talk to Gunnar Lynum, who is in domestic promotion.

ASA probably could put together graphs of membership and funding. He suggests that Soyfoods Center write a letter to Ken Bader, Steve Drake, and Marlyn Jorgensen (ASA President) offering to work with ASA in developing a history of ASA. ASA has a history of ASA that was partially done (by Kent Pellett) while they were still in Hudson. It has been dormant for the past 10 years. It is a low priority and will probably never be published, unless I volunteer to write it.

The next World Soybean Research Conference (WSRC) will probably be held in China (PRC), or Brazil (less likely). In recent years there has been a decrease in the number of people working on soybean utilization. So there is not much new to report at the world conferences. The people on the WSRC continuing committee are mostly soybean production people and breeders. Maybe the soyfoods industry and ASA (Gunnar Lynum, who is mainly into soy oil and industrial uses) could cooperative to have the soyfoods industry better represented in these conference speeches.

ASA will put Soyfoods Center on its news release list. Address: Staff Vice President, Research and Utilization, American Soybean Assoc., P.O. Box 27300, St. Louis, Missouri 63141. Phone: 314-432-1600.

1305. Zoller, Stephen; Belleme, John. 1990. Soy sauce: A brewing controversy. *Solstice* No. 39. p. 4-5. Feb. [1 ref]

• ***Summary:*** First Zoller responds to Belleme's two articles about San-J tamari in recent issues of Solstice. Then Belleme responds to Zoller.

Zoller contents that (1) San-J adds food grain alcohol (manufactured by Grain Processing Corp. and certified as kosher) to bring the level up to 2% to inhibit the growth of aerobic yeasts. No benzene is used in the production of this alcohol. (2) San-J's shoyu is made with approximately 80% whole soybeans and 20% whole wheat. No wheat flour is used. (3) Soy grits are of two types: Food grade (which San-J uses) and ordinary (which is used for animal feed). San-J's soy grits are certified as Kosher. (4) Traditionally brewed. The essential parts have not changed.

Belleme responds to each point, then concludes: "San-J cannot have it both ways. When they were marketing only whole soybean tamari in the U.S., their promotional literature referred to soy sauce made with soy grits as 'modern' and 'conventional.' San-J Tamari (black label) and Shoyu (blue label) proudly said, 'traditionally brewed,' 'aged in four seasons,' and 'made with whole soybeans, not chemically treated soy grits.' When San-J began marketing their soy meal product in the U.S., the 'modern' process suddenly became traditional and hexane-extracted soy grits became Kosher. San-J's soy grits may be Kosher, but the confusion they have caused in the natural foods market is not.

"Judging food based on flavor is a matter of personal preference, but natural food shoppers need more accurate labelling to make an educated choice." Address: 1. Vice President and General Manager, San-J International, Richmond, Virginia; 2. Saluda, North Carolina.

1306. Carter, Thomas E., Jr. 1990. Soybean geneticists at public institutions involved with food-quality soybeans. Raleigh, North Carolina. 2 p. May 11. Unpublished typescript.

• ***Summary:*** For each geneticist, the following information is given: Address, U.S. maturity groups involved with, and which of the following the person is interested in: Large-seeded varieties (LSV), small-seeded varieties (SSV), edamame (EDA = green vegetable soybeans), high protein (HP), or low saturated fat (LSF).

The geneticists (all PhDs) are: T.E. Carter, Jr. (Raleigh, North Carolina; MG 5-7, LSV, SSV), Dr. Joe W. Burton (Raleigh, North Carolina; MG 5-7, HP, LSF), Dick Bernard (Urbana, Illinois; MG 2-4, LSV, SSV, EDA?), Bill Kenworthy (College Park, Maryland; MG 2-4, EDA), Dr. Kang (Univ. of New Hampshire; MG 2-3, EDA), J.H. Orf (St. Paul, Minnesota; MG 0-2, SSV), David Weaver (Auburn Univ., Alabama; MG 6-8, SSV), Kuell Hinson (Gainesville, Florida; MG 7-9, LSV), Glenn Buss (Blacksburg, Virginia; MG 4-5, LSV, SSV), Edgar Hartwig (Stoneville, Mississippi; MG 5-6, HP), Niels Nielson (West Lafayette, Indiana; Lipoxygenase null varieties).

Five researchers in universities in the 1890s Black College Consortium are also initiating work in this area; only names and addresses are given: McArthur Floyd and Val T. Sapra, Alabama A&M Univ., Normal, Alabama; J. Joshi, Univ. of Maryland, Princess Anne, Maryland; N. Rangappa and P.S. Benepal, Virginia State Univ., Petersburg, Virginia. Address: Research Geneticist / Assoc. Prof., USDA-ARS, North Carolina State Univ., Raleigh, NC. Phone: (919) 737-2734.

1307. Quillin, Martha. 1990. Soybeans take big drop as N.C.

growers plant fewer acres of crops. *News and Observer* (*Raleigh, North Carolina*). July 9.
• ***Summary:*** During the first two weeks of June, the statistics division of the North Carolina Department of Agriculture conducted planting surveys. In 1990, North Carolina's four leading crops in terms of crop acreage are expected to be soybeans (1,400,000), corn (all types, 1,250,000), and corn for grain (1,120,000) and peanuts (165,000 acres). Soybean acreage is expected to fall 12.5% below the 1989 level of 1,600,000 acres. Address: Staff writer.

1308. Sheehan, Daniel M.; Medlock, Kevin L. 1990. Memorandum: Phytoestrogen meeting. Little Rock, Arkansas: Dep. of Health and Human Services, FDA, National Center for Toxicological Research (NCTR). 3 p. Nov. 28.
• ***Summary:*** In Jan. 1995, in the "Presentations from the Second International Conference on Phytoestrogens, Little Rock, Arkansas, October 17-20, 1993," the authors wrote: On 15-16 November 1990, the First International Conference on Phytoestrogens, sponsored and organized by the National Center for Toxicological Research (NCTR) / Food and Drug Administration (FDA), was held in Little Rock, Arkansas. The conference was attended by nine investigators representing two countries."

The proceedings of this conference were never published, but this 3-page Memorandum summarizes the reasons for the meeting and what took place. The Memorandum was written to: (1) Director, NCTR (HFT-1); (2) Associate Director for Research (HFT-110); and (3) Acting Associate Director for Management (HFT-300).

Conference attendees (6 people from outside NCTR and 3 people from within NCTR): 1. Dr. Herman Adlercreutz, University of Helsinki, Finland. 2. Dr. Cynthia Burroughs, Cal State Univ., Hayward, California. 3. Dr. Claude Hughes, Jr., Duke Univ. Medical Center, Durham, North Carolina. 4. Dr. Paul Musey, Clark-Atlanta Univ., Atlanta, Georgia. 5. Dr. Ken Setchell, Children's Hospital Medical Center, Cincinnati, Ohio. 6. Dr. Pat Whitten, Emory Univ., Atlanta, Georgia. 7. Dr. Daniel Sheehan, NCTR, Jefferson, Arkansas. 8. Mr. William Branham, NCTR, Jefferson, Arkansas. 9. Mr. Kevin Medlock, NCTR, Jefferson, Arkansas.

"Agenda: Important items for discussion: 1. Review implications of findings to date regarding phytoestrogens. 2. Determine, in detail, the interests and capabilities of the investigators with respect to compounds, effects, metabolism, species and sex. 3. Identify the research initiatives which would utilize the expertise of the investigators most effectively without duplication of efforts. 4. Identify means whereby investigators could acquire desired phytoestrogens at the lowest cost and acceptable purity. 5. Exchange information and methods dealing with the measurement of compounds and effects and ideas for solving problems associated with the above measurements.

"Accomplishments desired: 1. To reach a consensus concerning the most important research objectives and issue a *brief* summary. 2. Establishment of areas of collaboration between the various laboratories for maximum utilization of resources. 3. Write a brief assessment of potential toxicity of phytoestrogens to the human population as well as to livestock."

The investigators met to discuss a number of issues "regarding phytoestrogens which were prompted by our new protocol (495: 'Characterization of Biochemical and Morphological Effects of Phytoestrogens on the Developing Rat Uterus'). This is a brief summary of research areas needing emphasis, collaborations resulting from the meeting, and future plans.

"Phytoestrogens occur in a number of chemical classes, and within a class there are differences in hormonal potency and, potentially, in other nonhormonal endpoints. For these reasons, it is inappropriate to directly extrapolate results from one phytoestrogen to another. Rather, we will need to select and experimentally examine representative phytoestrogens based on relative potency, human and animal exposure, ease of analysis and availability/expense of the phytoestrogen.

"Our first need is a common literature base and retrieval system for the phytoestrogen literature. We are collecting papers from all attendees and entering them on ISI's Sci-Mate, which can be distributed as a floppy disc or hard copy to interested parties. Other laboratories are being notified regarding the activities of this group, and we expect to expand our list of investigators interested in phytoestrogens."

"A number of collaborations and agreements resulted from our meeting, Dr. Claude Hughes will be able to utilize the brains and pituitaries from our neonatally dosed rats, while Dr. Cynthia Burroughs is interested in working in our laboratory next summer on developmental effects of phytoestrogens, which she has studied in mice. Dr. Pat Whitten will be able to utilize brains, ovaries and livers from our experimental animals for receptor assays. Dr. Ken Setchell is willing to negotiate a trade of equol for genistein with us and other investigators, and we will see if selected phytoestrogens could be synthesized in radiolabelled form for metabolism and bioavailability studies. Dr. Herman Adlercreutz can synthesize some phytoestrogens and would be willing to do so for meeting attendees at a minimal cost. Each investigator will communicate his or her need to Mr. Kevin Medlock who will inform Dr. Adlercreutz regarding the total amounts needed. Drs. Setchell and Adlercreutz are willing to provide analysis of a limited number of phytoestrogen samples at a reduced cost... Dr. Paul Musey, who has extensive experience in estrogen metabolism, particularly in primates, is interested in conducting and/or collaborating on phytoestrogen metabolism studies if appropriate radiolabelled compounds are available.

"The group agreed that a review of the literature" is needed.

Talk with Daniel Sheehan. 1996. May 8. Daniel's group organized this international conference with the hope that a number of experts in this field would come to Little Rock, Arkansas, and provide his group with expert advice concerning a new research project that they were undertaking, and to determine to what extent these experts might be interested in collaborating on the research. The new protocol 495 was an "investigator originated research proposal" that was developed at NCTR. It is cited separately (NCTR 1990). Address: Developmental Mechanisms Branch, National Center for Toxicological Research (NCTR), U.S. Food and Drug Administration (FDA), Dep. of Health and Human Services, Little Rock, Arkansas.

1309. Clarkson, Thomas B.; Shively, C.A.; Morgan, T.M.; Kortinik, D.R.; Adams, M.R.; Kaplan, J.R. 1990. Oral contraceptives and coronary artery atherosclerosis of cynomolgus monkeys. *Obstetrics and Gynecology* 75:217-22. [56* ref]*
• ***Summary:*** The phytoestrogens in soybean protein significantly reduced low density lipoprotein (LDL) molecular weight in female non-human primates. In premenopausal females this magnitude of reduction was associated with a 74% lower extent of coronary artery atherosclerosis.

Note: *Macaca fascicularis* is a type of cynomolgus monkey, the macaque (pronounced muh-KAK; plural: macaques. A short-tailed Old World monkey that is used in medical research; includes the rhesus monkey).

Note: *Merriam-Webster's Collegiate Dictionary* (1998) defines cynomolgus monkey, a term first used in 1936, as "a macaque (*Macaca fascicularis* syn. *M. cynonolgus*) of southeastern Asia, Borneo, and the Philippines that sometimes feeds on marine crustaceans and shellfish [i.e. animal foods] and is often used in medical research." Note also that in the 1985 edition of this dictionary, the scientific name was given as *Macaca irus.* Address: Comparative Medicine Clinical Research Center, Bowman Gray School of Medicine, Wake Forest Univ., Winston-Salem, North Carolina 27157-1040.

1310. Messina, Mark; Barnes, Stephen. 1991. The role of soy products in reducing risk of cancer: Commentary. *J. of the National Cancer Institute* 83(8):541-46. April 17. [83 ref]
• ***Summary:*** Contents: Introduction. Isoflavones in cancer prevention. Protease inhibitors. Phytosterols and saponins. Inositol hexaphosphate [phytic acid]. Phytochemical variation. Isoflavones in plant physiology. Soybean processing. Discussion.

This is the report of a workshop held June 26-27, 1990, at the Guest Quarters Hotel in Bethesda, Maryland. Workshop members were Donna Baird, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina; Stephen Barnes, University of Alabama at Birmingham, Birmingham, Alabama; David L. Brandon, Western Regional Research Center, USDA, Albany, California; James A. Duke, Agricultural Research Service, USDA, Beltsville, Maryland; Ernst Graf, The Pillsbury Co., Minneapolis, Minnesota; Ann R. Kennedy, University of Pennsylvania Medical School, Philadelphia; Renee M. Kosslak, Iowa State University, Ames; Irvin E. Liener, University of Minnesota, St. Paul; Mark Messina, National Cancer Institute, Bethesda, Maryland; Frank L. Meyskens, University of California, Irvine, California; A. Venket Rao, University of Toronto, Ontario, Canada; Kenneth D.R. Setchell, Children's Hospital, Cincinnati, Ohio; Bernie F. Szuhaj, Central Soya, Fort Wayne, Indiana.

"Since the initial recognition that diet plays a role in the etiology of certain cancers, particularly cancers of the breast and colon, considerable progress has been made in identifying dietary patterns associated with cancer risk. There is general agreement that a high-fat, low-fiber diet, like that consumed by much of the industrialized world, increases cancer risk and that plant-based diets, rich in whole grains, legumes, and fruits and vegetables, are protective...

"The recent workshop on The Role of Soy Products in Cancer Prevention, sponsored by the National Cancer Institute, had two objectives: (1) to evaluate the role of soybeans, food products derived from soybeans, and specific components of soybeans in the dietary prevention of cancer and (2) to recommend research initiatives and approaches for further studies of the effect of soy intake on human cancer risk. The meeting was chaired by Stephen Barnes and organized by Mark Messina."

Concerning isoflavones in cancer prevention: "Setchell concluded his presentation with a reminder (a) that all weak estrogens also have antiestrogenic activity; (b) that tamoxifen, which has been used therapeutically for breast cancer, is structurally related to some of the phytoestrogens; and (c) that vegetarians, who may have a lower risk of certain cancers, excrete higher levels of phytoestrogens." Mentions "soy molasses, a concentrate of the aqueous alcohol extract of soy flour" (p. 542).

Concerning phytosterols and saponins: "A. Venket Rao presented evidence for the reduction of colon cancer by phytosterols and saponins. Both substances are common constituents of plants, but the concentration in soybeans is particularly high... Rao said that while nutritional interest in phytosterols and saponins has focused on their cholesterol-lowering properties, some data suggest that these compounds may be anticarcinogens.

"Ernst Graf discussed the rationale for the hypothesis in which inositol 1,2,3,4,5,6- hexaphosphate (IP_6), not fiber, is postulated to be responsible for the inverse correlation between the incidence of colon cancer and the consumption of fiber-rich foods. Soybeans are an especially rich source, containing about 1.4% on a dry weight basis. This compound is well known to inhibit mineral absorption. It forms tight

chelates with a variety of polyvalent metals such as calcium, zinc, and iron.” However Graf noted that the ability to bind metal ions, particularly iron, may provide the basis for the anticarcinogenic effects of this compound. The iron may be a key factor, via the Haber-Weiss reaction, in the production of hydroxyl radicals, which are postulated to play a role in causing some cancers.

James Duke discussed phytochemical variation in soybeans, noting that the isoflavone content varies tremendously according to the plant part, variety, year harvested, and geographic location. In addition, as much as fivefold variation was found among different phenolic acids in soybeans, many of which have also been investigated as potential anticarcinogens.

Renee Kosslak noted that isoflavones play a role in plant physiology and survival. The isoflavones daidzein and genistein are the major inducers of the nodulation genes in *Bradyrhizobium* bacteria, which form nodules on soybeans. Kosslak suggested that if future research shows isoflavones and/or phytoestrogens to be important dietary factors in cancer prevention and if the demand for soyfoods materializes, it may be possible to manipulate levels of these compounds in soybeans, using root fluorescence as a marker.

“The consensus of the meeting was that there are sufficient data to justify studying the impact of soybean intake on cancer risk in humans. There were three workshop recommendations. First, future dietary studies involving soybeans should be carried out using soy products rather than isolated compounds, since soybeans appear to contain several potential anticarcinogens... Second, standardized and improved analytical methods are needed so that the contents of all soy-based materials employed in soybean research, whether soybean fractions or soy products, can be accurately described. This methodology will allow for valid comparisons among studies. Third, basic research on the absorption, metabolism, and physiology of potential anticarcinogens in humans should be conducted. This research will likely help to determine the clinical relevancy of these compounds and to provide a basis for selecting specific soy products for use in future dietary studies.”

Note: This is the earliest English-language document seen (April 2005) that contains the term “soy molasses.” Letter (e-mail) from Daniel Chajuss. 2004. April 15. The soy molasses used in this experiment was obtained from Central Soya, many years after Central Soya bought the soy protein concentrate and soy molasses plant from Aarhus Oliefabrik A/S, Aarhus, Denmark–a plant that Hayes General Engineering had designed and had given a license to use to Aarhus Oliefabriek together with the name “soy molasses.” Letter (e-mail) from Mark Messina. 2005. April 18. Stephen Barnes was the source of the term “soy molasses” in this paper, not Mark. Address: 1. Diet and Cancer Branch, Div. of Cancer Prevention and Control, National Cancer Inst., 9000 Rockville Pike, Bldg. EPN–Room 212C, Bethesda, Maryland 20892; 2. Univ. of Alabama at Birmingham, Birmingham, Alabama. Phone: 301-496-8573.

1311. Burton, J.W. 1991. Development of high-yielding high-protein soybean germplasm. In: Richard F. Wilson, ed. 1991. Designing Value-Added Soybeans for Markets of the Future. vi + 135 p. See p. 109-17. [25 ref]
• ***Summary:*** “Abstract: Soybeans typically contain about 41.5% protein on a dry weight basis. However, the development of agronomically acceptable cultivars exhibiting higher protein concentration has been impeded by an apparent negative genetic correlation between percent protein and yield. Although the basis for this negative genetic correlation is unknown, a breeding method has been proposed that allows development of germplasm populations in which adverse genetic linkages between these traits are minimized. The proposed method utilized a restricted index in conjunction with recurrent selection technology for self-pollinated crops. As applied in development of high-protein high-yielding soybean germplasm, this strategy is an efficient way to accumulate genes that are favorable for increasing both yield and protein. However, the concept of selection indices may be used in any type of selection system to attack difficult problems that require genetic recombination among selected genotypes and consideration of more than one trait.” Address: USDA Agricultural Research Service, Raleigh, North Carolina 27695.

1312. Israel, D.W. 1991. Biochemical and physiological regulation of nitrogen metabolism in soybeans. In: Richard F. Wilson, ed. 1991. Designing Value-Added Soybeans for Markets of the Future. vi + 135 p. See p. 69-79. [25 ref]
• ***Summary:*** “Abstract: Nitrate or atmospheric nitrogen may serve as the nitrogen source for protein synthesis in soybean seed. These compounds are assimilated and transported in the plant by different processes. Nitrite is reduced to ammonia in root tissues or in leaves by action of two reductases. Atmospheric nitrogen is converted to ammonia by nitrogenases in root nodules. Ammonia from either nitrate or nitrogen gas is assimilated into amino acids which are transported throughout the plant for protein synthesis. Glutamine and asparagine account for 75% of the nitrogen transported as amino acid. These substrates for protein synthesis may be transported directly to seed or indirectly via mobilization of nitrogen from protein stored in vegetative tissues. Although seed protein accumulation is supported equally well by nitrogen from nitrate or atmospheric nitrogen, genetic differences among soybean cultivars effect the contribution of each nitrogen source to seed protein synthesis. In addition, differences in symbiotic nitrogen-fixation efficiency among strains of *Bradyrhizobium japonicum* also influence nitrogen accumulation in reproductive tissues. Therefore, a knowledge base on how nitrogen metabolism is affected by interactions between plant

cultivar, microsymbiont strain and environmental factors is fundamentally important for breeding efforts to enhance protein content of soybean." Address: USDA Agricultural Research Service, Raleigh, North Carolina 27695.

1313. Kwanyuen, P. 1991. Protein synthesis and composition in high-protein soybean germplasm. In: Richard F. Wilson, ed. 1991. Designing Value-Added Soybeans for Markets of the Future. vi + 135 p. See p. 80-90. [23 ref]
• ***Summary:*** "Abstract: A wide range of genetic variability for percent protein exists among accessions of the Soybean Germplasm Collection. However, the biochemical basis for genetic regulation of protein concentration in soybean is unknown. In an attempt to establish such information, an assessment of protein synthesis was conducted with genotypes from two different soybean populations selected for high-protein content. This work has revealed that genotypic differences in protein synthetic capacity contributed to the expression of the trait. These data suggested that higher protein concentration may be effected through either increased protein synthetic capacity or through loss of oil synthetic capacity without effect on protein synthetic capacity. The mechanism of action resident in the selected genotypes depended upon traits inherent in the parental lines chosen to initiate the respective breeding populations. In addition, genotypic effects also were exerted upon the composition of the storage protein in these high-protein germplasm. These changes influenced the levels of methionine and cysteine in 11S and 7S proteins. Such information may be useful not only in the identification of breeding lines for enhancement of total seed protein concentration; but also in the development of strategies to increase the nutritional value of soybean meal." Address: USDA Agricultural Research Service, Raleigh, North Carolina 27695.

1314. Scott, M.P.; Lago, W.J.P.; Nielsen, N.C. 1991. Molecular genetic control of protein composition and quality in soybean. In: Richard F. Wilson, ed. 1991. Designing Value-Added Soybeans for Markets of the Future. vi + 135 p. See p. 91-101. [15 ref]
• ***Summary:*** "Abstract: Soybean meal is an important source of vegetable protein. However, problems such as amino acid balance, digestibility and antigenic properties tend to diminish its nutritional quality. This report summarizes our progress toward improving the amino acid balance of soybean protein. Our work has employed a molecular genetic approach to add sulfur-containing amino acids within the structure of the glycinin family of seed storage proteins, which comprise the majority of the protein in soybean seed. Through this approach, modifications in glycinin proteins are made by altering cloned cDNAs encoding glycinin subunits. Then these cDNAs are used to drive an in vitro transcription/translation system. Subsequently, the proteins made in this system are tested for ability to assemble into complexes that are similar to those that occur in the seed. This system has been used to identify a hypervariable region in the protein that tolerates extensive deletions or insertions, and other regions in the subunits where conservative point mutations can be made. Using this information, a series of modified glycinin genes have been constructed that encode subunits with increased amounts of sulfur amino acids. Several of these constructs are expressed in transgenic tobacco plants resulting in the accumulation of modified proteins in the seed. Therefore, we expect that insertion of these modified genes in soybean lines that lack undesirable glycinin subunits should result in considerable improvement of seed protein quality." Address: USDA Agricultural Research Service, West Lafayette, Indiana 47907.

1315. Sibley, K.D. 1991. Perspectives on the application of utility patents to plant germplasm. In: Richard F. Wilson, ed. 1991. Designing Value-Added Soybeans for Markets of the Future. vi + 135 p. See p. 123-35. [35 ref]
• ***Summary:*** "Abstract: Patent protection for plants in the United States was made available under the Utility Patent Act in 1985. Since that date, patent activity related to plants in general, and soybeans in particular, has increased, with protection being sought on gene transfer vectors, plant regulatory elements, transgenic plants, tissue culture techniques, plant breeding techniques and hybrid plants. Changes in the Utility Patent Act in 1988 have made patent protection for methods, such as tissue culture and plant breeding techniques, substantially more valuable. Because the Utility Patent Act is more favorable to the patentee than the Plant Variety Protection Act [of 1970], the increased availability and use of the Utility Patent Act portend significant changes in plant research and commerce." Address: Bell, Seltzer, Park and Gibson, PA, Suite 310, 3605 Glenwood Ave., Raleigh, North Carolina 27612.

1316. Wilson, Richard F. ed. 1991. Designing value-added soybeans for markets of the future. Champaign, Illinois: American Oil Chemists' Society. vi + 135 p. Illust. No index. 24 cm. Based on presentations given at the 81st Annual American Oil Chemists' Society Meeting held 22-29 April 1990 at Baltimore, Maryland.
• ***Summary:*** Contains 14 chapters by various authors, each cited separately. This monograph gives the edited versions of all papers presented at two symposia sessions held at the annual American Oil Chemists' Society meeting held in Baltimore, Maryland, on April 22-29, 1990. The Preface notes: "These symposia were convened to showcase research efforts that have succeeded in developing soybeans with traits that may increase the value and competitive advantage of this important commodity. In that regard, research conducted over the past 15 years has demonstrated the ability and technology to make significant changes in the primary

constituents of soybean seed, oil, and protein. Knowledge of the genetic and biochemical regulation of these constituents has resulted in major breakthroughs that have affected many areas in soybeans, including: increased oil content, improved oxidative stability through naturally lower linolenic acid and higher oleic acid concentration, better nutritional value through lower levels of palmitic acid, higher protein content without sacrifice in yielding ability, and enhanced protein quality through genetic alteration of essential amino acid composition in specific storage proteins." Address: USDA/ARS, North Carolina State Univ., Raleigh, North Carolina.

1317. Wilson, R.F. 1991. Advances in the genetic alteration of soybean oil composition. In: Richard F. Wilson, ed. 1991. Designing Value-Added Soybeans for Markets of the Future. vi + 135 p. See p. 38-52. [37 ref]
• ***Summary:*** "Abstract: During the past decade, significant breakthroughs have been made in genetic alteration of soybean oil composition. These accomplishments have led to the development of germplasm resources with a wide array of individual traits for each of the major fatty acids in soybean. Such germplasm has been extremely useful in attempts to determine the genetic and biochemical basis for changes in each trait. It is now known that genetic regulation of glycerolipid (oil) composition in soybean is mediated by a number of different biochemical reactions. Genetic control of unsaturated fatty acid composition has been shown to involve genes governing the expression of two acyl-desaturases. Recessive gene action at these loci determined low-linolenic acid concentration and significantly improved oxidative stability of the oil. In addition, knowledge has been gained on the genetic regulation of saturated fatty acid composition. These new technologies are now being employed to create agronomic soybean cultivars with altered levels of palmitic acid. Combinations of these traits may also be effected in a single germplasm line. This work will lead to the development of soybeans with low-palmitic, high-oleic and low-linolenic acid phenotypes. These traits should contribute to the improvement of the quality, nutritional value and economic worth of soybean oil in markets of the future." Address: USDA Agricultural Research Service, Raleigh, North Carolina 27695-7620.

1318. Cash, James. 1991. Quincy Soybean, Virginia firm join forces. *Herald-Whig* (*Quincy, Illinois*). May 24. p. 1A, 2A.
• ***Summary:*** "Quincy Soybean Co. has formed a joint marketing venture with a Virginia company that could lead to construction of a multi-million dollar plant in Quincy and 50 new jobs." C & T Refinery, Inc. of Richmond, Virginia, will work with Quincy to market vegetable [soybean] oil products in the USA. C & T, which operates a vegetable oil refinery in Charlotte, North Carolina, markets a full line of vegetable oils throughout the eastern USA.

This is Quincy Soybeans second major joint venture. The first, 2 years ago, was with Continental Grain Co. to export soybean meal and oil. The success of that venture helped inspire Quincy Soybean to look at other joint ventures, said Mike Foster. A portrait photo shows Mike Foster, president of Quincy Soybean. Address: H-W staff writer.

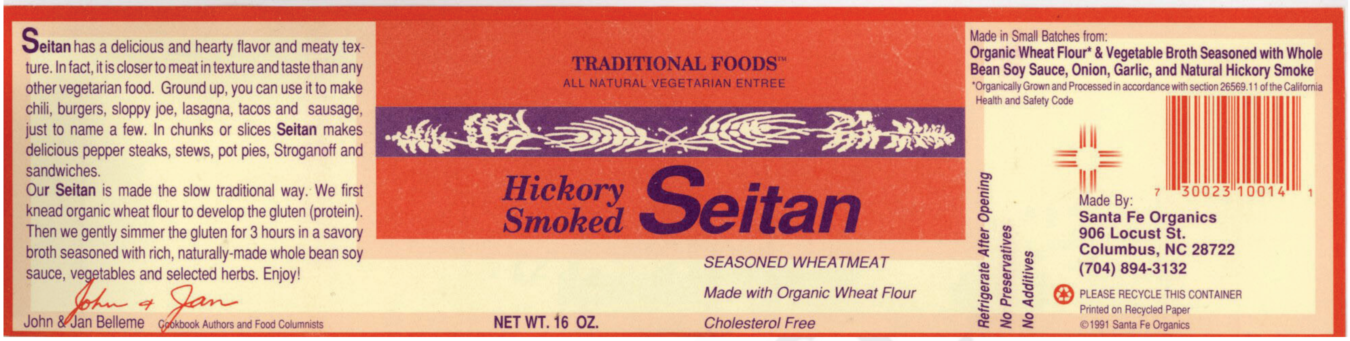
1319. **Product Name:** Traditional Foods Hickory Smoked Seitan, Seitan Curry, Seitan with Ginger, Seitan with Garlic & Herbs.
Manufacturer's Name: Santa Fe Organics.
Manufacturer's Address: 906 Locust St., Columbus, NC 28722. Phone: (704) 894-3132.
Date of Introduction: 1991 June.
Ingredients: Hickory smoked: Organic wheat flour* & vegetable broth seasoned with whole bean soy sauce, onion, garlic, and natural hickory smoke. * = Organically grown and processed in accordance with Section 26569.11 of the California Health and Safety Code.
Wt/Vol., Packaging, Price: Retorted in a 1 pint (16 oz) glass jar with a 2-piece canning lid. Retails for $3.99 on the East Coast.
How Stored: Shelf stable; refrigerate after opening.
New Product–Documentation: Talk with Lenny Jacobs. 1991. Nov. 15. The Bellemes' new seitan products are now on the market. They are expensive but good. The Bellemes were going to spell seitan as "saytan" but they got a lot of flack from the idea and decided to drop it.

Talk with Jan Belleme. 1991. Nov. 14. Santa Fe Organics (run by John Belleme) started making four seitan products in June 1991. They are made from high-protein wheat flour. The plant is located near Rutherfordton, but not on their property. The principal owner of the business, who lives in Santa Fe, New Mexico, chose the business name. Starting the business took much longer and was much more complicated than expected. They do not yet have a brochure describing the products, but every distributor who has seen them immediately wants to carry them.

Small leaflet (3 panels each side. Each panel: 6.2 x 5 cm. Black, brown, and silver on white. Front and back) sent by John Belleme. 1991 June. "All about seitan." One panel is: "Cooking with Seitan–Traditional Foods Seitan." Another: "Try all Traditional Foods Heat & Serve Seitan Classics: Chili Beans with Seitan. Seitan Sloppy Joe. Smokey Mt. Seitan & Beans. Pasta Sauce with Seitan & Miso. Zesty Pasta & Grain Topping."

Talk with John Belleme. 1992. March 7. He makes his seitan using a seitan machine that he ordered from Muso in Japan.

Talk with a reporter. 1992. March 12. John Belleme believes that it is not good to make seitan starting from vital wheat gluten, since the latter is made from white flour and the finished raw gluten does not absorb flavors nearly as well as raw gluten made from whole wheat. This reporter found



that the Bellemes' products had a flavor and texture that was remarkably similar to that of meat.

Labels for all 4 products sent by Santa Fe Organics. 1992. April. 8 by 2.5 inches. Two pastel colors plus white. Illustration of ears of wheat. Hang tag (neckhanger: 2.5 x 2-inch, 6-panel leaflet) attached to neck of jar with a rubber band. "Seasoned Wheatmeat. All natural vegetarian entree. Please recycle this container. Printed on recycled paper. Copyright 1991 Santa Fe Organics."

1320. Leviton, Richard. 1991. The duke of herbs [Dr. James A. Duke of USDA]. *East West.* Sept/Oct. p. 66-72, 74, 76.
• ***Summary:*** Dr. James A. Duke, age 62, of the USDA, has been finding scientific validation for botanical remedies for 25 years. He is one of the country's leading experts on the medicinal uses of plants. The author of ten botanical manuals and 200 scientific papers, he is both an ethnobotanist (who combs the anthropological literature of native peoples for clues about traditional plant uses) and an economic botanist (who finds new ways to use plants profitably). His unique computerized database of plants with medicinal qualities (these plants are called phytomedicals; the database is called Father Nature's Farmacy or FNF) contains more than 20,000 records. His job, officially, is to assess marginal economic plants for their phytochemistry and potential benefits for U.S. agriculture. He owns a personal 6-acre Herbal Vineyard, 20 miles southwest of Baltimore, where he conserves and cultivates phytomedicals. He advocates solving the problem of global warming from the greenhouse effect by reforestation of 100 million acres with medicinal, pesticidal, and energy-producing crop plants. They would tie up enough carbon dioxide to halt its increase and retard or nullify greenhouse warming. 2,000 million acres in oil palms could provide us with enough oil (50 billion barrels), which, if properly converted to diesel fuel, could satisfy the world's energy needs renewably. When petroleum hits $50 a barrel, plant-derived fuel alcohol will become competitive.

Born in 1929 near Birmingham, Alabama into a "very poor" farm family, he soon became a self-taught botanist. Since that time, his favorite retreat has been the woods. He earned his PhD from the Univ. of North Carolina at Chapel Hill, was drafted into the Army, then worked for 3 years at the Missouri botanical gardens, where he immersed himself in the tropical ethnobotany of Peru and Panama. In 1963 the USDA hired Duke to study the tropical plants of Puerto Rico. Starting in 1965 he lived for 30 months in Panama, living with the native people, eating their plants and taking their medicines. From 1977-82 he worked for the National Cancer Institute (NCI) studying botanical cancer cures. He is married and his office is right across the street from the USDA National Agricultural Library in Beltsville, Maryland.

Why don't pharmaceutical companies sell more natural medicinal plant compounds? Because they cannot be patented and made proprietary; they belong to the people. "I lament that our government has abandoned the herbal alternatives for the pharmaceutical firms and their synthetics. I urge our government to sponsor research into safer, cheaper, natural herbal alternatives," Duke wrote in 1987. "The wave of the future in medicine should be prevention." The NCI now has an exciting program to prevent cancer; they will be telling people about such chemopreventives as estrogenic compounds in soybeans.

Dr. Duke's address: USDA Germplasm Services Lab., ARS [Agricultural Research Service] B-001 R-133,

Beltsville, Maryland 20705. Phone: 301-344-4419. Four different color photos show Jim Duke with plants. Address: 111 Lake Shore Drive / Goshen, RR 1, Box 322B, Williamsburg, Massachusetts 01096.

1321. Smoky Mountain Natural Foods. 1991. Fall/Winter 1991. Natural foods price list [Mail order catalog]. 15 Aspen Court, Asheville, North Carolina 28806. 23 p. 28 cm.
• ***Summary:*** This is a "Catalogue of natural foods, body care and home products for a healthier, more natural way of life." This mail-order company, which began operation in Jan. 1991, sells products made by other companies; it does not do any manufacturing and does not have its own brand on any products. Their specialty is macrobiotics products, and they buy their Japanese imports from Macrobiotic Wholesale Co. They sell miso (Miso Master American Miso, Mitoku Japanese miso, Traditional Foods domestic miso, and instant miso soups from Edward & Sons), black soybeans and azuki beans (organic are grown in the USA, non-organic from Hokkaido), sea vegetables, soy sauce (San-J shoyu and tamari, Mansan tamari, Sakae shoyu, Johsen shoyu), San-J teriyaki sauce and Szechuan sauce, Nasoya dressings and Nayonaise, Natto miso chutney, Sesame miso sprinkle, Tekka condiment (jar or bag), jinenjo tekka, MMB [Mitoku Macrobiotic, a premium brand] organic farmhouse tekka, seitan, MMB traditional dried tofu, Tofu burger, scrambler, and stroganoff, Sweet Cloud sesame miso munchie, Sweet life miso candy.

John Troy is not connected to this company, nor is John Belleme; John is the wizard, and now he makes sauces from the Wizard's Cauldron. He also works with John Belleme at Traditional Foods making seitan. Address: North Carolina. Phone: 1-800-926-0974.

1322. Silver, Jimmy. 1991. Re: Key contacts concerning the early history of macrobiotics and natural foods in the United States. Letter (fax) to William Shurtleff at Soyfoods Center, Dec. 17. 2 p. Typed, with signature.
• ***Summary:*** Contact information is given for: Roger Hillyard (San Francisco, California). Bruce Macdonald (Vermont). Wendy Calpeno VanGemert (Denver, Colorado). Judy Coates Deming Knepfer (Ross, California). Dora Coates Hawken (Marin, California). Michel Abehsera (Montreal, Canada).

Some notes: "Hy Lerner, a physician who ran the warehouse at Erewhon [Boston] in the early days subsequently started [with Paul Petrofsky] and owns Baldwin Hill Bakery, bakers of the most wonderful whole wheat breads from the Belgian / French sourdough recipe taught to him by Omer Gevaert, one of the members of the family that owns Lima / Belgium. Omer's nephews are Lark and Kerry Lindsey, who started Arden Rice Cakes in North Carolina (with Lima's technical assistance) and subsequently sold the company to Quaker Oats shortly before Bob Kennedy sold Chico-San to H.J. Heinz."

"Eric Utne, presently publisher of *The Utne Reader* (bankrolled by his wife's Rothschild inheritance, according to an interview with Eric) once was manager of the Erewhon retail store on Newbury Street in Boston. As I recall, Michio Kushi put him there for ideological reasons after Roger [Hillyard] put organically grown potatoes on sale in the store and everybody freaked out!" Note: Potatoes, as well as tomatoes and eggplant, are "forbidden foods" in a macrobiotic diet because they are members of the nightshade family.

"Eric was married to Peggy Taylor before that [after working at *East West Journal*] and together they started the *New Age* magazine. When they split up, she kept the magazine, which she later sold. Peggy Taylor was Evan Root's girlfriend when I moved to Boston... Evan later married Barbara Reardon... Barbara was at that time one of the principal students of T.T. Liang, my first t'ai chi teacher, who subsequently moved to Los Angeles and who I see every Saturday morning. He's 91." Address: President, Pure Sales, P.O. Box 5116, Irvine, California 92716-5116. Phone: 714-540-5455.

1323. **Product Name:** Harbor Lites Sea Sauce [Ginger Soy, Garlic Grille, Lemon Chablis, Tomato Tarragon].
Manufacturer's Name: Simply Delicious, Inc. [Div. of The Wizard's Cauldron, Ltd.].
Manufacturer's Address: 8411 Hwy. NC 86 North, Cedar Grove, NC 27231. Phone: 919-732-5294.
Date of Introduction: 1991.
Ingredients: Ginger Soy: Tamari soy sauce, water, white wine vinegar, ginger puree, rice syrup, white wine, lemon juice, garlic juice, pepper mash, sea salt, natural herbs & flavours, toasted sesame seed oil, shiitake mushrooms, natural vegetable gum, natural hickory smoke.
Wt/Vol., Packaging, Price: 10 fl. oz glass bottle with white plastic twist-off cap.
How Stored: Shelf stable.
New Product–Documentation: All four products, with Labels, sent by John Troy. 1991. Labels are turquoise blue and reddish brown on tan. Each sauce is meant to be served on seafood. The Garlic Grille has tamari soy sauce as the first ingredient. Lemon Chablis has "clear shoyu" as the sixth ingredient. Tomato Tarragon has "clear shoyu" as the seventh ingredient.

1324. **Product Name:** Simply Delicious Vinaigrette Un-Dressing [Tofu Poppyseed, Lemon Tahini, Miso Sesame, Herb Garlic], and Miso Magic.
Manufacturer's Name: Wizard's Cauldron, Ltd.
Manufacturer's Address: P.O. Box 969, 108 S. Church St., Hillsborough, NC 27278. Phone: 919-732-9445.
Date of Introduction: 1991.
Ingredients: Tofu Poppyseed: Canola oil, well water, apple cider vinegar, honey, organic tofu (White Wave), clear shoyu,

garlic juice, white wine, pepper mash, lemon juice, mustard, poppyseeds, natural herbs & flavours, natural vegetable gum.
Wt/Vol., Packaging, Price: 10 fluid oz (300 ml) glass bottle.
How Stored: Shelf stable.
New Product–Documentation: Talk with John Belleme. 1992. July 11. John Troy is back in business after American Natural Foods went bankrupt–with the help of designer / marketer John Fogg. He now owns and runs a company named Wizard's Cauldron, located about 100 miles from where Belleme lives. Of his 30-35 products, the one Belleme likes best is Miso Magic, which is a sauce and/or dressing in his Simply Delicious line. John Troy has been very successful. He just spent $200,000 upgrading his operation. He has a totally automated bottling and labeling line. His specialty is interesting combinations of esoteric ingredients. He makes two lines for Joel Dee under the Edward & Sons label.

Products sent by John Troy. Reddish brown and dark blue on pastel labels. Stylish. Lemon Tahini contains "clear shoyu" as the fifth ingredient. Herb Garlic contains "clear shoyu" as the sixth ingredient.

Talk with John Troy. 1999. May 3. His plant is now located at 8411 Hwy. N.C. 86 N, Cedar Grove, North Carolina 27231. He does a lot of work out of his home. Two thirds of his business is private label; he makes 14 SKUs for Whole Foods (such as Soy Ginger), Wizard's Hot Stuff for Joel Dee of Edward & Sons, Miso Mustard Dressing (fresh refrigerated organic) for Alberts, etc. He is in the process of removing the honey in some of his products and switching to agave nectar, to make them vegan and to give them a lower glycemic index; agave nectar is about to be approved as a sweetener for diabetics. Products he makes under his own Simply Delicious brand for the natural foods trade are three flavors of organic vinaigrette–each of which has a soy ingredient. They were introduced in about 1991.

1325. **Product Name:** Troy's Micro-Saucery Organic Ginger Sauce, Peanut Sauce, Chipotle Sauce.
Manufacturer's Name: Wizard's Cauldron, Ltd.
Manufacturer's Address: P.O. Box 969, 108 S. Church St., Hillsborough, NC 27278. Phone: 919-732-9445.
Date of Introduction: 1991.
Wt/Vol., Packaging, Price: Bottle.
New Product–Documentation: Talk with John Troy. 1999. May 3. His plant is now located at 8411 Hwy. N.C. 86 N, Cedar Grove, North Carolina 27231. Two thirds of his business is private label. Products he makes under his own Troy's brand for the natural foods trade are three organic sauces–each of which has a soy ingredient. They were introduced in about 1991. Chipotle refers to smoked jalapeño; it is like a miso barbecue sauce, with a southwestern flavor profile. The ginger and peanut sauces each contain soy sauce.

1326. Davis, Clarence B.; Wilburn, Kenneth E., Jr.; Robinson, Ronald E. eds. 1991. Railway imperialism. New York, NY: Greenwood Press. xix + 225 p. Illust. Index. 25 cm. Series: Contributions in Comparative Colonial Studies, No. 26. [500+* ref]
• ***Summary:*** See Chapter 8, titled "Russia, the Soviet Union, and the Chinese Eastern Railway," by R. Edward Glatfelter (p. 137-54). And Chapter 9, titled "Railway Imperialism in China 1895-1939," by Clarence B. Davis, each cited separately. Address: 1. Keene State College, New Hampshire; 2. East North Carolina Univ., Greenville, NC; 3. Emeritus Beit Prof. of History of the British Commonwealth, Oxford Univ., England.

1327. DeBona, Don. 1992. The miso market in America and The American Miso Co. (Interview). *SoyaScan Notes.* Feb. 29. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** The miso market in America is growing nicely. There are two distinct U.S. miso markets, the Asian-American (Oriental) market and the natural foods (macrobiotic) market. Don can only speak for the latter, and is best able to discuss his company's experience in that market. In the last 3-4 years, his production has grown on average 10-12% a year. He thinks that the causes of this growth are the wider availability of miso, and its greater accessibility to mainstream consumers who increasingly shop at natural food stores and chains such as Whole Foods Market and Bread & Circus. Neither the current recession nor the greater consumer awareness of dietary sodium affect miso sales. Most miso buyers are macrobiotics or vegetarians who are not very concerned about consuming too much sodium. People who buy his lower-sodium misos (sweet white [rice], sweet barley, mellow barley, or chickpea miso), do so not because of their lower sodium content but because they have different applications and flavors. He does not market his low-salt products as "low salt" nor does he see any great potential in making and marketing low-salt misos. Miso buyers generally know a lot about miso and about nutrition. He makes no nutritional claims on his miso products. His main concerns are with the taste and quality of his misos.

From the late 1960s until the very early 1980s, the non-Oriental U.S. miso market was largely a macrobiotic market. But the growth he has seen in the last 3-4 years is mainly to non-macrobiotic customers. He estimates that more than half the people who buy his miso do not think of them selves as macrobiotic, and perhaps a third of them have never even heard the word "macrobiotic." They buy it as a vegetarian natural food product; they like the taste, and see it a new and versatile seasoning. The dark misos provide a meatlike flavor but the sweet and mellow misos do not. People use mellow white miso is soups, salad dressings, or stir fries. Dark misos are used more in soups, whereas sweet misos are not very

widely used in soups.

He would categorize the different varieties of miso (both from a production and sales viewpoint) as percentages of his total production as follows: 1. Long-term, traditional darker, 40% (23% barley and 17% rice). 2. Mellow miso (white or barley), 30%. 3. Sweet miso (white or barley), 20%. 4. Other (including non-soy): Chickpea, 10%.

Looking at the same categories for the American natural foods/macrobiotic market as a whole: 1. Long-term, traditional darker, 57% (35% barley, 15% rice, 7% soybean or Hatcho). 2. Mellow miso (rice or barley), 25% (American Miso Co. and Miyako Oriental Foods/Cold Mountain dominate this category). 3. Sweet miso (rice or barley; only American Miso makes or sells a true shiro miso), 10%. 4. Other (including non-soy): Chickpea, finger lickin' miso (a topping), natto miso, buckwheat miso, etc. 8%.

Two Japanese men now live and work at American Miso Co.; one was brought by John Belleme about 8 years ago, and one came about 3 years ago. They are in production. Don also has 2 American workers. They are like part of the family. He has never had soybean or Hatcho miso in his house and has never seen these Japanese eat it. Don does not particularly like the taste; it is dark, lacks sweetness and a complex bouquet due to its lack of grain, and is over-aged. Moreover, he feels it is more difficult to make because soybean koji is hard to make.

Westbrae sells a lot of miso on the West Coast but not much on the East Coast. Miso is said to be Westbrae's third best-selling product category. Don used to sell Westbrae's miso in the 1970s, when he worked for Laurelbrook Foods in 1980-81, shortly after Rod and Margy Coates were bought out.

Companies that make the miso in the USA using organically grown soybeans and grain include American Miso Co. (50% of natural foods market), and South River Miso Co. (10%); Westbrae and Miyako/Cold Mountain only use organic soybeans, but they call their miso "organic." New labeling regulations will soon make that illegal, and will probably cause most of the miso made in America to be made from organically grown soybeans and grains. Many consumers want organic miso.

The three largest makers of miso in America (for both markets), in descending order of production, are Miyako Oriental Foods, American Miso Co., South River, Junsei Yamazaki, and Traditional Foods. The major miso importers, again in approximate descending order, are Eden Foods, Great Eastern Sun (Mitoku Brand), Westbrae, Granum (Mitoku brand), and Tree of Life (Mitoku Brand).

In the U.S. natural foods market, American Miso Co. is the market leader. Don estimates the size of this market to be about 750,000 lb/year, but he would guess that Asian-American market is about twice this large (1,500,000 lb/year). His various misos retail for about $5.95 in 1 pound sizes or $3.95 in 8 oz sizes. When Don travels in America, he studies the shelves, and has been in almost every major natural foods store in the USA. He also regularly visits distributors and food brokers. But he does not try to keep systematic statistics on the market size.

American Miso Co. is growing rapidly, and it is hard to finance this growth from earnings. Don's plant is now too small relative to demand; it is bursting at the seams. He has added more vats and plans to add another building this summer, financing it with a bank loan. The company is owned by only two people: Don and his partner, Barry Evans. Barry used to have a lot of money, but he got out of the marijuana business–where he made the money. He is now in jail in Santa Barbara for selling marijuana. In went to jail in Jan. 1992 and expected to be there for about 2½ years. Much of the $500,000 startup capital for America Miso Co. came from Barry, but since then the company has largely had to finance itself. Financially the company is doing very well; they have made a profit every year for the past 3-4 years. Don is wary of bringing in more partners because of bad experiences in the past. Don has had a very good relationship with Barry Evans, and it has greatly benefited both of them and American Miso Co.

Don, whose ancestry is mostly Italian plus a little Irish, greatly enjoys running the company. His role has changed a lot. Up until last year, he made miso every week. How he does that much less, and focuses more on marketing. For the past 2-3 years he has also been president of Great Eastern Sun–a position he held before he came to replace John Belleme at American Miso Co. Most customers identify the company as "Miso Master" rather than "American Miso Co." Address: General Manager, American Miso Co., Route 3, Box 541, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1328. DeBona, Don. 1992. Miso in Europe (Interview). *SoyaScan Notes.* Feb. 29 and April 19. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Don has had 2-3 offers (though not serious enough) to go to Europe to build and run a miso factories. When a really serious offer for a major joint venture is made, backed by sufficient capital, he would like to do it. He would provide the production (and maybe the marketing) expertise. In about 1985 Don trained Jan Kerremans, a Belgian, from Lima Foods in the south of France, in how to make miso–after they had started and weren't doing very well. After that, Lima got their miso production under control, but then Jan left at about the same time that Lima Foods was sold–Don is not sure which came first. Jan was a minor partner in Lima Foods. The Gevaert family sold Lima in about 1987-88 to Vibec, a consortium in Canada. At that time Lima had a lot of financial problems. Then in about 1989 Lima was purchased from the Canadian company by Euronature, a large France-based international food company. Lima is presently doing well, and their traditional high standards

of food quality are completely supported by Euronature. Mark Callebert is the manager of Lima; Pierre Gevaert no longer owns any part of Lima and is no longer active with the company. Lima is no longer making miso at their old mill on a river in the south of France. Lima also made rice cakes and ground their sea salt at that old mill. This mill was the Gevaert's personal getaway and farmhouse, and he thinks they kept it when they first sold Lima, and no longer process food there. The Lima rice cakes may now be made in Belgium. Don thinks Lima Foods is now stronger than they were 5 years ago. Great Eastern Sun was the first company to import Lima's miso into America, starting in about 1984, and they were the sole importer for about 18 months until Lima appointed Eden as their exclusive U.S. agent. Don's current contact at Lima Foods is Mark Callebert. Don buys a lot of their salt in containers, directly from Europe, but he has to run the money and paperwork through Eden Foods. Don has exported several containers of miso to Europe through Sjon Welters' wife's brother, Adelbert, who used to work with Manna Foods in the Netherlands. He has also exported some to Erika Lemberger of EuroHealth. Bernard Faber also wants import Don's miso. After the Chernobyl nuclear disaster, Mitoku's sales of miso to Europe reached a new high, from which they have since dropped.

There is currently no major miso manufacturer in Europe. There is a small miso plant in Bristol, England named Source Foods, founded and run by Paul Chaplin, who Don trained at American Miso Co. for about 2 months. Chris at Mitoku recently told Don that Italy has recently become Mitoku's biggest market for natural food products in Europe.

In short, there is great potential for miso in Europe, including Eastern Europe, although the political instability of Eastern Europe makes for a very risky financial environment there. Its a high risk, high gain situation. Address: General Manager, American Miso Co., Route 3, Box 541, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1329. DeBona, Don. 1992. Work with tofu and soymilk in America (Interview). *SoyaScan Notes.* Feb. 29. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Don has owned a part of Bean Mountain Soyfoods in North Carolina since 2-3 years ago; their biggest competition in the tofu market is Nasoya. Don was on the board of the Soyfoods Association of America, but he dropped it when he saw it was basically a tofu and soymilk association; he was "the token miso maker." Address: General Manager, American Miso Co., Route 3, Box 541, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1330. Macdonald, Bruce. 1992. Work after leaving Erewhon in May 1971. Part II (Interview). *SoyaScan Notes.* April 5. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: During the time when Jimmy Carter was president and interest rates were at 18% (these were hard economic times), Bruce's flagship retail store, Green Mountain Granary in Boulder (which had been a grocery store for 130 years) was condemned by the City of Boulder. They said the building was in a 100-year floodplain, and they condemned every building from 4th Street at the tip of the mountains all the way to Broadway–but actually they wanted to build their own Justice Center and Library in this area. So instead of invoking "eminent domain," they used this back-handed method. In about 1980 Bruce sold what was left of the company to his manager Seth Feldman.

Bruce then moved from Boulder to Boston. Tony Harnett, of the natural foods retail chain Bread & Circus, called Bruce and asked Bruce to come and work with him. After Erewhon went bankrupt, Tony was in big trouble; he had been getting most of his supplies from Erewhon. There was a little distributor in Connecticut named Earthbound. After Erewhon's demise, all five of Tony's retail stores tried successfully to order from Earthbound. But the next week when they tried to order again, Earthbound said, "Sorry, but we don't have enough capital." So Earthbound promptly went out of business. Consequently, Tony asked Bruce to start him a warehouse so he could supply his five stores. Bruce set it up in Watertown, and before long they had sales of $120,000 a week with three people–a very efficient operation. Then Bruce asked Tony for a share of the company, and Tony said "no."

Then Michelle Abehsera's younger brother, Georgie [George], called Bruce to say that he had just sold Nature de France (clay soaps) and he wanted to start a natural food store. Bruce left Boston in Dec. 1982, went down to New York City, and that was the beginning of Commodities, which they opened in March 1983. It was soon the biggest natural food store in New York City. At he beginning, Bruce and Georgie were equal partners in the company. But he was becoming a very, very orthodox Jew. So every Friday at 3:00 he would sell Bruce his 50% of the company, then he would buy it back Sunday morning. But Friday night and Saturday were the two times the company had its biggest income–about 50% of the weekly total. This was great for Bruce personally. Then a rabbi in Israel told Georgie that this way of doing business was not "Kosher" enough, so Georgie he asked Bruce to buy him out–which Bruce did–but it was hard.

Commodities had signed a 10-year lease in 1982, starting at about $3,000 a month and gradually increasing each year to $7,000 a month. But in the meantime, Robert De Niro and George Lucas had started Tribeca as a state of the art film editing facility in New York; in 1989 De Niro bought the old Martinson Coffee factory on Franklin and Greenwich in Tribeca–a 300,000 square foot building a block from the Commodities natural food retail store. They invested millions of dollars in equipment, and before long every celebrity known to man started coming to Tribeca in limos. So, with 3 years to go on the lease, when Bruce eventually

went to his landlord to renegotiate his 10-year lease, the landlord said the first year's lease would be $30,000. "You can't run a grocery store paying that kind of rent." So Bruce sold Commodities to his ex-girlfriend and moved up to Vermont and basically retired.

That next summer (1990) he met Linda Green, "a walk-in angel," at an annual dowser's conference in [Danville?] Vermont. In the early 1990s, Bruce studied with Linda from Oklahoma. He actually lived in her monastery in Guthrie, Oklahoma–where she lived. He lived there 3-4 months and practiced spiritual dowsing, but he went there on and off for a year while she was there with the whole group. "We were dowsing these evil ratios and putting them in Solomon's seals (a star inside of a circle) and then in a black box–many tens of thousands of them. For high-level dowsing, we used an Aurameter, a very, very sophisticated and super-sensitive device (no electricity is involved) for sensing energy fields. Its a long story. She had a amazing personal charisma–such a pure spirit. I'd never met anyone like that before–not even remotely close. She just turned my life in a completely new direction. It was a wonderful, wonderful experience. She asked me to start a publishing company. So I went to Vermont and published five of her books (several thousand copies were sold or given away) and organized four different conferences (one in Toronto, Canada; one in Burlington, Vermont) to introduce her and her work to people."

Bruce (and Richard Young) published books at Right Hand Press (which Bruce started) in Cambridgeport, Vermont, about the work and teaching of this angel.

"She died three years later and the group basically disbanded; she predicted her death because she had too many "dreaming bodies"–many more than her body could withstand. Bruce has healed a number of people of chronic illnesses using spiritual dowsing. "You should go to this annual dowsing conference, where the dowsers all meet at this little town in Vermont. Old water dowsers, who come out of the hills, can tell you how deep a source of water is, how many gallons per minute you'll get. They use different dowsing devices. I became proficient using that Aurameter; I can find anything–such as energy blockages in other people–if they are the right soul-type. It's real. You can laugh or not, but I've seen it work again and again." She was an "uneducated nurse." She said there were two people born in the last century who came from a more evolved planet: Rudolf Steiner and Nikola Tesla (1856-1943). Tesla figured out a way to get free electricity.

In 1992, his daughter Crystal's senior year, Bruce was in Boulder, Colorado. He moved to North Carolina in 1993 where he remains in 2011. Bruce has moved 55 times in 40 years.

In 1993 Bruce bought the Macrobiotic Wholesale Company, which had been a division of Great Eastern Sun. Barry Evans, owner of Great Eastern Sun, had sold it to a German guy named Kurt Schmidt, who ran it (with his wife) for about five years, then sold it to Bruce and Yuko Okada, who renamed it Macrobiotic Company of America (MCOA). Since MCOA had been part of Great Eastern Sun, they imported from Mitoku in Japan–not from Muso. In Feb. of 2000 there was a hostile takeover of MCOA by Bruce's partner Yuko Okada of Muso. There were lawsuits back and forth, they settled, and Bruce had to sign a non-compete agreement for a year. In Feb. 2002 Bruce started his present company, Natural Import Company, also in Asheville, North Carolina. Norio Kushi ran MCOA for Yuko. As soon as Bruce left, Mitoku stopped selling to MCOA–but Mitoku had accounts receivable from MCOA. MCOA went bankrupt before Bruce's new company opened. Norio sold down the $400,000 inventory and did not replace it; he was selling his seed corn. Norio started spending money lavishly, and 14 months later he went bankrupt. Address: P.O. Box 100, Cambridgeport, Vermont 05141. Phone: 802-869-2010.

1331. **Product Name:** Traditional Foods Original Traditional Seitan.
Manufacturer's Name: Santa Fe Organics.
Manufacturer's Address: 906 Locust St., Columbus, NC 28722. Phone: (704) 894-3132.
Date of Introduction: 1992 June.
Ingredients: Organic wheat flour, vegetable broth seasoned with whole bean soy sauce, onion, and kombu.
Wt/Vol., Packaging, Price: Retorted in a 1 pint (16 oz) glass jar with a 2-piece canning lid.
How Stored: Shelf stable; refrigerate after opening.
New Product–Documentation: Letter from John Belleme of Santa Fe Organics. 1992. March 9. "In a few weeks we will be adding an 'original' flavor, which will be seasoned with soy sauce, onion, and kombu. We now have eight distributors." Talk with John Belleme. 1992. July 1. Their most recent product is a traditional original seitan, sold in canning jars just like the company's first line of products, launched in early June, 1992. "It was made to satisfy the needs of all the macro [macrobiotic] people who were not satisfied with all these flavors we had. They wanted something they could do their own thing with."

1332. Belleme, John. 1992. Santa Fe Organics and seitan (Interview). *SoyaScan Notes.* July 1. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Santa Fe Organics is owned by 3 people: James MacCreight (of Santa Fe, New Mexico) and John each own 45%, and Sandy Pukel (owner of Oak Feed Store in Florida) owns 10%. James got involved because he knew of John's work at American Miso Co., and he was a friend of Barry Evans. Barry was the majority owner of that company but he was sent to jail in early 1992 in California with a 7-year sentence, of which he must serve at least one-third. John got bought out of American Miso Co. in 1986 for two reasons: He had conflicts with Barry, and there were indications that

Barry was making his money illegally. He wanted to get out "before the whole thing came down on our heads. My equity in the company might have been confiscated by the federal government." Before Barry went to jail, he made a deal such that his two companies (American Miso Co. and Great Eastern Sun) were not affected. After John left American Miso, he and Sandy Pukel formed a partnership with Blake Rankin and established Granum East. They ran that for 2½ years then sold it to great Eastern Sun in 1988. From that time until 1990 he and his wife, Jan Belleme, did a lot of writing.

James MacCreight, a former Hippie, had made money investing in real estate in Philadelphia, Pennsylvania, where he also founded and owned George's Restaurant (a lovely place named after George Ohsawa). One day in late 1990 he called John and said "I'd like to do something with you. What would you like to do?" They spent a lot of money starting a miso shop adjoining John's home in Saluda, North Carolina, but then John decided it would not be grand enough to meet James' expectations. So they dropped the miso project after 6 months before the equipment even went in. James heard about Seitan Mama's, and they decided to make seitan instead. John had been interested in seitan since 1974, and in Feb. 1978 his wife, Jan, had started an early and very successful seitan company in Coconut Grove, Florida named Seitan Mama's, which see. In early 1991 a huge building became available at an excellent price 10 miles from John's home in Saluda at 906 Locust St. in Columbus, North Carolina. Their first line of 4 retorted seitan products in glass jars was introduced in June 1991. Originally they had planned to be a wholesale company, selling pallets via commercial trucking lines or UPS directly to larger stores (mostly on the East Coast) with a broker; it was hoped that this approach would keep the retail price down. Now they sell only through distributors.

Santa Fe Organics produces its seitan using a huge Japanese-made gluten-making machine (ordered through Mitoku) and an automatic cutter. The company has 3 production workers. To the machine they add flour, water, and salt (or nigari). The salt helps develop a little more gluten, and gives a tighter product with a higher yield. John's machine will process 150 kg (330 lb) of flour per run (which takes 2½ hours). Paddles in the machine knead the flour with water for about 30 minutes to develop the gluten, then the loaf sits undisturbed under water for about an hour, then the dough is rinsed by kneading it under water for about 1 hour; 100 kg of flour yield about 45 kg of fresh gluten. John orders his wheat flour freshly milled once a week from a mill 50 miles away. Fresh milling is very important for good yield and taste. He uses organically grown hard winter wheat. John uses a mixture of whole wheat and unbleached white flours. They key to getting flavors to penetrate to the core of the seitan lies in retorting at 250ºF under pressure (which causes the seitan to expand and become porous allowing flavor penetration) plus the proper mixture of flours. The more whole wheat flour used, the greater the flavor penetration and concentration–but the product is somewhat bready and less dense. The more unbleached white flour used, the greater the density, chewiness, and meatlike texture of the final product. The proportion of flours varies with each product.

John has no problem with starch disposal. The local government looked at the starch and its effects on the local sewage system carefully, and actually encourages Santa Fe Organics to dump it into the sewage system. Eventually John would like to find ways to use the starch, as in stews.

Sales of Santa Fe Organics seitan are large and growing–although the company is still not profitable. A new conflict has arisen in that one owner wants to own a larger percentage of the total shares.

Plans for the future: (1) A new line of 3 Seitan Sloppy Joe products, due out in August; (2) They may have a ravioli maker in Atlanta, Georgia, make Seitan Ravioli using they would ship to Atlanta. They will be sold frozen, 18-22 units in a 13 oz bag, like the Soyboy Ravioli from Northern Soy in Rochester, New York; (3) Sell frozen 6-8 oz chunks or slabs of seitan in bulk (12 lb in a plastic bucket) to restaurants and foodservice institutions, then help them to work out recipes. They hope to have Tree of Life or Cornucopia distribute the product; (4) John's wife, Jan, is now finishing writing a vegetarian cookbook for the Avery Publishing Group. It will contain a whole chapter on seitan. (5) John would like to write a book on miso.

Mitoku has sold two Japanese-made gluten-making machines to the Western world; one was sold to Lima Foods in Belgium. The retort process that both Jonathan and Santa Fe Organics use is a very technical process; one must be set up with a license and follow federal regulations. According to Chris Dawson, Lima imported this machine for Jonathan–which made the seitan that Lima sold. The other machine went to the Erewhon warehouse, where it sat for years, until it was sold to the people who started Upcountry. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1333. Troy, John. 1992. Update on Wizard's Cauldron and work with miso (Interview). *SoyaScan Notes.* July 11. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** John makes many lines of products that contain miso. "The Wizard" line, sold through Joel Dee of Edwards & Sons, contains three products: Hot Stuff, Stir Crazy (a stir-fry sauce), and Sweet & Sour Sauce. The Premier Japan line is also exclusive to Edwards and Sons. The Simply Delicious line consists of many salad dressings, such as Lemon Tahini, Ginger Plum (with umeboshi plums), Tofu Poppyseed, and Miso Sesame (the only miso product in this line). His favorite salad dressing (which is also his best-seller) is the Miso Sesame; it is sweetened with rice syrup, and contains both clear shoyu and white miso. "It's really nice."

A fourth line, called "Troy's" is a line of sauces, such as a steak sauce and a poultry sauce. Three of these products contain miso: Miso Magic (a sauce for grains and vegetables), and Cracked Peppercorn Steak Sauce, and Honey Mesquite Barbecue Sauce. John's favorite sauce is his Thai Peanut Sauce. A fifth, called Harbor Lites, is a line of six seafood sauces–all of which contain either soy sauce or miso. The Garlic Grill contains miso. There is also a Ginger Soy in this line.

American Natural Foods (ANF), started in 1984, attracted many local investors who finally got control of the board of directors and encouraged John to do things that went against his beliefs; the company eventually lost about a million dollars, and John lost everything he had. It didn't go bankrupt; it's still alive but John "walked away from it." It's sole product is Miso Mustard, which is made by Morehouse Foods.

At the end of 1985 John was penniless, and had to draw unemployment to buy groceries. "But it was a real blessing in disguise." John started doing some consulting work. In 1986 he started a new company named "Wizard's Caldron," which was initially just a consulting company. John was able to buy the trademark for Hot Stuff away from ANF, then cut a deal with Joel Dee. In Oct. 1987 Edwards and Sons became the exclusive distributor of his Premier Japan line and his Wizard Baldour condiments and sauces, including Hot Stuff. He saved enough money to buy a little plant, then started real small, making food products again. The new company's first product line, the Simply Delicious salad dressings, was launched in 1989. The company has been growing and growing, until now it is a very healthy little company with one million dollars of annual sales. This is the first time John has owned his own plant; previously he always had to use co-packers. "I'm just having a wonderful time with it, but it was a hard lesson to learn." John buys his miso from Don DeBona of American Miso Co. He also uses a lot of clear shoyu, which he buys from San-J; they make it in Japan. He consulted for San-J, and when he visited their plant in 1986 he noticed some stuff dripping from a vat. They said it was clear shoyu which they said they used in sauces, dashi, etc. He brought back a 5-gallon pail to the USA, and eventually made it a featured ingredient in his line of salad dressings. Address: The Wizard's Cauldron, 8411 Hwy. NC 86 N, Cedar Grove, North Carolina 27231. Phone: 919-732-5294.

1334. **Product Name:** Seitan Sloppy Joe (American, with Garlic), Seitan Sloppy José (Southwest, with Hot Chilies), Seitan Sloppy Giuseppe (Italian, with Fennel).
Manufacturer's Name: Santa Fe Organics.
Manufacturer's Address: 906 Locust St., Columbus, NC 28722. Phone: (704) 894-3132.
Date of Introduction: 1992 August.
New Product–Documentation: Talk with John Belleme. 1992. July 1. The labels and recipes for these products are finished. They should be on the market by August. They are based on a basic Sloppy Joe recipe that is 35-40% seitan and includes tomato-based products. To this they add several ethnic flavorings. The product is ready to heat and serve on rice, noodles, bread, a bun, etc. The latter flavoring is Italian; John is Italian on all sides going back as far as he knows. Southern Italians make a dish named Risotto, which is ground Italian sausage with gravy and fennel over white rice. The product will be sold in a 16 oz jar but will not be retorted like the company's first and current line of products.

1335. Belleme, John; Belleme, Jan. 1992. Culinary Treasures of Japan: The art of making and using traditional Japanese foods. Garden City Park, New York: Avery Publishing Group Inc. xiv + 232 p. Illust. by Akiko Aoyagi. Index. 25 cm.
• ***Summary:*** Contents: Acknowledgments. Foreword. Preface. Map of Japan showing where 21 traditional foods sold by Mitoku are made. 1. Kuzu: The wonder root. 2. Mirin: Sweet rice wine. 3. Miso: A health secret to savor. 4. Mochi: The sweet rice treat. 5. Noodles: Traditional Japanese fare. 6. Rice malt: Heavenly sweet water. 7. Toasted sesame oil: Cooking oil supreme. 8. Shiitake: Miracle mushrooms. 9. Soy sauce: King of condiments. 10. Tea: A national institution. 11. Snow-dried tofu: Protein powerhouse. 12. Umeboshi: Venerable pickled plums. 13. Vegetables of the sea: Underwater harvest. 14. Brown rice vinegar: Japan's liquid treasure. 15. Traditional vessels: Vats, crocks, and barrels. Glossary. Worldwide importers.

Concerning soy sauce, this book discusses Sendai Shoyu and Miso Co., Johsen, tamari, Mansan Brewing Co. founded by Oguri family in 1875, almost destroyed in Sept. 1959 by the fierce Ise-wan typhoon, "discovered" in 1982 by Akiyoshi Kazama of Mitoku. Now a macrobiotic staple.

For details on the uncondensed introduction to this book see Kushi (1992) "Introduction to *Culinary Treasures of Japan."* Though very interesting, it contains a number of factual errors and statements that leave the wrong impression. Address: Saluda, North Carolina.

1336. Stowe, Gene. 1992. Reducing chemicals discussed. *Charlotte Observer* (*North Carolina*). Nov. 6. p. 18C.
• ***Summary:*** The section titled "Soy fuel" states: Soybean growers might find their crop made into fuel. At the South Carolina Soybean Field Day last month, researchers demonstrated a "soy-diesel fuel."

"Two tractors powered with half soy diesel, half regular diesel were operated at Edisto Research Center. The smell of the burning fuel reminded some people of french fries."

But soy diesel is not cheap: It costs $2.25 a gallon, vs. $0.70 a gallon for regular diesel. In Europe, however, diesel costs $3.50 to $4.00.

1337. Christner, Deborah. 1992. Twin Oaks corners a two-state food market: Commune sell organic tofu to vegetarian,

Chinese restaurants, groceries. *Times-Dispatch* (*Richmond, Virginia*). Dec. 14. p. E4.
• ***Summary:*** Twin Oaks Community Foods of Virginia makes tofu from organically grown soybeans. Twin Oaks has been in the organic business since March, 1991, when the community purchased Virginia Soyworks from its owner, Ken Scotton, for $10,000 plus $11,000 worth of equipment and inventory (mainly soybeans). At this time, Virginia Soyworks was making 700 pounds of organic tofu in two production days per week, using about 7 bushels of soybeans. Today Twin Oaks makes about 2,000 lb/week of tofu, plus 30-40 lb/week of tofu spreads; this requires about 25 bushels per week of soybeans.

At the time they bought Virginia Soyworks, Twin Oaks, which has been in existence as a communal living group since 1967, had one other communal enterprise that supported the residents–a hammock business that has now expanded to national and international markets. Twin Oaks inherited its North Carolina customers after Bean Mountain Natural Foods, an organic tofu producer [in Boone, then Weaverville, North Carolina], went out of business in 1992. Twin Oaks bought a hydraulic press from Bean Mountain, which allowed it to speed up production time and abandon the primitive lever press it has been using to press the soymilk out of the ground soybeans. A detailed description of the current tofu-making process is given. Twin Oaks is considering buying a vacuum packing machine. Kessler is developing a peanut flavored tofu.

One customer, Grace Place (owned by Michael King), is the oldest vegetarian restaurant in Richmond, Virginia. A photo shows Jon Kessler pressing tofu in a forming box. Address: Special correspondent.

1338. Troy, John. 1992. The Wizard behind innovative salad dressings: Photos, samples, and interviews available (News release). Cedar Grove, North Carolina. 1 p. Dec.
• ***Summary:*** Begins with a biography of Troy's boyhood years, with summers spent in western North Carolina on a rural farm with his maternal grandmother doing what he loved best–cooking with his grandmother on her wood stove.

"Troy's journey from kitchen to manufacturer has an unusual twist. Intensely interested in medicine and health, Troy worked as a surgical and research lab assistant in his late teens but his part-time stereo business made him more money in the 60's. The back-side of success was introspection. Troy searched his spiritual aspirations in the 70's. He became vegetarian and was introduced to healthy Asian foods like tofu, miso soybean condiment, and umeboshi plum vinegar. That's when he made the link between food and medicine.

"Troy's next business venture involved natural foods. The American Natural Food Company was born in 1983, where he developed a line of miso-based condiments under his 'Wizard' nickname. Natural food stores went into a slump and Troy lost everything, but kept Wizard Baldour his original trademark.

"'Funny how things happen. Just as I was out of work, my wife, ex-wife and I were given a chance to buy a local restaurant, The Regulator Cafe,' quips Troy.

"The restaurant became successful and was the perfect place for Troy to create and test new recipes. At the same time, he did formulation consulting for several other natural food manufacturers creating new sauces and condiments from organic and fresh ingredients. This gave him the financial means toward furthering his own comeback.

"Thus, in 1988 he started Simply Delicious, Inc. Now he works out of his own manufacturing facility using the natural ingredients he loves."

This year alone more than one million bottles of Simply Delicious salad dressing have been sold in the USA alone.

A full color, 4-page brochure titled "Simply Delicious" accompanies this news release. It contains color photos of Chef John Troy and products in three different lines that he makes: (1) Simply Delicious, (2) Harbor Lites Sea Sauces, and (3) Troy's sauces. Address: The Wizard's Cauldron, 8411 Hwy. NC 86 N, Cedar Grove, North Carolina 27231. Phone: 919-732-5294.

1339. Berkeley, Edmund; Berkeley, Dorothy Smith. eds. 1992. The correspondence of John Bartram, 1734-1777. Gainesville, Florida: University Press of Florida. xv + 809 p. Illust. Index. 21 cm.
• ***Summary:*** John Bartram lived 1699-1777. On pages 727-28 of this book are: (1) A letter from Benjamin Franklin to John Bartram dated 11 Jan. 1770 from London; it mentions soybeans and tofu. (2) A letter from James Flint to Benjamin Franklin dated 3 Jan. 1770 from Capringe. It discusses how the Chinese convert Callivances (soybeans) into Towfu (tofu).

Contents of this book: List of illustrations. Acknowledgments. Editors' introduction (incl. a brief biography of John Bartram). The correspondence (arranged chronologically). Appendix I. Bartram's descriptions of North American forest trees and shrubs. Appendix II. Bartram's notes in the *Medicina Britannica.* Glossary of names. Bibliography.

This book also contains letters to and/or from (or information about): Samuel Chew (born 1693; physician in Philadelphia after 1732; introduced John Bartram to Peter Collinson), Peter Collinson (1694-1768; London woolen draper and avid gardener, obsessed with introducing foreign plants to his garden at Peckham, in Surrey; member of the Royal Society), John Fothergill (1712-1780; distinguished Quaker physician in London and Fellow of the Royal Society), James Flint, Benjamin Franklin (1706-1790; publisher, scientist, interested in all aspects of natural science, and Fellow of the Royal Society), Henry Laurens (1723-1792; distinguished citizen of Charleston, South

Carolina, later president of the Continental Congress, and American Commissioner at the Treaty of Paris), Library Company of Philadelphia, Carolus Linnaeus (1707-1778), Philip Miller (1691-1771; director of the Chelsea Physic Garden), Thomas Penn (1702-1775; one of the three sons of William Penn; inherited proprietary rights in Pennsylvania and was in charge of the colony's interests in England), William Penn (1644-1718; English Quaker and founder of the Pennsylvania colony; Fellow of the Royal Society), Benjamin Rush (1746-1813; Philadelphia physician and professor at the University of Pennsylvania Medical School), Peter Templeman (1711-1769; physician, secretary of the Royal Society).

About the authors (p. [809], with photo of both together): "Edmund Berkekley and Dorothy Smith Berkeley have published numerous biographies of notable figures in natural history, including John Clayton, Alexander Garden, John Mitchell, Moses Ashley Curtis, and George William Featherstonhaugh. Before his retirement, Edmund Berkeley taught at Washington and Lee University [in Lexington, Virginia], the University of the South, and the University of North Carolina."

1340. Yeye-Odu, Ayorinde. 1992. Effect of pH and *Bradyrhizobium japonicum* inoculation on nodulation and N-2 fixation of acid tolerant and sensitive vegetable soybeans. MSc thesis, North Carolina Agricultural and Technical State University. x + 82 leaves. Illust. 29 cm. * Address: Richmond, Virginia.

1341. *SoyaScan Notes.* 1993. America's most active and least active states with respect to soybeans and soyfoods, as of 1 April 1993 (Overview). April 1. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** A tally by state on the SoyaScan database (which currently contains 42,087 bibliographic references relating to soybeans and soyfoods) shows the following states to have the largest number of listings relating to soya (over 300): Illinois 3,353, California 2,603, New York 1,316, Ohio 929, Michigan 920, Massachusetts 805, Indiana 739, Iowa 689, Minnesota 607, New Jersey 572, Missouri 553, District of Columbia 546, North Carolina 460, Wisconsin 433, Tennessee 412, Hawaii 387, Pennsylvania 372, Washington state 303, Maryland 300.

States with the fewest listings (40 or less) are Nevada 11, Alaska 17, Montana 23, Rhode Island 23, Wyoming 24, Idaho 27, New Hampshire 29, North Dakota 33, South Dakota 36, Arizona 38, Oklahoma 39, New Mexico 40.

1342. Allen, Ann. 1993. Greenpeace bus plans stop near ThermalKEM. *Charlotte Observer* (*North Carolina*). May 2. p. 1Y.
• ***Summary:*** Greenpeace started by working to save the whales. Now they are on a tour to protest hazardous waste incineration, as at ThermalKEM Inc., where they will stop for a town meeting. They have an 18-ton high-tech bus, "The Rainbow Warrior on Land," with fax, phones, computers, and a copier plus sleeping facilities for eight. "Its about as green a bus as is on the road, in terms of soy diesel and solar panels and all that," said Scott Brown, their Southeast toxics campaigner. Address: Staff writer.

1343. Belleme, John. 1993. Problems with trying to make traditional seitan America. Plans to start making miso dressings (Interview). *SoyaScan Notes.* June 2. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** John plans to shut down Santa Fe Organics soon and stop making seitan. He is losing too much money. He hopes to start making miso dressings. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1344. North Carolina Soybean Producers Association, Inc. 1993. The amazing soybean: Food for a hungry world (Leaflet). Raleigh, North Carolina. 3 panels each side. July. Each panel: 22 x 9 cm.
• ***Summary:*** The amazing soybean (history, leading cash crop in USA). Soybean facts: Soy oil and soybean meal. Recipes (using cooked soybeans or soybean oil). Oven or deep-fat roasted soybeans. Questions often asked: Can "regular" soybeans be eaten? (Yes). Where can I buy soybeans for edible purposes? How to cook dry soybeans. About the North Carolina Soybean Producers Association, Inc. Some accomplishments of the NCSPA. Address: 211 Six Forks Road, Suite 102, Raleigh, North Carolina 27609.

1345. Gain, Jeff. 1993. Thoughts on the soybean checkoff program, the American Soybean Assoc., and United Soybean Board (Interview). *SoyaScan Notes.* Aug. 24. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** "I invested 7 years of my life with the ASA, starting on 1 Aug. 1978, in a fairly major role, as executive director and chief of staff for Ken Bader, and the person in charge of ASA's office in Washington, DC. What I see taking place now between ASA and USB disturbs me very much. It's a power play–to see who is the most important–and its stupid. But it's a lot deeper than just individuals struggling for power.

"I have some very strong feelings against national checkoffs. I think its a very big mistake to go in that direction. I was in favor of the state-by-state checkoff that ASA had, starting in 1966 in North Carolina, before the national checkoff began. When you have a national checkoff, politics come into play too much, the federal government is too much involved, there is too much of a propensity for staff to take things over and exclude the grower participation, and there is a very strong reason or propensity for the boards to move away from basic production agriculture. It gets too far removed from the people back home. When you have a

state program and individual farmers go to a central location in their state and sit down and discuss a project, they know what is going on with that program. However when the board is a national board and it meets in any state it wants to, it lacks local focus or interest and farmers lose control. On the 50% of the funds that each state sends to the national organization (USB) there is no state control, and on the 50% that stays within the state, I think you have to ask yourself how effectively money can be spent within a state on this kind of program."

Concerning the state-by-state checkoff: "I was basically in charge of that whole development process from 1978 to 1984. We went from 4 or 5 state checkoffs to 26." When SPARC came along, Jeff no longer worked for ASA but he was "not uninvolved." He opposed the national checkoff. In 1994, American soybean farmers will vote on whether or not to continue the national checkoff. "If they were to choose not to continue, and to go back to the state-by-state system, since the states have expanded their programs because of the higher level of funding, there won't be enough money to go around. My guess is that the states will keep their money and send little or no money to ASA. They have every right to do that." Address: Chairman, New Uses Council, c/o National Corn Growers Assoc., 1000 Executive Parkway #105, St. Louis, Missouri 63141. Phone: 314-275-9915.

1346. Tenuta, Albert. 1993. Soybean cyst nematode. *Ontario Soybean Growers' Marketing Board Newsletter.* Aug. p. 2.
• ***Summary:*** "The soybean cyst nematode (SCN) has been a major pest of soybeans for at least a century and maybe much longer. It was first reported in Japan in 1915 and since has been found in Egypt, Korea, China, Taiwan, Columbia, Argentina, Brazil (unconfirmed), the United States and Canada. In 1954, the nematode was found for the first time in North America in Hanover County, North Carolina. This particular area has a history of growing flower bulbs imported from Japan. The first report of soybean cyst nematode in Canada occurred in two fields in Kent County in 1987 and has since been identified in five other counties."

"What is soybean cyst nematode?... It is called a cyst nematode because the swollen, egg-filled adult female (200-600 eggs) is referred to as the 'cyst stage'." Address: Ridgetown College of Agricultural Technology, Ridgetown, ONT, Canada.

1347. Brar, Gurdip S.; Carter, Thomas E., Jr. 1993. Soybean *Glycine max* (L.) Merrill. In: G. Kalloo and B. Bergh, eds. 1992. Genetic Improvement of Vegetable Crops. Oxford, UK and New York: Pergamon Press. xi + 833 p. Illust. Index. 26 cm. [215 ref]
• ***Summary:*** This very interesting chapter is about breeding soybeans for food uses. Contents: Introduction: Domestication for soyfood use, westward spread. Cytology: Karyotype, aneuploids, chromosome interchanges, interspecific hybridization. Genetics: Linkage maps, restriction fragment length polymorphism and amplification DNA length polymorphism. Breeding objectives: Important soyfoods, heightened Western interest in soyfoods. Germplasm resources. Reproductive biology: Flower biology, cross-pollination, male sterility. Breeding strategies and methods. Genetic traits and soyfood variety development: Seed size, protein and oil content, oil composition, lipoxygenase genes, sugar content, swell ratio, hilum color, protein composition and texture. Biotechnology and its applications: Rapid multiplication of valuable genotypes, somaclonal variation, introgression of valuable traits from perennial species (especially of subgenus *Glycine* into *G. max*), other uses, transformation, criteria of successful germline transformation event, *Agrobacterium*-mediated transformation, protoplast transformation and regeneration, transformation by particle bombardment, cell, protoplast and tissue culture, regeneration from immature / mature cotyledons or immature embryos, regeneration from leaves, protoplast culture and plant regeneration. Future prospects.

Tables: (1) Major producers and consumers of soybean, 1989-90. (2) Soybeans consumed as soyfoods in Japan in 1986. (3) Publicly released US soybean varieties developed for (or utilized in) the soyfoods market. (4) Agronomic and chemical characters of Japanese and US varieties grown at Clayton, North Carolina, USA, in 1988. (5) A partial listing of soybean seed requirements for selected soyfoods consumed in Japan. (6) Selected Japanese soyfoods varieties. (7) Traits genetically engineered into soybeans.

1348. Carter, T.E., Jr.; Shanmugasundaram, S. 1993. Vegetable soybean (*Glycine*). In: J.T. Williams, ed. 1993. Pulses and Vegetables. London and New York: Chapman & Hall. xii + 247 p. See p. 219-39. Underutilized Crop Series. [50 ref]
• ***Summary:*** Contents: A brief history of soybean. Food uses. *Edamame.* Consumption and marketing of *edamame.* Harvest factors. *Edamame* production factors. Nutritional character of *edamame.* Preference factors for *edamame.* Breeding edamame cultivars. Future prospects.

J.T. Williams, the editor of this volume, is with the International Fund for Agricultural Research, Washington, DC, metro, USA. Address: 1. USDA / ARS, North Carolina State Univ., Box 7631, Raleigh, NC 27695-7631; 2. AVRDC, P.O. Box 42, Shanhua, Tainan 74199, Taiwan.

1349. MacDonald, June Fessenden. ed. 1993. Agricultural biotechnology: A public conversation about risk. *NABC Report* (*National Agricultural Biotechnology Council, Ithaca, New York*). No. 5. [8] + 135 p. (Proceedings of the NABC 5th annual meeting, held at Purdue University, Lafayette, Indiana, in 1993).
• ***Summary:*** Contents: Part I Agricultural Biotechnology: A

Public Conversation About Risk.

(3) Overview, by Peter E. Dunn, Purdue University Biotechnology Institute, and Marshall A. Martin, Center for Agricultural Biotechnology Policy and Technology Assessment, Purdue University.

(13) Putting It in Context, by Theodore L. Hullar, Chancellor, University of California, Davis.

Part II Workshops: (21) Technical Risk Assessment and Regulations, by Rebecca Goldburg, Environmental Defense Fund William F. Greenlee, Pharmacology and Toxicology, Purdue University.

(25) Public Assessments of Benefits and Risks, by Ted A. McKinney, Community Affairs & Contributions, DowElanco, and A. Ann Sorensen, Center for Agriculture and the Environment, American Farmland Trust with Patrick Stewart, American Farmland Trust

(31) Public Values: Benefits and Harms, by Rosetta Newsome, Scientific Affairs and Information, Institute of Food Technologists, and Lilly-Marlene Russow, Philosophy, Purdue University. (3) Public Communication about Risk, Karen Bolluyt, Agricultural Information Service, Iowa State University, and David Judson, Gannet News Service.

Part III Plenary Lectures: (47) Regulatory Risk Assessment: A View from the Potomac, by David R. MacKenzie, National Biological Impact Assessment Program, USDA. (55) Risk Assessment: A Technical Perspective, by Roy L. Fuchs, Regulatory Sciences, Monsanto Corporation, with Terry B. Stone and Paul B. Lavrik, Monsanto Corp. (65) Risk Assessment: A Farmer's Perspective, by Will Erwin, Indiana Farmer. (73) Public Perceptions of Benefits and Risks of Biotechnology, by Thomas J. Hoban, Sociology and Anthropology, North Carolina State University, with Patricia Kendall, Food Science and Nutrition, Colorado State University. (87) Public Values and Risk Assessment, by Roger A. Balk, Ethicist, McGill University; Physician's Information Systems, Royal Victoria Hospital. (97) Telling Public Stories about Risk, by Sharon Dunwoody, Journalism and Mass Communication and Center for Environmental Communications and Education Studies, University of Wisconsin, Madison. (107) Communicating with the Public about Risk, by Jerry E. Bishop, Deputy News Editor, Wall Street Journal.

Part IV Roundtable: (116) A Public Conversation about Risk.

Part V Participants.

New members include: International Service for the Acquisition of Agri-Biotech Applications, North Carolina State Univ., Oregon State Univ., Univ. of Guelph (Ontario, Canada), Univ. of Saskatchewan (Canada). Address: Deputy Director, NABC, Ithaca, New York 14853-1801.

1350. Macdonald, Bruce. 1994. Macrobiotic Wholesale Co. is now Macrobiotic Company of America (MCOA) (Interview). *SoyaScan Notes.* Jan. 26. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Bruce (who was one of the early important figures in Erewhon) bought this company from Kurt Schmitz on 15 Sept. 1993. Kurt, who is about age 65, had come to North Carolina from California to retire. He had worked at Hewlett-Packard for more than 20 years. He purchased the company (named Macrobiotic Wholesale Co.) in Aug. 1986 from Great Eastern Sun; Barry Rand negotiated the deal. At the time the company had sales of about $170,000/year; now its sales are well over $1,300,000/year and the last two months have set sales records. Bruce renamed it Macrobiotic Company of America. Bruce used to live in Vermont, but he now lives in North Carolina. Kurt is interested in possibly starting a miso manufacturing company in North Carolina–which has long been considered by macrobiotic teachers to have an ideal climate for making miso (hot summers, cold winters, somewhat humid). The American Miso Company is only 50 miles away. Bruce would like to move the company up to the northeast; he feels it is situated in the wrong place.

Macrobiotic Wholesale Company used to be a division of Great Eastern Sun. Great Eastern Sun sold products to distributors, whereas Macrobiotic Wholesale Company sold directly to retail stores. The distributors got upset with Great Eastern Sun for wearing two hats, so Great Eastern Sun decided to sell Macrobiotic Wholesale Company. Barry Evans still owns Great Eastern Sun.

Note: Half of MCOA is owned by Muso Shokuhin of Japan. When William Shurtleff asked Bruce about this on 4 April 1997, Bruce confirmed that it was true. When the company was purchased from Kurt Schmitz on 15 Sept. 1993, Yuko Okada of Muso put up 95% of the money and Bruce put up 5%–using his own funds. Yuko borrowed all or most of the 95% to make the purchase, and MCOA is paying him back. Bruce agreed to manage the company in exchange for 50% ownership, which he still has. Muso owns the other 50%. He did not tell the true story to Shurtleff in 1994 because Muso wanted to keep this semi-confidential. Address: Owner, Macrobiotic Company of America, 799 Old Leicester Hwy, Asheville, North Carolina 28806. Phone: 704-252-1221.

1351. DeBona, Don. 1994. Early work with natural foods, macrobiotics, and soyfoods in America (Interview). *SoyaScan Notes.* Jan. 27. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Don was born in Eagle Pass, Texas, in 1955. He had "hung around natural food stores since high school." While in high school, he worked as produce clerk at a natural foods store named The Powerhouse in his home town on Towson, Maryland. It was the town's first natural foods store. They bought foods from Erewhon.

In 1977 Don graduated from a small Catholic college named Mount St. Mary's College in Emmitsburg, Maryland. He got interested in macrobiotics through books (such as *Zen*

Macrobiotic Cooking by Michel Abehsera) that same year several months after he graduated; he had been a vegetarian for about 6 months. His first job after college was in Virginia at Appalachian Outfitters, a store which outfitted people going on camping or river trips.

Don worked for Laurelbrook Foods in Maryland for about a year, starting in 1981. He left shortly after the company filed for Chapter 11 bankruptcy protection on 15 Feb. 1982, then he went to work on a Permaculture farm named Watkins Farm on the Maryland/Virginia border. Run by a man named Law Watkins, it was testing no-till agriculture, growing organic winter wheat, barley, soybeans and summer produce according to the principles set forth in Masanobu Fukuoka's classic, *The One Straw Revolution...* After working there for a year and a half, in December 1983 he went to Great Eastern Sun (GES, which had started business in March 1982). GES was just starting to get involved with soymilk (Ah Soy) when Don arrived; taking charge of the soymilk was his first project at GES. Barry Evans hired Don and was actively running GES at the time. Marty Roth had just left for Westbrae when Don arrived; Don took his place as general manager/sales manager. John Belleme was still at American Miso Co. John Fogg designed the package for Ah Soy; Don invented the phrase "Nondairy Soy Beverage" which is now widely used on other soy beverages. After working at GES for about a year plus several months, Don and his wife went down to the American Miso Company in Feb. 1985 to take over from John Belleme. Bob Ballard took Don's place at GES, but Don was the general manager of GES until Nov. 1993, when he hired John Swann. Don still owns part of GES (as well as part of American Miso Co., along with Barry Evans) and is paid by them, even though American Miso Co. is a separate corporation. Bean Mountain Soyfoods in North Carolina was shut down about 2 years ago; John Swann used to be in charge of Bean Mountain. John Fogg worked with John Troy for a while; they started a company named American Natural Foods. Then John Fogg did consulting for Arrowhead Mills, but 2-3 years ago he left the natural foods business and was writing books on motivation. Address: General Manager, American Miso Co., Route 3, Box 541, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1352. Nakagawa, Keiko H. 1994. The miso market in America (Interview). *SoyaScan Notes.* Feb. 8. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Keiko has just finished a market survey titled *Beikoku Miso Shijo Chôsa Hôkoku* (The miso market in America: Report of a survey; 22 pages, in Japanese). She used statistics (with permission) from *Soyfoods Industry and Market: Directory and Databook* (1985) by Shurtleff and Aoyagi and from a database search of the SoyaScan database to get started on her research. Then she contacted all miso manufacturers listed in the directory and in this search, and interviewed the owner of each company. She found that total miso production by the 7 manufacturers listed below was 1,467 tonnes/year = 3,227,400 lb/year. She found that the largest miso makers in the USA (including Hawaii) are as follows, listed in descending order of size: 1. Miyako Oriental Foods (founded 1976, 1,000 tonnes/year = 2,200,000 lb/year, Los Angeles; Mr. Shimizu says they are still only using half their production capacity. Note: In 1982 Miyako produced 544 tonnes/year of miso according to Shurtleff and Aoyagi. 1985. *Soyfoods Industry and Market,* p. 108). 2. Hawaiian Miso & Soy Co. (founded 1936, 227 tonnes/year = 500,000 lb/year, Honolulu. Production was 512 tonnes/year in 1982). 3. American Miso Co. (founded 1979, 113 tonnes/year = 250,000 lb/year, North Carolina. Production was 125 tonnes/year in 1982). 4. American-Hawaiian Soy Co. (founded 1941, 91 tonnes/year = 200,500 lb/year, Honolulu. Production was 125 tonnes/year in 1982). 5. South River Miso Co. (founded 1981, 18.18 tonnes/year = 40,000 lb/year, Massachusetts). 6. American Biofoods (founded 1983, 16 tonnes/year = 35,300 lb/year, Holmdel, New Jersey; also makes Dengaku Miso). 7. Junsei Yamazaki Miso Co. (founded 1983, 2 tonnes/year = 4,400 lb/year, Orland, California).

Companies listed in the 1985 directory which cannot be located and probably no longer make miso are: Cottage Miso (Wisconsin), Imagine Foods (Missouri), Parks Brands (Hawaii), The Soy Plant (Ann Arbor, Michigan), and Well House (Colorado).

Imports of miso to the USA have continued to increase dramatically, from 959 tonnes (metric tons) in 1982 to 1,554 tonnes in 1992 (according to Japanese Customs sources).

On 20 Feb. 1994 Keiko sent a copy of her Japanese-language market study to Soyfoods Center, where it was placed in the library. Address: 667 Spyglass, Valley Springs, California 95252. Phone: 209-772-1502.

1353. Boerma, H. Roger. 1994. The Center for Soybean Improvement at the University of Georgia and new developments with soybean breeding nationwide (Interview). *SoyaScan Notes.* May 9. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Roger is a soybean breeder and geneticist by training. This center was opened at the University of Georgia in May 1992. It is a commodity center (soybeans) rather than a discipline center. They are moving this state center to a more regional consortium (Georgia, Alabama, North Carolina, South Carolina, Florida) in the next 9 to 18 months. This will not involve moving people but it will involve new ways of and commitments (perhaps based on written agreements) to doing and sharing soybean research across state boundaries. It will allow them to maximize the return from each soybean research dollar invested and prevent unnecessary duplication of research. During the last 2 years the United Soybean Board (USB) has been

very receptive to the idea of doing larger regional soybean research projects rather than individual state research. In the Southeast and nationwide, soybean research will increasingly have to be done regionally rather than on a state or local bases–for three reasons: (1) The funds available for research at to agricultural experiment stations are decreasing; (2) The cost of doing cutting-edge research (such as genetic research) is increasing; and (3) the number of scientists qualified to do advanced genetic research is limited.

Some of the cutting-edge genetic and breeding research, which has already made impressive gains, involves work on the soybean genome, and soybean genetic mapping. A leader in genetic mapping is Randy Shoemaker at Iowa State University (Ames. Phone: 515-294-6233). For the past 24 months he has been building the soybean genome database, which is trying to pull together all the classical genetic, cytogenetic, and molecular genetic data onto one database. This is not a bibliographic database but a very graphic, user-friendly, but in-depth database, where you can look at individual soybean chromosomes and see the genes that have been mapped on that chromosome. You can then look at the research data that was used to find that location on the genetic map. Much of the excitement in this field is derived from the human genome project. Both projects are working with DNA, a basic building block of all living things, so there are quite a few similarities between humans and plants.

The human genome project gets about $240 million a year funding versus about $15-$20 million year for the entire plant genome project. Much of the plant genome research is affordable only because the techniques and technology worked out by scientists on the human genome project is directly applicable to and is being shared with the plant genome project. The computer software used with this database is probably at least partially derived from the human genome project, of which the plant genome project can be thought of as an offshoot. Maps made by Shoemaker are now being used by Boerma and others for soybean improvement. Phase I is to draw the molecular map. Phase II is to locate as many important genes as possible on the map. Phase III is for plant breeders to use the molecular map with the genes on it to breed better soybeans. The project is now moving rapidly from Phase II to Phase III. Some support for the plant genome project and soybeans has come out of the USDA National Research Initiative, and from USB (which is interested in important traits for soybean quality, composition, pest resistance, etc.).

New techniques in soybean breeding include soybean transformation, molecular markers, and work on what the National Science Foundation (NSF) calls “intractable traits.” Soybean transformation involves transferring genes from another organism (such as a *Escherichia coli* or other microorganisms) into the soybean. In the U.S. there are 3 major public programs in soybean transformation: At Ohio State Univ. (Columbus, Ohio), Univ. of Kentucky, and Univ. of Georgia. Examples: Monsanto has developed Roundup-Ready soybeans which have a very high tolerance for the pesticide Roundup (made by Monsanto), and DuPont has developed stachyose-null soybeans that cause less flatulence.

Note: This is the earliest English-language document seen (Sept. 2010) that contains the term “Roundup Ready” or “Roundup Ready soybeans.” Address: Coordinator, Center for Soybean Improvement, 3111 Miller Plant Sciences Building, Georgia Agric. Exp. Stations, The Univ. of Georgia, Athens, GA 30602-7272. Phone: 706-542-0927.

1354. *Seed World.* 1994. Soybean tailored to natto market. 132(7):58. June.
• ***Summary:*** Pearl, a new small-seeded soybean variety for the production of natto, was developed by Thomas Carter, USDA plant breeder stationed at North Carolina State University (NCSU). Pearl is adapted to North Carolina growing conditions.

1355. Fellman, Louis. 1994. History of pioneering work with tofu cheesecake, Sprucetree Baking Co., and Soy Delites. Part I (Interview). *SoyaScan Notes.* Aug. 19. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Louis played a major role in developing America’s first commercial tofu cheesecakes–which were named Tofu Cream Pies and were delicious. The product was originally developed by Sprucetree Baking Co. in Maryland. From the outset, it was sold with two different toppings: Blueberry and strawberry. Louis was not with Sprucetree when the product was launched in about 1976 by Howard Grundland, who started and owned Sprucetree on Belair Road in Overlea, a suburb of Baltimore, Maryland. Several people helped Howard start the bakery, including Murray Snyder and Norman Zweigel. Louis does not know who first had the idea for the tofu pies and who developed the first recipe.

Louis started working at Sprucetree right after the first East Coast Macrobiotic Summer Camp in about August or September 1977. [Note: In Oct. 1973 Sprucetree began operations on Belair Road in Overlea.] Sprucetree was making the tofu pies when Louis arrived in 1977 but it was only one of about 30 baked goods (including bread, cookies, other desserts, etc.) that they sold. Louis left Sprucetree twice. The first time was 6-8 months after he first arrived; he was lured back to New York City by Jim Guido, who used to own two East-West restaurants in the city. Louis worked there as a baker, and made tofu pies (which he now called “Tofu Cheesecakes”) for the restaurant. He made many tofu cheesecakes and improved on the original recipe. John and Yoko Lennon used to come in to the restaurant (on 74th Street and Columbus Ave.) almost daily and enjoy Louis’ tofu cheesecakes. The restaurant was crowded every night and was one of the hot, chic places to eat on the Upper West Side. Louis hired Alan Hoffman to be his assistant at the

East-West restaurant. Alan later became the baker at Souen.

In about June 1978, after about 6 months in New York City, Louis returned to Sprucetree. He helped finance Sprucetree's move across town from Belair Road to 4105 Aquarium Place at Reisterstown Road in Baltimore. The company continued to make its tofu pies and other baked goods. In late summer of 1980 Louis found a new job as production manager at Erewhon Natural Foods. So he moved to Boston, Massachusetts, and soon hired Alan Hoffman (a baker at the Souen restaurant, who baked tofu cheesecakes using Louis' recipe) to be his assistant. Within 18 months he was married, with a child on the way, and Erewhon had declared bankruptcy. Next he worked briefly for Great Eastern Sun in North Carolina. Louis and his family moved to New Jersey where his mother was living. There he took jobs to make money, such as selling cars. At this time Tofutti was becoming famous; Louis (now living at 436 Jefferson Ave., Staten Island, New York) considered opening a tofu shop that made fresh tofu in New York City. He and Alan Hoffman even looked at some locations for the tofu company. While waiting for customers to come into the car showroom, he planned a company to make tofu pies which would be profitable and widely distributed. He found some friends who had a food shop in northern New Jersey with an oven and mixing machines. In 1983 Sprucetree stopped making tofu pies/cheesecakes. Continued. Address: Abraham's Natural Foods, P.O. Box 4201, Long Branch, New Jersey 07740. Phone: 908-229-5799.

1356. Belleme, John. 1994. New developments with rice beverages and natto (Interview). *SoyaScan Notes.* Sept. 16. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** At the recent Natural Products Expo on the East Coast there was a big battle of the rice beverages. Westbrae has just launched two new rice beverages in aseptic cartons with spouts; one is regular strength and the other is concentrated. This may be the first natural foods product in an aseptic carton with a spout. Imagine Foods then switched to a carton with a spout. Then Imagine Foods put out a big poster explaining why their Rice Dream is superior to Westbrae's. John prefers the flavor and texture of Rice Dream.

John's main business is now exporting to Mitoku. There is a big demand for organically grown soybeans in Japan. John has a standing order from Mitoku for 1,000 tons of small-seeded organically-grown soybeans to be used in Japan for making natto. Tommy Carter at North Carolina State University in Raleigh is breeding natto-type soybeans. Charles Kendall, a natto manufacturer in Massachusetts, is now testing the soybeans that Carter breeds. It is a nice relationship. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1357. **Product Name:** Organic Tofu–Extra Firm, with Dulse.
Manufacturer's Name: Twin Oaks Community Foods.
Manufacturer's Address: Route 4, Box 169, Louisa, Virginia 23093. Phone: 703-894-4112.
Date of Introduction: 1994.
Ingredients: Water, organic soybeans, and natural nigari derived from sea water.
Wt/Vol., Packaging, Price: 16 oz.
How Stored: Refrigerated.
New Product–Documentation: Label sent by Jon Kessler. 1996. Jan. 29. "Twin Oaks Community Foods tofu is made by people who live and work together. We are a worker-owned cooperative that is dedicated to cooperation, equality, and non-violence. We take pride in producing this extremely satisfying, premium tofu." A small, round, purple and white sticker that reads "with Dulse" is affixed to the front panel. Another larger round sticker says "Virginia's Finest–Virginia Agriculture." The product is certified organically grown by VAFB in Charlottesville.

Talk with Jon Kessler. 1996. Feb. 9. Bean Mountain Natural Foods (in Weaverville, North Carolina) was one of the first companies in America to make tofu with dulse, and they were making this product when Jon bought their company. The dulse is mixed with the curds before pressing. Jon buys his nigari from Great Eastern Sun, who gets it from Mitoku.

1358. Fleishman-Hillard. 1994? Survey of mass-transit systems taking part in biodiesel demonstrations 1993-1994. n.p. 35 p. Undated. 28 cm.

• ***Summary:*** At least one page of detailed information is given for each project, including main organization, location, and contact person. There are projects in: Olympia, Washington. Richmond, Virginia. Charlotte, North Carolina. Louisville, Kentucky. Dayton, Ohio. Portland, Maine. Santa Clara, California. Flint, Michigan. Alexandria, Virginia, Ukiah, California. Lincoln, Nebraska. University of California, Davis. Marin County, California. Worcester, Massachusetts. Yosemite National Parks, California. Cincinnati, Ohio. Sparta, Wisconsin. Wenatchee, Washington. Riverside, California. Madison, Wisconsin. Coeur d'Alene, Idaho. Erie, Pennsylvania. Denver, Colorado. Indianapolis, Indiana. Crosby, Texas. Vail, Colorado. Denver, Colorado. Jacksonville, Florida. Baltimore, Maryland. New Orleans, Louisiana.

1359. Levy, Jill R.; Faber, K.A.; Ayyash, L.; Hughes, C.L., Jr. 1995. The effect of prenatal exposure to the phytoestrogen genistein on sexual differentiation in rats. *Proceedings of the Society for Experimental Biology and Medicine* 208(1):60-66. Jan. [20 ref]

Address: Div. of Reproductive Endocrinology and Infertility, Dep. of Obstetrics and Gynecology, Duke Univ. Medical Center, Durham, North Carolina 27710.

1360. Clarkson, Thomas B.; Anthony, Mary S.; Hughes, C.L., Jr. 1995. Estrogenic soybean isoflavones and chronic disease: Risks, and benefits. *Trends in Endocrinology and Metabolism* 6(1):11-16. Jan/Feb. [56 ref]

• ***Summary:*** It was first noticed that plants could induce estrus in animals nearly 70 years ago. Since that time, more than 300 plants have been found to possess estrogenic activity. These compounds, which are known by their general name *phytoestrogens,* represent several chemical classes.

"Potential risks or benefits of phytoestrogens depend not only on dose and potency but also on duration and pattern of exposure. Further, risk assessment must be considered relative to the developmental phase or life stage of the individual at the time of exposure."

This review focuses on isoflavones from soybeans, in part because consumption of soyfood products and soybeans is increasing, and in part because soybeans are the major source of genistein and daidzein in human diets.

Discusses the effects soy isoflavones on infants and children during these life periods: Fetal-neonatal period. Prepubertal period. Women attempting conception.

Chronic diseases of adulthood: Adlercreutz (1990) had noted that there is an abundance of phytoestrogens in Asian diets compared with Western diets, and that this difference may account for some "Western" diseases (breast, prostate- and colon cancer, and coronary heart disease). Address: Comparative Medicine Clinical Research Center, Bowman Gray School of Medicine, Wake Forest Univ., Winston-Salem, North Carolina 27157-1040.

1361. Anderson, J.J.; Ambrose, W.W.; Garner, S.C. 1995. Orally dosed genistein from soy and prevention of cancellous bone loss in two ovariectomized rat models (Abstract). *J. of Nutrition* 125(3S):799S. March. Supplement. First International Symposium on the Role of Soy in Preventing and Treating Chronic Disease.

• ***Summary:*** Administered at low dosages in two ovariectomized rat models, genistein (a phytoestrogen) is effective in reducing rates of bone loss; it can be used like Premarin (an estrogen from the urine of horses) or estradiol. Address: Dep. of Nutrition and Dental Research Center, Univ. of North Carolina, Chapel Hill, NC; and Dep. of Surgery, Duke Univ., Durham, North Carolina.

1362. Anthony, M.S.; Clarkson, T.B.; Weddle, D.L.; Wolfe, M.S. 1995. Effects of soy protein phytoestrogens on cardiovascular risk factors in rhesus monkeys (Abstract). *J. of Nutrition* 125(3S):803S-804S. March. Supplement. First International Symposium on the Role of Soy in Preventing and Treating Chronic Disease.

• ***Summary:*** Dietary soy protein has long been known to lower plasma cholesterol, however the contribution of its phytoestrogens to that effect has been largely unexplored. There is abundant evidence that traditional estrogens (such as conjugated equine estrogens and 17-Beta estradiol) reduce the risk of coronary heart disease. Female rhesus monkeys fed a diet containing soy protein enriched with soy phytoestrogens had significantly lower total plasma cholesterol concentrations (290 vs. 472 mg/dl) and higher high density lipoprotein cholesterol concentrations (90 vs. 58) than the females fed the same diet but with the phytoestrogens removed from the soy protein. This diet resulted in significantly reduced risk of cardiovascular disease in females, but not in males. Address: Comparative Medicine Clinical Research Center, Bowman Gray School of Medicine, Wake Forest Univ., Winston-Salem, North Carolina 27157-1040.

1363. McCarthy, Paul. 1995. Dietary phytoestrogens: Scientists stalk potential soy chemopreventives. Research round-up. *Oncology Times* (*New York, NY*). April. p. 19-20.

• ***Summary:*** A good overview and summary, highlighting the work of leading researchers. According to biochemist Kenneth D.R. Setchell, PhD, investigations in this relatively new field began in his laboratory in the early 1980s. Dr. Setchell is Director of the Clinical Mass Spectrometry lab and Professor of Pediatrics at Children's Hospital Medical Center in Cincinnati, Ohio. He found equol, a phytoestrogen metabolite that is structurally similar to estradiol-17B, in human urine. He then determined that eating soy had the greatest effect on equol levels; 40 gm/day of soy protein made equol levels in the blood and urine jump 5,000 times above baseline.

This led him to measure phytoestrogen levels in Asians; he found their levels to be very high. Since weak estrogens have both estrogenic and anti-estrogenic effects, he hypothesized that soy might have properties similar to tamoxifen (a drug which is widely used in the successful treatment of hormone-dependent breast cancer in humans) and that a diet high in soy might explain the lower rates of breast and prostate cancers in Asia. Several key experiments conducted by Setchell, Dr. Stephen Barnes, and others, previously published in scientific journals, are then described.

The results have been provocative, but the mechanism behind the anticancer actions of soy remains unclear. Dr. Setchell is not convinced that it is as simple as his 1984 hypothesis, that the phytoestrogens in soy act like tamoxifen. Since then it has become clear that phytoestrogens also act as antioxidants. Moreover, genistein is a potent inhibitor of protein kinases, the key enzymes involved in the regulation of the phosphorylation of cells.

Herman Adlercreutz, M.D., PhD, of the University of Helsinki in Finland, has studied the anticancer role of soy in prostate cancer and is interested in the mechanism. Soy's estrogenic properties might suppress the growth of prostate tumors. This makes sense because prostate cancer

is treated with estrogen. Dr. Adlercreutz has shown that genistein is one of the strongest known natural inhibitors of angiogenesis; it helps to cut off the blood supply that tumors need to grow. Alternatively, soy can suppress the production of gonadotropin secretions by the hypothalmus. This may cause a secondary decrease in testosterone production, which may be reflected in the lower levels found in Japanese men. And lifelong lower testosterone levels may postpone the development of prostate cancer.

Dr. Barnes has observed that prostate-specific antigen (PSA) values fall sharply in men with prostate cancer after that start a soy regimen. So he has started a systematic investigation of PSA values and other bio-markers of prostate cancer to determine if they can be favorably altered by soy.

Some researchers believe that soy could substitute for estrogen-replacement therapy (ERT). Barry R. Goldin of Tufts University School of Medicine notes that a Japanese woman on a traditional high soy diet (about 55 gm/day) is getting the daily equivalent of a low dose of Premarin. Already Dr. Adlercreutz and Mark Whalqvist, MD, Chairman of the Department of Medicine at Monash University in Melbourne, Australia, offer a soy alternative to women who are reluctant to take ERT.

Dr. Margo N. Woods at Tufts is now conducting a study on soy and breast cancer in a group of 200 women. She will be studying levels of serum hormones, luteinizing hormones (LH), and follicle-stimulating hormones (FSH), and trying to correlate them with diary recorded hot flashes and night sweats.

No one knows if consuming large amounts of soy could prove harmful to humans; soy researchers typically respond that the Chinese and Japanese have no apparent problems. But fertility specialist Claude L. Hughes, Jr., PhD, MD, raises important questions. Associate Professor of Comparative Medicine and Obstetrics & Gynecology at Bowman-Gray School of Medicine of Wake Forest University (Winston-Salem, North Carolina), Hughes urges researchers to look at both risks and benefits, especially for humans and other animals in their early developmental stages. He "said he wouldn't be comfortable with his pregnant wife eating large amounts of soy. Nor would he want to expose a neonate [an infant less than 4 weeks old] to soy-based formula." Dr. Hughes sees puberty as another opportunity for research. He is feeding soy to peripubertal male and female monkeys to see if it "perturbs the events of puberty from a reproductive/endocrine point of view."

"After puberty, except when a woman is trying to conceive, he said he expects that soy will prove to be a good addition to Western diets and possibly chemopreventive for breast and prostate cancers."

Photos show Dr. Kenneth D.R. Setchell, Dr. Margo N. Woods, and Dr. Claude L. Hughes.

1364. Baird, Donna D.; Umbach, D.M.; Lansdell, L.; Hughes, C.L.; Setchell, K.D.R.; Weinberg, C.R.; Haney, A.F.; Wilcox, A.J.; McLachlan, J.A. 1995. Dietary intervention to assess estrogenicity of dietary soy among postmenopausal women. *J. of Clinical Endocrinology and Metabolism* 80(5):1685-90. May.

• ***Summary:*** This study gave totally negative findings. Changes in estrogenic activity in postmenopausal women consuming soy over a 4-week period were examined. Subjects consumed daily one main soy dish (½ cup of soybeans or 38 gm of texturized vegetable protein) and two soy snacks–either soy chips (a roasted soybean product) or a spread for crackers made from whole soybeans. The estimated isoflavone content was about 200 mg/day, the equivalent of about 0.3 mg/day of conjugated steroidal estrogen, assuming that the estrogenic activity of phytoestrogens is about 0.1% that of conjugated estrogen. Compared with control subjects, more women fed soy exhibited an estrogenic response, as demonstrated by an increase in the number of superficial cells in the vaginal epithelium.

Talk with Donna Baird. 1991. May 28. The study was designed to examine whether soy estrogens were active as estrogens in post-menopausal women. Post-menopausal women were used because they have low endogenous estrogen, and thus would be expected to show a response more readily than cycling women. They were not looking for any health effects. As women enter menopause, the ovary starts to produce less estrogen. It has been found that when some women take estrogens, some of the menopausal symptoms such as hot flashes will be alleviated. In addition, estrogens are now being recommended on a much longer term basis to help bones resorb calcium and thus avoid osteoporosis. It is conceivable that, if these experiments give good results, it may some day be said that postmenopausal women should consider consuming soyfoods to help relieve undesirable symptoms.

A conjugated estrogen is one to which a sugar molecule has been added in the liver. It is more water soluble so it can pass into the urine. The estrogen most commonly used by postmenopausal women is an oral estrogen, which is already conjugated. Address: 1. National Inst. of Environmental Health Sciences, Research Triangle Park, North Carolina. Phone: 919-541-2786.

1365. Evans, Barry. 1995. The American Miso story. In: Great Eastern Sun. 1995. Pricelist. Effective June 5, 1995. 37 p. See p. 2-3.

• ***Summary:*** "This spring, as we complete our sixteenth year of operations at the American Miso Company, we are moved to reflect back on the path we have traveled to reach this point. In the spring of 1979, a group of people approached Michio and Aveline Kushi with the idea of forming a new company to produce miso in the United States using

traditional methods and only the finest organic ingredients. With the Kushi's enthusiastic support, the Erewhon Miso Company was created to supply Erewhon with miso to distribute throughout the United States. From this distant perspective, it is difficult to remember how powerful a force Erewhon was in the natural foods industry at that time. Dominating the market in the Northeast, Erewhon was the largest distributor of natural food in the United States with strong connections to distributors for its name brands in other regions.

"With Erewhon as our partner, master distributor, and a major investor, we moved ahead confidently with our plans to build a miso factory in the Piedmont Region of North Carolina. The Kushis entreated Akiyoshi Kazama, founder of Mitoku Trading Company, a major supplier then as now of high-quality Japanese natural food to the U.S. market, to put aside any narrow concerns of self interest and find us someone to train our would-be miso makers in the rapidly fading art of traditional miso manufacture. In a selfless spirit of international cooperation, Mr. Kazama searched for someone who still made miso the old-fashioned way, yet was open-minded enough to invite strangers into his home (literally).

"After many false starts amid a lengthy search, Mr. Kazama finally located, in the mountains of Yaita Prefecture north of Tokyo, Takamichi Onozaki, a country miso maker of the old school. Mr. Onozaki, generously opening his home and his heart to *gaijin* [foreign] seekers after knowledge from half a world away, agreed to house and train an American couple, John and Jan Belleme, for an entire miso-making season. From November, 1979, until June, 1980, Mr. Onozaki taught his students all the miso lore he had accumulated from a lifetime of miso making in his small, rural miso factory staffed entirely by local farmwives. This was intermediate technology with a vengeance!

"Upon the Bellemes' return to America, we rapidly constructed our factory building near Rutherfordton, North Carolina, and Mitoku arranged to ship us our new equipment from Japan. By late 1980 we had begun to make our first experimental batches of rice miso. As the miso slowly aged in its huge cypress vats, great events developed hidden from our eyes which were to have a profound effect on the young Erewhon Miso Company. In July, 1981, Michio and Aveline Kushi journeyed to Rutherfordton for the official christening of the miso plant. The beautiful and joyous ceremony left not a dry eye in the gathering; later we discussed Erewhon's ambitious plans to package and market the rapidly ripening miso.

"A glorious road into the future seemed to lay open before us, but Erewhon's financial condition was rapidly deteriorating as too rapid expansion took its toll on a company stretched to the limit by its success. One month later we received the stunning news that Erewhon had filed for bankruptcy. In one of the saddest stories we have ever had the misfortune to be a part of, the Kushis lost control of the company they had nurtured from its birth, and we lost our only customer, a major investor, and our major source of inspiration and guidance.

"At first we were devastated by the blow fate had dealt us, but we had nowhere to go but forward as we had already made a huge financial and emotional investment in our project. Severing our ties to the past, we renamed our enterprise the American Miso Company and began a desperate search for marketers for our product. When we were unable to find anyone to help us, we resolved to set up our own marketing company and do the job ourselves. Thus, out of the direct necessity, Great Eastern Sun was born in December, 1981. Mitoku, itself almost destroyed in the storm of the Erewhon disaster and eager to rebuild, agreed to export Japanese natural food to Great Eastern Sun. GES processed its first order in April, 1982, and sold the first American Miso in September of that same year.

"In the fall of 1981, Mr. Onozaki came to Rutherfordton on an inspection trip to see exactly how well his students had learned their lessons. He stayed and worked in the factory alongside our own crew, patiently reviewing our practices and refining our procedures until he pronounced himself fully satisfied. He had never left Japan before in his life. In the fall [sic, spring] of 1982, Mr. Onozaki dispatched his daughter and son-in-law to America to work for several months in the miso factory just to make absolutely certain that everything remained kosher. In late 1985, John and Jan Belleme turned over the operation of the factory they had built to their successor, Don DeBona, who remains as miso factory manager to this day. Three books and many projects later, the circle comes round again as the Bellemes are now Mitoku's U.S. representatives.

"Although our miso was sold only in bulk for its first two seasons, our familiar tubs with the Miso Master logo soon arrived on the scene and sales slowly but steadily grew. Starting with eight barrels, we added six in 1986, seven in 1989, five in 1991, and fifteen more in 1993 for a total of 41 of these leviathans, each holding over four tons of two-year miso. In order to house our expanding activities, we built a second factory building as big as the first in 1992, and we are already experiencing a shortage of space once again as demand continues to grow. Two years ago we began to export our miso to Europe where it is distributed by Lima throughout the continent. The American Miso Company story continues on into the future." Address: Owner, Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1366. Great Eastern Sun. 1995. Pricelist. Effective June 5, 1995 [Mail order]. Asheville, North Carolina. 37 p. 28 cm. • ***Summary:*** Contents: Catalog information. Miso Master organic miso (traditional, mellow, or sweet). Sweet cloud organic sweeteners. Haiku organic Japanese tea.

GES organic English tea. Emerald Cove sea vegetables. Emperor's Kitchen condiments (soy sauce, vinegars, ume plum products, toasted sesame oil, mirin, dried vegetables, shiitake mushrooms, beans, seeds, grains, dry condiments, Atlantic sun-dried sea salt). Traditional Japanese macro pasta. Traditional Japanese specialty items (misos, candies, seaweed and ume, organic pasta, liquid condiments, specialty products {snow-dried tofu, HamaNatto, Zenryu fu (round cakes of wheat gluten), shonai fu (flat sheets), organic brown rice koji, organic nuka rice bran, organic brown rice dinner with azukis [azuki beans], or with vegs, mochi (4 types), noodles (some or bifun rice noodles), ume products, teas, pickles (incl. natto miso chutney)}, personal care products, kitchenware, knives). Address: 92 McIntosh Road, Asheville, North Carolina 28806. Phone: 704-252-3090.

1367. Natural lifestyle magazine and mail-order market. Spring. 1995. Asheville, North Carolina: Natural Lifestyle Supplies. 55 p. Catalog. 28 cm.

• ***Summary:*** A macrobiotic mail-order catalog with several nice articles, it sells many types of soyfoods and related products, including the full line of Kushi Cuisine, organic soybeans (yellow and black), Rice Dream soymilk (p. 27), Edensoy soymilk, Westbrae Malteds, Nasoya Vegi-Dressings, Nayonaise, Farmhouse Tekka, organic soy sauce, fresh tofu, snow-dried tofu, organic miso (from Miso Master and Japan–Onozaki, and Hatcho Miso), instant miso soups (Mitoku and Fantastic Foods), South River American Miso, and tamari roasted nut mix.

Plus: Mochi, kuzu, sea vegetables, shiitake mushrooms, umeboshi and ume "plum" products, azuki beans, amazake, Corona hand mill, water filters, organic cotton clothes, cookbooks, etc.

Publisher: Tom Athos. Editor and graphic design: Debbie Athos.

On page 5 is a nice ½-page article, "Dr. Spock goes macrobiotic." It begins: "I've been practicing transcendental meditation twice daily since my late seventies. I swim every day, and I try to take short walks after meals. I go to bed at 9 p.m. and get up at 5 or 6 a.m. I do 50 minutes of Yoga stretches each morning. Mary gives me daily massage for my weakened legs. I've been eating a macrobiotic diet for two years. It includes practically no fat, no meat, no sugar and no dairy products. I lost fifty pounds in the first few months and I was eating as much food as I wanted.

"Turning point: Until a few years ago, my health had gradually deteriorated, beginning with a heart arrhythmia at age 65. In 1987 my heart stopped altogether, long enough to drop me face first on the marble floor of the Copley Plaza Hotel in Boston. So they sewed a pacemaker under my skin, with an electric wire into my heart to keep it beating adequately. Three years ago I had a brief stroke-like episode that reduced my talk to gibberish for 15 minutes, and I was put on a blood thinner to prevent a more serious stroke. My legs were gradually getting weaker and less coordinated; the neurologist said it would be progressive. For a year I had repeated attacks of severe bronchitis that required antibiotics; that scared my internist. In 1991, I was introduced to a Belgian-trained physician who had become a macrobiotic counselor. He put Mary and me on a macrobiotic diet." His health improved steadily. "I feel much more alive and alert. After dropping 50 pounds, I lost all my subcutaneous fat, so I get cold easily,... My cholesterol level has gone from over 200 to 123; Mary's was 285 and is now 124. We found that our annual pharmacy bill went from $5,000 to $780."

"Once you decide to take your healing into your own hands, any sense of powerlessness and hopelessness ebbs away." Address: 16 Lookout Drive, Asheville, North Carolina 28804-3330. Phone: 1-800-752-2775.

1368. Evans, Barry. 1995. Chronology and history of Oak Feed Miso, Inc. and American Miso Co. of North Carolina. Part I. 1947 to 1979 (Interview). *SoyaScan Notes.* Aug. 25. With follow-up talks on 4 Dec. 1999, and 29 June and 2-7 July 2000. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Barry was born on 25 Feb. 1947 in Reading, Pennsylvania. His father was in the army reserves. He has been an avid reader since he was about age 9. He did very well on his SAT exams, and entered Princeton University in the fall of 1965 on an ROTC scholarship; there he majored in history, a subject in which he is deeply interested to this day. After 3 years he left Princeton (in a squabble over a project) and attended Temple University in Philadelphia for one year. Returning to Princeton for a fifth year in college, he graduated in 1970. He has been a "natural foods enthusiast" since he was in college. He entered the U.S. Army in Feb. 1971, living off post at Fort Knox (Kentucky), formally applied as a conscientious objector, and was honorably discharged in Aug. 1972 with full veteran's benefits. He returned to Temple Univ., enrolled in a PhD program in history, but left after 3½ semesters. In June 1974 he became a vegetarian–though he regularly eats fish. In 1977, while living in Coconut Grove, Florida, he first heard about macrobiotics and heard Michio Kushi speak in Coconut Grove. He became a devoted follower of macrobiotics, which he still is. Barry heard about the miso venture through Kathy Kashdan, his housekeeper, who was the sister of John Belleme's ex-wife. Sandy Pukel (pronounced pyu-KEL), who owned the Oak Feed Store, was the pasha (local chieftain) of the large macrobiotic community (satrapy) in Coconut Grove. Sandy was also extremely close to Michio, and they were often in touch. Sandy was probably Michio's closest friend among American followers of macrobiotics. The day after Michio's lecture, Barry went to Sandy's Oak Feed Restaurant (where he had previously spent much time) and asked to see John Belleme, the manager of Oak Feed Store, who was seated at a table in the Oak Feed

Restaurant with Sandy Pukel, talking with Edmund Benson about the miso company idea. Barry walked over to the table and introduced himself, and said he might like to be involved with the miso company; neither he nor John knew one another, but their paths were soon to become deeply intertwined.

1978 fall–Sandy Pukel, John Belleme, and Michio Kushi start to discuss the idea of a miso manufacturing company in America. John Belleme became interested in this idea in the fall of 1976 in Brookline, Massachusetts.

1978 fall–Various people buy shares in the new miso company. Jim Kenney $5,000. Frank Head intended to buy shares, but never did. At either that time or later Edmund Benson invested about $25,000 of $50,000 that he had formerly pledged.

1978 fall–Pukel and Belleme make a deal through a real estate agent to buy the property in Rutherfordton, North Carolina, on which the American Miso Co. now stands. As Barry recalls, this was the very first concrete move toward starting a miso company other than John taking Japanese Berlitz lessons, which he started at about the same time. They bought something like an option on the property. They put something like $1,000 to $5,000 down as good-faith money and had about 6-12 months to come up with the rest of the down payment of $15,000 to $20,000. John Belleme rode up to North Carolina on his motorcycle to help make the down payment and sign the original land deeds *before* Barry invested any money. Maybe John also rode up again later.

1979 Feb. 28–Oak Feed Miso, Inc. is incorporated. The initial directors and officers are Sanford J. Pukel (President, 3030 Grand Ave., Coconut Grove, Florida 33133) and John Belleme (Secretary-Treasurer, 5490 W. 1 Ct., Hialeah, Florida 33012). It is not clear who owns how much stock at this time. Oak Feed Miso was discussing a joint venture with Erewhon to establish the actual factory, which would then be called the Erewhon Miso Co.

1979 April–Five of the six months have passed. Barry (now age 32) becomes involved as an investor in the miso company, contributing initially $50,000, which more than covers the urgently needed down payment. He thinks Sandy could have found a way to make the next land payment without his money, but perhaps not easily. Barry had not been previously involved in the miso project in any way. Barry believes that by this time Sendai Miso-Shoyu and Mitoku (Mr. Kazama) had very little interest in serious participation in the Erewhon Miso Co. Michio may have wanted them to be involved, but they did almost nothing to demonstrate their interest. At best they may have said "keep us posted." But nothing ever happened.

1979 Oct.–John and Jan Belleme leave for Japan to study miso making. After "camping out" in Mr. Kazama's office for a while, he ends up studying with Mr. Onozaki. Barry's investment helps, but the checks sent to the Bellemes in Japan are written by Sandy Pukel on the Oak Feed Miso account.

1979 Nov. 18–Barry is in a horrific bicycle accident in Pennsylvania. He flies over the handlebars, into a field, breaking 5 vertebrae and 9 ribs. After a 14-hour operation, he spends 6 months flat on his back in the hospital and 1 year in a full-body cast. He was paralyzed from the waist down for quite some time. He did not eat one bite of hospital food; he had all natural-food meals brought in. Continued. Address: Owner, American Miso Co., Inc. and Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1369. Evans, Barry. 1995. Chronology and history of Oak Feed Miso, Inc. and American Miso Co. of North Carolina. Part II. 1980 (Interview). *SoyaScan Notes.* Aug. 25. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: 1980 June–John and Jan Belleme return to the USA from Japan. A letter shows that by late summer John had started to order miso-making equipment. Barry is sure that the wooden vats come from Arrow Tank Co. (Buffalo, New York) the only traditional barrel maker left in the United States–a very interesting place. The vats are all traditionally made, from old recycled wine barrels and other old wood. Over the years, the miso company has bought all its vats from Arrow Tank Co. The first 35 vats were cypress, but when those ran out, the next five were fir (they took a long time to season), and last 5-6 were redwood (they worked better).

Concerning Joseph and Patricia Carpenter: Barry never met them and he understands that their being asked to leave when the Bellemes returned was a traumatic, landmark event in their lives. Barry was once in prison for 32 months, and was on probation for three years after that, and was awaiting prison for 2 years before he actually went. But when it was over, he let it go and went on with his life. After John returned from Japan, Barry heard about the Carpenters situation from John and Sandy, who said (generally) that they had not done much while they were there, and they did not seem very motivated. But, in all fairness, maybe they didn't have any clear instructions as to what they were supposed to do. For him, their whole role in the miso company was always very hazy. But until Barry took a hand in things, the whole company was very "loosey-goosey." Nobody had any clear instructions as to what was to be done. Only John and Jan Belleme know the details of what actually happened. Sandy is a "conflict avoider" so he would have been ambiguous. John was not a conflict avoider. John, who was never a hippie and was very yang after his stay in Japan, came back to find these two hippie types on the land. "This culture clash may have had a lot to do with it." Also, there was only one house, so the two families would have had to live together.

1980 summer–Each time the company needed more money, they would come to Barry–since he was the only

one they knew who had any and was willing to invest it. This summer, when the building had to be constructed, the equipment ordered and paid for, and land payments made, Barry started to invest a lot more money, and to own more and more shares. When he invested his second $50,000 he began to pay more attention to who else owned shares. "As I began to sniff the wind a little more, I sensed that I was surrounded by phantom shareholders, and was the only one actually investing any money." Sandy and Michio didn't want Barry to be on the board of directors, and they wanted his stock to be Class B, which did not enable him to vote–even though he was now the leading investor. Barry confronted Michio on this while on an airplane en route from Boston to Florida; Sandy was also on the plane. Barry made it plain that he would not invest any more money (he was being asked for about $90,000 more) unless he could be on the board of directors, and all the stock (not just his) would be voting stock. Michio and Sandy reluctantly agreed. All this came to a head at an important meeting in Miami in the summer of 1980, shortly after John and Jan returned from Japan.

When the Belleme's returned from Japan, people began to realize that this miso company might really happen. Negotiations had been taking place throughout 1979 and 1980. Three or four versions of an ownership contract / agreement had been presented but never signed; there would be 14-15 more over the next year, and none of those was ever signed either. The negotiations ended with Erewhon's bankruptcy. The discussions were really between the Erewhon group (comprised of Michio, Aveline, Morris Kirsner–their attorney–and Evan Root) and the Oak Feed Miso group (comprised now of Barry, John and Jan Belleme, and David Young–their attorney). Sendai Miso-Shoyu and Mitoku were not even mentioned; they were out of the picture. Mr. Kazama, owner of Mitoku, probably feared and doubted the potential new American miso company. "The issue was: Who would control the company, Erewhon or us? And how many shares would each person or company own?" Each group wanted to own a majority of the shares. This meeting went on for several days at various places, including restaurants, the Oak Feed Store, and the office of David Young–the Oak Feed Miso group's attorney. Note: See also meeting of 27 Sept. 1981.

Barry, who was on crutches, flew in from Reading, Pennsylvania, accompanied by his close friend and confidant, Saul Goodman, a macrobiotic healer and shiatsu practitioner. Barry could not travel by himself, and this was the first trip he had taken after his bike accident. David Young was concerned that the Oak Feed group was being asked to put up almost all of the money yet would not have control; yet he was ambivalent. Sandy Pukel was a member of the Oak Feed Miso group, but he was also ambivalent; he was really on Michio's side. He felt that Erewhon's participation was absolutely vital, and whatever had to be given up to get that participation was appropriate. Everyone should trust in Michio, and Michio would provide.

Sandy was and is one of Michio's closest friends and confidants in the whole world. Sandy and Mona Schwartz were the co-heads of the Florida Macrobiotic Association. An excellent macrobiotic teacher and cook, Mona ran a study house in the Miami area, where Barry ate many of his meals for the first several years that he was practicing macrobiotics. So did Dr. Keith Block. Mona first told Barry how close Michio and Sandy were, and how much each influenced the other's thinking.

Barry recalls that Michio and his attorney, Morris Kirsner, were so demanding and unreasonable in what they wanted that even Sandy hesitated. He wanted to give them more than Barry and John, but he didn't want to give them everything they wanted. Negotiations dragged on and on because they were taking this unrealistic negotiating stance. So it was easy for Barry and John, who saw increasing signs of weakness in Erewhon, to begin to fight a war of attrition and prevent anything from happening.

The Board at that time had five members–including John Belleme, Sandy Pukel, Edmund Benson, Barry, and one other person–which was probably not Michio. Only four other people besides Barry invested money in the miso company: Edmund Benson $20,000, Frank Head (who started Mountain Ark) $5,000, the Japanese cook at the Oak Feed Restaurant (Yozo Masuda) $10,000, and Jim Kenney $5,000. Barry bought out the first two, and Jim died before the company began operations. Sandy Pukel, as one of the company's founders, got a number of "founders shares" for free, which Barry eventually bought back from him.

1980 fall–A document shows that at this time "John and Jan go on Erewhon payroll and start construction of Erewhon Miso in Rutherfordton, North Carolina." They begin by leveling the land. They went on the payroll of the Erewhon Trading Co., not the Erewhon Miso Co., since the latter company did not have a payroll and never really existed. Of course, Michio and Aveline owned Erewhon and all or most of its stock. Barry recalls that Erewhon was supposed to put up a certain amount of money for their share of the joint venture, and then provide the additional services of buying all miso made by the new miso company, packaging, and distributing it.

Barry recalls that much of the automatic miso-making equipment came from Japan–some or all of it from the Fujiwara Brewing Co. in Hiroshima. John visited them in 1983 when the miso company was considering adding a soy sauce plant near the miso plant. Continued. Address: Owner, American Miso Co., Inc. and Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1370. Evans, Barry. 1995. Chronology and history of Oak Feed Miso, Inc. and American Miso Co. of North Carolina. Part III. 1981 to 1982 (Interview). *SoyaScan Notes*. Aug. 25.

Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: 1981 Jan. 31–Oak Feed Miso, Inc. IRS tax returns (for the fiscal year ending Jan. 31) show losses of $89,000 for the last year with no sales. Note: The land was purchased on a mortgage, with about $20,000 down payment.

1981 March–The miso building is essentially complete, but some equipment still had to be ordered–from Japan and the USA.

1981 early–Michio and Aveline Kushi can see that Erewhon is heading for bankruptcy. They try urgently to raise money. Sandy Pukel loans the Kushis $100,000– and thereby wins their eternal gratitude and friendship. Sandy never gets the money back. Barry is upset, because he believes that this was money he gave to Sandy as his investment in the miso company. Essentially, Barry then had to give Sandy more money which he finally did invest in the miso company–as follows: Sometime later in 1981, to make things more complicated, Sandy (who is now short of cash) asks Barry if he would be willing to invest in Oak Feed Store and Restaurant with the understanding that Sandy will use the money to buy the shares he had pledged to buy in Oak Feed Miso, Inc. Barry accepts the deal, and Sandy invests the $80,000 to $90,000 in Oak Feed Miso–which makes Barry happy.

1981 July–The opening ceremony for Erewhon Miso Co. is held at Rutherfordton, North Carolina. This was "the crowning moment of the early phase of the miso company. We were all still together at that point, including Michio. We had a big, beautiful sign out on the road in front of the factory, put up for the opening ceremony, that read 'Erewhon Miso Co.'–even though that was never the name of the company. The delegation from Erewhon was Michio, Aveline, and Evan Root. Evan was overwhelmed by the emotion of it all–just crying like a baby. John and Jan Belleme were there, as was a woman from Asheville who did the photography. Sandy Pukel must have also been there, though Barry has no clear recollection of this. Yet tension between Barry and Sandy had been growing. "Without Sandy and Michio, the project never would have happened." By now many people could see that Erewhon was headed for bankruptcy, but "Even at the time of the opening, everyone thought Michio would pull another rabbit out of his hat in the end," to save Erewhon. In late summer and early fall Barry attended several meetings called to discuss Erewhon's perilous financial condition. These meetings were all held in the area of Boston, Massachusetts, sometimes in the office of Morris Kirsner, the Kushi's attorney. Barry was invited largely because they hoped he would help bail out Erewhon.

1981 Aug.–John and Jan Belleme start making miso in North Carolina; the soybeans and grains are contributed by Erewhon Trading Co. But by August or September the Kushis can see that Erewhon's bankruptcy is imminent, so they stop sending John his paycheck and additional raw materials. This creates a crisis; everything must be rethought with Erewhon out of the picture. John may have sent out feelers to Westbrae and Eden to see if they wanted to take over Erewhon's role as distributor of the miso–they didn't.

1981 Sept. 27–At an annual meeting of Oak Feed Miso, Inc. all shares are converted to Class A voting shares. Major shareholders are: Barry Evans 1400 shares. Sandy Pukel 1400 shares. John Belleme 900 shares.

1981 Nov. 18–Erewhon Trading Co. files for bankruptcy protection under Chapter 11 of the federal Bankruptcy Act. For the next several months, "various wolves were circling around, trying to grab hold of the half-dead body. Finally U.S. Mills and Nature Food Centres Inc. grabbed it and dragged it off to its lair." As part of the deal, Michio had to agree that he would only do endorsements through the new owners. So Michio, who had lost control of his own destiny for quite some time, could not be involved with the miso company any more. Barry thinks Sandy realized that and his heart went out of the miso company project at that point. Consequently, all deals between the miso company and Erewhon come to an end. Barry thinks that Erewhon Trading Co. invested a total of about $15,000 in the miso company in the form of payments and miso ingredients. After Erewhon was purchased out of bankruptcy, the new owners, Chuck Verde and Cynthia Davis, never got this investment back. When they called, Barry took the position that the costs and difficulties the miso company had endured because of Erewhon's collapse were much greater than $15,000. Barry added that if they took the matter to court, he would sue them for breach of contract. In fact, the miso company barely survived that collapse.

Over the past four months Barry, who admires Michio as a spiritual leader, has come to realize that he cannot be counted on to help establish the new miso company. He has grown tired of all the difficulties with Erewhon and Michio; as a practical businessman, he was "a nightmare."

1981 late–Marty Roth now enters the picture. When John Belleme left his job as manager of Oak Feed Store to study miso in Japan, Jim Kenney took over from him. Jim was an epileptic; while traveling on vacation in East Asia about a year later, he died tragically at about age 27–Barry heard he choked on the seed of an umeboshi salt plum that he was using to try to control an epileptic fit. So in about July or August 1981 Sandy brought in Marty Roth, who had been running the Natural Cafe in Santa Fe, New Mexico. Marty was soon working as manager (or assistant manager) of Oak Feed Store. Marty (a very inventive and creative guy) and Barry (a co-owner of the store) quickly find they get along well and work together effectively. Marty didn't want to stay in Miami, and his job with Sandy wasn't working out. When Marty told this to Barry, Barry said that he was planning to establish his own import company in North Carolina, and that company was also going to take over distribution for the miso factory. It is not crystal clear to what extent Barry lured

Marty away from Oak Feed Co. and to what extent Marty would have left anyway.

1981 Dec.–Great Eastern Sun (GES) is organized. The first employee and manager is Barbara Arrow, who arrived in Dec. 1981.

1982–Jan. GES orders its first container of natural foods from Mitoku (Mr. Kazama) in Japan.

1982 Jan. early–Marty Roth moves from Florida to North Carolina to run Great Eastern Sun (GES)

1982 Jan.–Barry makes another investment in the miso company and thereby replaces Sandy Pukel as the largest shareholder. Barry buys out remaining shareholders–except Jim Kenney who is no longer living. Sandy proposes to Barry a deal whereby he would trade Barry all of his stock in the miso company for all of Barry's stock in Oak Feed Store. Barry accepts, but with the added condition that Barry could import goods from Mitoku in Japan.

1982 Jan. 4–Barry Evans sends out a letter on American Miso Co. letterhead to potential customers that begins: "Dear Friends–We at The American Miso Company are proud to announce the opening of our miso shop in Western North Carolina." It ends: "The Lindenself Foundation, doing their business as Linden's Elf Works, located in Piedmont, North Carolina, has been appointed as the sole agent in marketing and distribution of The American Miso Company brand products... Your phone contact is John Troy at... 919/364-2723. Enclosed is the Linden's Elf Works distributor price sheet which includes all the pertinent information for your upcoming Spring catalogue. With kindest regards, Barry Evans, President." When Marty Roth sees this announcement, he argues that GES should distribute AMC's miso; Barry agrees. So John Troy and Elf Works never did distribute any AMC miso.

1982 Jan. 31–Oak Feed Miso has losses of $67,000 for the previous year with no sales. Total loss: $157,000.

1982 Feb. 26–Sandy Pukel and Barry Evans sign an agreement whereby Sandy gets out of Oak Feed Miso and Barry gets out of Oak Feed Store and Oak Feed Restaurant by an exchange / trade of stock. Barry recalls that Sandy left the miso company reluctantly for two reasons. First, because he saw the miso company as "his baby" and he liked to be in control–not so much because he saw it as a company with a bright and profitable future. And second, because Michio wasn't involved any longer, and couldn't be because of what had happened to Erewhon. Barry never asked Sandy (or any of the other shareholders) if he could buy their shares. They all approached him with the idea. First, for example, Edmund Benson wanted to get his money back, so Sandy bought his stock. Yozo Masuda's stock was included in the deal with Sandy.

1982 March 22–Great Eastern Sun is incorporated.

1982 April 19–At the annual meeting of the shareholders of Oak Feed Miso, the name is officially changed to American Miso Co. This change is filed with the state of Florida on 5 May 1982, and signed by Barry Evans and Janet Belleme. The final stamp of filing is 19 May 1982. Barry notes: "In numerology, this date (May 19) is a 44 number, since 5 + 19 + 1 + 9 + 8 + 2 = 44. Forty-four is the number of ultimate business success." Barry did not plan to incorporate the company on this date. "It was just the order of the universe."

1982 May 18–Great Eastern Sun sells its first food products to a natural food store; they were imported from Japan.

1982 mid- to late- The principals of the American Miso Co. are now Barry Evans, John and Jan Belleme, and Mrs. Kenney. Barry started with 1,400 shares, got 1,400 from Sandy, 100 from Yozo, 250 from Edmund, and 200 from Gary Dukeman (a friend of his)–for a total of 3,350. John and Jan had about 850 shares. John had been given about $20,000 worth of shares as a founder of the company, and because he went to Japan to learn how to make miso, and because he had worked for a modest salary (less than $20,000/year) as a miso maker in North Carolina. Mrs. Kenney had 50 shares. On a percentage basis, Barry owned 78.9% of the miso company, John and Jan Belleme owned 20%, and Mrs. Kenney owned the rest. Continued. Address: Owner, American Miso Co., Inc. and Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1371. Evans, Barry. 1995. Chronology and history of Oak Feed Miso, Inc. and American Miso Co. of North Carolina. Part IV. 1983 to present (Interview). *SoyaScan Notes.* Aug. 25. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: 1983 Oct. 1–Barry desires to buy and John and Janet Belleme desire to sell all their 900 shares in the American Miso Company. John agrees to work as a consultant for 6 months and to train a person to take his place. Barry wants to run the company in a more "commercial" way than John does, starting with major price increases.

1984 Jan. 31–American Miso Co. has gross receipts or sales last year of $61,941, annual losses of $68,367, and total losses from day one of $306,633.

1985 Jan. 31–American Miso Co. has sales last year of $107,000, annual losses of $21,000, and total losses from day one of $327,000.

1985 Dec.–John Belleme leaves American Miso Co. because of a conflict with Barry Evans. Don DeBona, who arrived in the spring of 1985 and worked with John for 6 months, takes over. A year or two before John left, Sandy purchased his shares in American Miso Co.–because John wanted him to. John felt that Barry was making decisions with which he did not agree, and that he shouldn't have to suffer financially if they turned out to be bad decisions. Barry did not want John to leave, but neither did he want John to be in control of the business. Barry recalls that there was a big conflict and bad feelings between him and John at the time

John left.

1986 Jan. 31–American Miso Co. makes its first profit during the past year of $22,000. Gross revenues or sales were $214,000 and total losses from day one decrease to $304,000. Notice the big jump in sales. Barry instituted a 50-70% price increase, over John's protests. Note: Barry never went to business school, but he learned to be a good businessman in the "school of hard knocks."

1987 Jan. 31–Sales last year of $262,000, profit of $101,000 (up 4.6 fold), and total losses to date of $203,000. Now–sales only for the following fiscal years: $252,000 in 1988, $275,000 in 1989, $315,000 in 1990.

Then the fiscal year end changes to Aug. 31 to coincide with that of Great Eastern Sun. Sales are $161,000 in 1991, $392,000 in 1992, $435,000 in 1993, $505,000 in 1994, and $550,000 in 1995. In 1995 the total losses carried forward go to zero for the first time. In other words, including his salary, Barry first broke even this year.

1992 Jan. 2–Barry takes a federal vacation, returning to the company on 1 Sept. 1994.

1997 Oct.–Don DeBona decides to leave AMC. The broad issue was control. It was a sad day for Barry. Don owned no shares in the company and, after having been there for ten years, he wanted to own a significant part of the company, and be able to build up equity, if he was to continue. Barry was unwilling to give him that ownership, so he quit–but continued to live in his house on the property. "It was not a very pleasant parting."

2000 July–In the early years, no koji was made each year during the hot months, from about June until August or mid-September. Now, however, the koji-makers are so skilled that they make it during those months, but outside of the koji room on open tables. This helps to meet the steadily growing demand. Today, with a crew of eight (including 4 packagers), AMC makes about 350,000 lb/year of miso (about 7,600 lb/week) and might possibly be able to expand this to 450,000 lb/year with its existing buildings.

2000 July–Almost all the early American Miso Co. records (including payables, receivables, invoices, payroll records, etc.) are kept in many cardboard boxes in a storage area in Asheville–but they are not well organized. Records from the first year or two (1979-80) may be missing entirely. One of these days Barry would like to get these AMC records organized. may be missing. The Great Eastern Sun records are intact from the beginning and are well organized.

Barry: "I have tried to tell you this story in a fair and dispassionate way. No one should think that I was the dogged person hanging on, or the prime mover of everything. But it was really just the flow of circumstances. I was just swept along, and countless times I was scared to death and wished I had never gotten involved, and spent sleepless nights ruing the fact that I had made such a fool out of myself, and thought things would never work out, and would end in disaster." But actually the company has experienced nice, steady growth.

Note: Barry planned to buy South River Miso Co. within 1-2 weeks after this interview and was 90% sure the deal would go through–but it never did. Address: Owner, American Miso Co., Inc. and Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1372. Anthony, Mary S. 1995. CHD protection by soy and its phytoestrogens: Beyond plasma lipid concentrations. *Soy Connection* (*The*) (*Chesterfield, Missouri–United Soybean Board*) 3(3):1, 4. Summer. [6 ref]
• ***Summary:*** "Reducing plasma lipid concentrations may not be the only way soy protects against coronary heart disease. Evidence suggests that soy and its phytoestrogens affect the composition of lipoprotein particles, which may make them less atherogenic. Greater understanding of alternative mechanisms may have a greater impact on improving cardiovascular disease." Address: M.S., Research Asst., Comparative Medical Clinical Research Center, Bowman Gray School of Medicine, Wake Forest Univ., Winston-Salem, North Carolina 27157-1040.

1373. Rice, M.M.; Graves, A.B.; Larson, E.B. 1995. Estrogen replacement therapy and cognition: Role of phytoestrogens (Abstract). *Gerontologist* 35:169 (Abst.). *
• ***Summary:*** Some research, and certainly anecdotal reports from both women and physicians, point to the influence of estrogens in memory and cognitive function (CF). Thomas B. Clarkson (DVM of Wake Forest Univ. School of Medicine, Winston-Salem, North Carolina) has spoken of an interesting study on Japanese-American women, age 65 or older, living in King County, Washington state. It found that those women who took estrogen and ate tofu less than three times per week had better CF than non-estrogen users. But estrogen users who ate tofu more than 3 times per week lost estrogen's protective effect on cognition. This study raises the concern that soy may interfere with the effects of estrogen in the brain.

1374. American Soybean Association. 1995. Resolutions and directory: 1994-95. St. Louis, Missouri. 68 p. 23 x 11 cm.
• ***Summary:*** Contents: Introductory information: ASA history highlights [by Steve Drake, contains some misleading statements], how the soybean association is organized, policy process of the soybean association, ASA executive committee, ASA committee assignments, statement of operations summary. 1994-95 Resolutions: Definition, purpose, mission, goals, ASA vision. I. Exports, market development and trade policies: Preamble, government support of market development and export sales, quality and grading standards for soybeans and soybean products, trade policy, assistance to developing nations, Third World debt.

II. Domestic issues and farm policies: Preamble, domestic market promotion, soybean policy, farm program

payments, Commodity Credit Corporation, transportation, farmer appointment to regulatory boards, edible oil content labeling, soy foods, crop insurance, equity protection of grain, soybean trading, family farm continuation, energy policies.

III. Research, education, and natural resources: Preamble, research, extension and education priorities, coordinating and funding research, extension and education, soybean research centers, biotechnology, varietal protection, conservation and natural resources, crop protectant materials, water quality.

IV. Organizational affairs: Preamble, scope and control, membership statement, state membership, uniform financing, industry support and cooperation, public affairs, general farm organizations.

General resolutions. ASA bylaws. 1994-95 soybean leader directory.

From ASA history highlights: 1960s–Soybean stocks became burdensome as production exceeded usage. High dependency on government and private industry for research and market development funding led farmers to initiate farmer-funded checkoff programs. 1964–States began to form soybean associations affiliated with ASA to involve more farmers. Note: This statement could be misleading. The first state soybean association was the Minnesota Soybean Association, founded on 6 December 1962 at St. Paul by Minnesota soybean growers. Next came the Mississippi Soybean Association, established on 3 December 1963. In 1964 the ASA amended its bylaws to allow affiliation with these two organizations.

1968–States involved with ASA resolved to initiate work on state-by-state passage of legislation to enable first point of sale deduction of one-half to one cent per bushel. Farmer-elected boards of soybean farmers would control funds for market development and research. Note: This too is misleading. On 9 Sept. 1966 soybean farmers in North Carolina passed a referendum that started America's first checkoff program. They paid ½ cent per bushel on 1966-crop soybeans. Address: P.O. Box 419200, St. Louis, Missouri 63141-9200. Phone: 314/576-1770.

1375. Beversdorf, W.D.; Buzzell, R.I.; Ablett, G.R.; Voldeng, H.D. 1995. Soybean. In: A.E. Slinkard and Douglas R. Knott, eds. 1995. Harvest of Gold: The History of Field Crop Breeding in Canada. Saskatoon, Saskatchewan: University Extension Press, Univ. of Saskatchewan. ix + 367 p. See p. 153-66. Chap. 13. [14 ref]

• ***Summary:*** An outstanding history of soybean breeding and production in Canada. Contents: Introduction. Evolution of the soybean crop in Canada. Early breeding efforts. The emergence of soybean as a significant Canadian crop (1940-70). The modern soybean breeding era [1970 on]. Current breeding objectives and methods.

Before 1930, soybeans were "grown primarily for annual forage production when traditional forage crops failed to survive Ontario winters." The appearance of two short-lived soybean crushing facilities in southwestern Ontario [at Milton in about 1930 and Chatham by April 1933] aided the transition of soybeans from a fodder crop to a grain legume crop.

"Evolution of Canada's soybean crop since 1949 reflects the expertise of soybean producers, dramatic improvement in production technology, improved and earlier maturing cultivars, improved domestic processing capacity and significant export market development."

"Soybean in Canada was born in the vision of C.A. Zavitz, arguably a man 50 years ahead of his time. Zavitz, who was head of the Field Crop Department of the Ontario Agricultural College (OAC) meticulously evaluated and selected soybean introductions for both fodder and grain production for 30 years (Zavitz 1927)."

"In 1893, Zavitz planted the first Canadian soybean crop, probably as a replacement for a field pea that failed to establish that year." Over the years, "Zavitz and two of his colleagues W.J. Squirrel and A.E. Whiteside, evaluated about 100 soybean introductions from the Orient [East Asia] via the United States and Japan for forage and grain production (Zavitz 1927)."

Early soybean breeding in Canada (before 1920) primarily involved the meticulous separation and selection of pure lines from heterogeneous seed introductions. "For example, Zavitz selected and evaluated 34 lines from nearly 10,000 plants from the Habaro cultivar obtained from the" USDA in 1909 (Zavitz 1927).

In 1923 A.E. Matthews and F.W. Dimmock of the Central Experimental Farm (CEF [part of the Dominion Experimental Farms]) conducted a soybean trial at the Harrow Research Station (HRS). "Dimmock continued soybean testing at Harrow until 1929, when Casper Owen took over (Ward 1978)."

The pioneering work of Zavitz (OAC), Dimmock (CEF) and Owen (HRS) to identify and develop soybean varieties adapted to southern Canada created "a base of soybean germplasm and technical knowledge that would support evolution of the soybean crop during and after" World War II.

During and after the war, the main soybean breeders in Canada were C.W. Owen at HRS and F. Dimmock at CEF. Varieties released after 1940 were mainly the result of pollinations among earlier selections from plant introduction and of pedigree selection procedures (Bernard et al. 1988).

The rapid growth in Canadian soybean production in mid-1940s can be attributed to: A large growth in the demand for oil and protein during the war, the appearance of Victory Mills Ltd. in Toronto, improved varieties, promotion and extension efforts by Ivan M. Roberts (of the Field Husbandry Dept. of OAC in 1948 but agronomist for Victory Mills by 1953), and improved inoculant produced by the

Microbiology Dept. of OAC. From the 1940s until the late 1970s nearly all of Canada's soybeans were produced in five southwestern Ontario counties: Elgin, Essex (incl. Pelee Island in the middle of Lake Erie; a southernmost point in Canada), Kent, Lambton, and Middlesex (see map near front of book).

Key soybean varieties of the period 1940-1970 are shown in Table 3. One key variety was Harosoy, released by HRS in 1951. Other key soybean breeders were Baldur Stefansson (from 1952) at the University of Manitoba that lead to Portage and Altona. G.E. Jones (from 1953) at OAC that led to Vansoy. John Giesbrecht (from 1959) at Morden (southern Manitoba) that led to Morsoy. A.A. Hildebrand was a pathologist who pioneered early research on phytophthora root rot; he worked with Owen to establish a program of disease resistance breeding at Harrow.

The 1960s: In 1961 Dimmock retired from CEF and was replaced by Lorne Donovan as an adjunct to his corn breeding program. In 1963 Owen retired from HRS and was replaced by R.I. Buzzell. Very early maturing introductions came from Sven Holmberg of Sweden. "Holmberg's material proved to be significant germplasm for Canadian soybeans. He derived it from crosses involving Manchurian and northern Japanese germplasm selected under the cool short-season environments (58º30'N) of Fiskeby, Sweden (Tanner 1973)."

Harosoy 63 dominated Canadian soybean production by the late 1960s. During this decade "two Ontario counties (Essex and Kent) produced nearly two-thirds of the Canadian soybean crop."

In 1974 H. Voldeng took over the soybean breeding program at CEF. In 1976 W. Beversdorf joined the University of Guelph with split responsibilities in soybean and field bean breeding and genetics. In 1982 G. Ablett initiated a soybean breeding program at the Ridgetown College of Agricultural Technology (RCAT). In 1976 CEF released Maple Arrow, a milestone cultivar, with parentage that included a Holmberg line. Maple Arrow, which was well adapted to the short-season areas of Ontario, combined with the higher prices of the early 1970s, sparked a soybean expansion northward and eastward.

The last two sections of this chapter are the longest and most detailed.

Figures show: (1) Graph of soybean production in Canada, 1945-1991. (2) Average yield of soybeans in Canada, 1938-1992.

Tables: (1) Early soybean selections and evaluation (OAC No. 211, Mandarin, Habaro No. 20405, Early Yellow). For each is given: Average height (inches), green fodder production (tons / acre). Yield of grain (lbs / acre). Source: Zavitz 1927.

(2) Early Canadian soybean cultivars (OAC 211 {released 1923}, A.K. (Harrow) {1933}, Mandarin (Ottawa) {1934}, Kabott {1937}, Pagoda {1939}, Goldsoy {1938}). For each is given: Source (pedigree, e.g., Habaro). Institution (e.g., OAC). Year licensed or released (1923-1939). (3) Canadian soybean cultivars of 1940-1970 (Harman {released 1943}, Capital {1944}, Manchu (Montreal) {1944}, Harly {1951}, Harosoy {1951}, Acme {1953}, Comet {1953}, Hardome {1953}, Crest {1957}, Merit {1959}, Portage {1964}, Altona {1966}, Harwood {1970}, Vansoy {1970}). For each is given: Pedigree, institution, year.

(3A) Public and private breeding of soybeans, Canada and USA, 1973-1992. The impact of privately funded soybean breeding programs has increased steadily since 1973, when the first privately bred variety was registered in Canada. This "private" variety was bred by N.R. Bradner in the USA and introduced to Canada by St. Clair Grain and Feed (a division of Maple Leaf Mills Ltd.). In 1973 in Canada there were 170 acres of privately bred soybean seed compared with 14,181 acres developed by publicly funded breeders. In 1982 the figures were 6,066 and 27,354 respectively. In 1987 the figures were 28,148 and 29,960 respectively. And in 1992 the figures were 43,004 acres private and 26,727 acres public. In this 20-year period, 120 private soybean varieties and 51 public varieties were registered. 27% of the private varieties and 81% of the public varieties came from U.S. breeding programs.

(4) Typical breeding cycle in the University of Guelph breeding program. Columns: Year and season, activity, location. The typical cycle is about 8 years. (5) Canadian soybean breeding programs (1991): Columns: Organization (public sector and private sector). Breeder (6 + 5 = 11 breeders in both sectors).

The Ontario Soybean Growers' Marketing Board identified export opportunities for both large-seeded yellow hilum cultivars (for tofu and miso) and small-seeded cultivars (natto type) in Pacific Rim markets. "The first natto-type emerged from CEF [Central Experimental Farm, Ottawa] in 1981, six years after D. Durksen of Continental Grain Company reported the potential export opportunity for small-seeded soybean to Japan. King Grain (N.R. Bradner) and CEF (Harvey Voldeng) each released three additional natto-type cultivars (Nattoking 86, Nattoking 87, Nattoking 88, Canatto, Nattosan and TNS) during the 1980s" (p. 8-9). Address: 1. Ciba Seeds, Greensboro, North Carolina; 2. Agriculture and Agri-Food Canada Research Station, Harrow, Ontario; 3. Ridgetown College of Agricultural Technology, Ridgetown, Ontario; 4. Agriculture and Agri-Food Canada Research Station, Ottawa, Ontario.

1376. North Carolina Soybean Producers Association, Inc. 1996. By-laws. Raleigh, North Carolina. 6 p. Jan. 18. Unpublished typescript.

• ***Summary:*** These by-laws were first adopted on 7 July 1966 by the Board of Directors at Raleigh, North Carolina. Articles: 1. Purposes and powers. 2. Membership and financial support. 3. Directors and officers. 4. Duties of

directors. 5. Duties of officers. 6. The executive committee: Its powers and duties. 7. Members meetings. 8. Association resolutions. 9. Amendments to by-laws.

Article 2 (part 2) states: "Financial support shall be derived from funds accruing from producers as a result of an assessment referendum held by authority of Article 50, Chapter 106, of the General Statutes of North Carolina as amended, associate memberships, the federal Soybean Promotion, Research and Consumer Act, and other sources."

1377. Anthony, Mary S.; Clarkson, T.B.; Hughes, C.L., Jr.; Morgan, T.M.; Burkes, G.L. 1996. Soybean isoflavones improve cardiovascular risk factors without affecting the reproductive system of peripubertal Rhesus Monkeys. *J. of Nutrition* 126(1):43-50. Jan. [41 ref]
• ***Summary:*** The authors fed peripubertal male and female rhesus monkeys moderately atherogenic diets in which the source of dietary protein was a soy protein isolate (20% by weight), "either containing phytoestrogens (also termed isoflavones) or with the phytoestrogens removed by alcohol extraction. The study was a crossover design with each period lasting for 6 mo. The phytoestrogen-intact soy protein (compared with the alcohol-extracted soy protein) had favorable effects on plasma lipid and lipoprotein concentrations, specifically by significantly reducing LDL + VLDL cholesterol concentrations in both males and females (~30-40% lower), significantly increasing high density lipoprotein cholesterol (HDLC) concentrations for females (~15% higher) and significantly lowering total plasma cholesterol (TPC):HDLC ratios (~20% lower for males and 50% lower for females). The phytoestrogens had no adverse effects on the reproductive systems of either the males or females, as evaluated by reproductive hormone concentrations and organ weights at necropsy." Address: 1-2. Comparative Medicine Clinical Research Center; 3. Dep. of Obstetrics and Gynecology; 4-5. Dep. of Public Health Sciences. All: Bowman Gray School of Medicine, Wake Forest Univ., Winston-Salem, North Carolina 27157-1040.

1378. Macdonald, Bruce. 1996. New developments at Macrobiotic Company of America (MCOA). Acquisition of Mountain Ark Trading Co. in Fayetteville, Arkansas (Interview). *SoyaScan Notes.* March 12. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Bruce's Macrobiotic Company of America (MCOA) used to sell tofu kits to Mountain Ark but then they stopped re-ordering because they planned to sell the company. When Mountain Ark was under the stewardship of Frank Head and others they were macrobiotic oriented. But 3½ years ago Frank sold the company to Ozark Cooperative Warehouse in Fayetteville. "There wasn't a person in that organization that ever had a bowl of miso soup in their life–I don't think. So they began to steer the company away from macrobiotics toward a mainstream natural food company. One of the first things they did was to put in a line of tomato products. So their macrobiotic customers began to run away."

MCOA acquired Mountain Ark on 1 Feb. 1996. Bruce purchased the company name, toll-free phone number, and mailing list of 5,700 customers. He did not purchase any of their inventory. The company is now located at 799 Old Leicester Highway, Asheville, North Carolina 28806–at MCOA. Phone: 1-800-643-8909. Bruce plans to carry the tofu kit on a regular basis–though it sells slowly. The kit is imported from Japan. The cost changes with each container imported. It retails for about $20-25.00. In Oct. 1993, Mountain Ark sold the kit for $36.99 + $4.95 shipping.

The innovation of this whole scenario is that, over the last 10 years or so, all of the companies that were involved with macrobiotics either went bankrupt or ran away from it. When Bruce took over MCOA 3 years ago he changed its direction and went headlong into becoming the largest variety supplier of macrobiotic foods on the planet. The company started to grow–even in the big natural foods stores–such as Fresh Fields. Macrobiotic foods is the most misunderstood category in the health food industry. For the big stores he printed up a best-seller list of 200 items that could be put in a "macrobiotics section." Now Bruce is in the process of putting macrobiotic sections in all the Fresh Fields stores. "Because we import direct then distribute direct to retail stores, we are able to offer them prices on these foods that are 25-30% less than a normal distributor. The old way of doing business was, for example, Eden Foods imports it, marks it up 30 or 35%, and sells it to Cornucopia, who marks it up 25-30% and sells it to the store." His wholesale and retail catalogs have a great selection of foods. The only difference is that the retail prices are 10% higher. These low retail markups give a real break to macrobiotic consumers. MCOA also provides information by phone.

Note: MCOA is owned equally by Muso Shokuhin of Japan and by Bruce Macdonald. Address: President, Macrobiotic Company of America, Asheville, North Carolina 28806. Phone: 704-252-1221.

1379. Macdonald, Bruce. 1996. Big problems at Kushi Macrobiotics (Interview). *SoyaScan Notes.* March 12. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Michio and Aveline have big problems on their hands at their new company Kushi Macrobiotics. "Basically, you've got a bunch of high rollers from the commercial food industry thinking that, with slick packaging and cheap ingredients, they can create a product line that is double the price of Fantastic Foods' and not nearly as good in quality... They just don't have a clue of the sophistication of the natural foods shopper. They've got five guys each making $125,000 a year, and they haven't sold a thing yet. Norio Kushi is making $80,000 a year, and he is barely at the level of knowing how to brush his teeth in terms of business

experience."

Its just amazing. They raise $1 million privately to start off with. They blew through that with surveys, etc. As Jimmy Silver said aptly, 'Basically what they found out with their million dollars was that people weren't interested in what they were selling.' What they are doing is basically the antithesis of what macrobiotics stands for. Then they proceeded to use no organic ingredients and made it a corporate policy to not use anything from Japan–except brown rice vinegar, of which they are buying a low quality product from Eden Foods. They then raised 6 million with a public offering, and now have less than $4 million left. They are going through money like crazy. They have a 40,000 square foot warehouse in New Jersey, with 10,000 square feet of offices and 3 people in there. None of the distributors that Bruce knows have picked up the Kushi line.

One little disaster got the president fired. They did a line of 4-5 bean dishes. Some jerk didn't realize that you don't add salt to beans when you cook them. So they advertised a 25-minute cooking time on the package; well you could cook this for 25 years and it would never be right. So this guy ordered a production run worth hundreds of thousands of dollars, without checking it with Michio, who is in charge of quality control. It is all garbage.

So 3 weeks ago Aveline called up Bruce in a panic. She thought she was creating another Erewhon. There is a peculiar lack of judgment throughout this whole process. Since Michio is in charge of quality, they do production runs of the whole line and then they send the finished products to Michio. Aveline tried tasting this bean dish and a few others and she was horrified, just beside herself. She says to Bruce, "We want to buy your company." Bruce says, "Okay, $5 million and you can have it." Bruce went to the Kushi's home in Brookline and spent 3 days with them. Aveline looks better and healthier than she has in years. They are now planning to go an acquisition binge; the first company they have their sights on is some cracker company. "I laid out a plan for them, including a major change in the 7-member board of directors. Michio can remain as chairman. You can keep three of the 'financial wizards' on the board, but the other three have got to be Yuko Okada (of Muso Shokuhin), Christopher Dawson, and me. We'll take all the losses at the beginning, then turn the company into a worldwide macrobiotic company."

Bruce's Macrobiotic Company of America is doing very well financially. When he acquired it, sales were less than $900,000 a year. This year he will probably do $3 million. Everyone from Lenny Jacobs on down told Bruce that macrobiotics was dead. True, it has changed, but it alive in new ways. For example, a guy name Horse Schultz is the chairman of the Ritz-Carleton Hotel Chain; he is having his chefs trained at the Kushi institute, and has sent out a memo to all of his hotels worldwide that by a certain date they will be offering macrobiotic quality meals at all hotels in addition to the traditional fare. They are converting one hotel at a time. Bruce is now flying miso down to Cancun. Horse Schultz's cancer is now in remission. Address: President, Macrobiotic Company of America, Asheville, North Carolina 28806. Phone: 704-252-1221.

1380. Mountain Ark Trading Co.; Macrobiotic Company of America. 1996. The "new" Mountain Ark consumer direct catalog–spring 1996 [Mail order]. 799 Old Leicester Hwy., Asheville, NC 28806. 37 p. March 15. 28 cm.

• ***Summary:*** This is a very comprehensive mail order catalog, with an excellent index, for macrobiotic whole foods, specialty cookware, cookbooks and books on natural healing, futons, furniture, etc. Soy-related products include: Aduki beans–precooked, amaranth, amazaki concentrate, amazaki [amazake] pickles, arame (sea vegetable), barley malt, black soybeans, brown rice malt, brown rice syrup, cookbooks, dulse (sea vegetable), fu (dried wheat gluten), green nori flakes, hamanatto, hijiki, Hokkaido azuki beans, Hokkaido black soybeans, Japanese plums (*umeboshi*), jinenjo soba, Job's tears, kamut, kanten bars, kelp granules, kinako, kombu cha, kuzu, miso, mochi, natto miso, natto starter spores, nigari, nori, quinoa, sea palm–California, seaweed sesame shake, seaweed cookbook, seitan, shoyu, soy sauce, tamari, tofu making kit, tofu–dried, wakame. Many of these products are imported from Japan.

Bruce Macdonald of Macrobiotic Company of America acquired the company from Frank Head of Fayetteville, Arkansas, on 1 Feb. 1996. The entire catalog can be viewed on the Internet at http://www.mountainark.com. Address: Asheville, North Carolina. Phone: 1-800-643-8909.

1381. Barrett, Julia. 1996. Phytoestrogens, benefits and risks. Research Triangle Park, North Carolina: National Institute of Environmental Health Sciences. 7 p. May 22. 21 cm.

• ***Summary:*** A well-written introduction with no references. Address: North Carolina.

1382. Messina, Mark J. 1996. The health benefits of phytoestrogens in soybeans are increasingly unclear. Many uses are being patented and conflicts of interest are increasing (Interview). *SoyaScan Notes.* June 4. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** At the soy symposium in Brussels, many researchers will be presenting new data as well as some published papers. Mark is not at all sure about how people will feel when the symposium is over about "The wonders of soy"; the very positive sound bites that some people are hoping for may not be there. But certainly from an academic perspective it should be quite interesting and stimulating. Already some conflicts among the papers are emerging.

Times are changing in the world of science that seeks the truth. Scientists are much quicker to get patents these days, and phytoestrogens are quite patentable. There are

now a number of similar or conflicting patents. Two or three people and companies have patents on using genistein to treat osteoporosis. The patents are on the use, but Mark cannot see how they will be of practical value. For example, Mark was told that Tufts University has a patent on use of isoflavones for a wide range of conditions, such as heart disease, osteoporosis, etc. Steve Barnes may have one for osteoporosis.

The people at Bowman Gray School of Medicine, Wake Forest University (in North Carolina), think–based on their monkey study–that it is the isoflavones in soybeans that lower blood cholesterol, not soy protein. But this is not new; during the 1970s, isoflavones were used to lower cholesterol in rats. So Mark found it very surprising that anyone could get a patent on isoflavones lowering cholesterol, because it is already in the literature and is not a "discovery."

Mark finds the whole area quite confusing, but it is clear that when a scientist is financially invested in something, it becomes increasingly difficult to accept information that conflicts with or might hurt that financial interest. Mark feels it is a conflict of interest for a person who teaches about nutrition to also become financially involved in commercial food-related products. It is hard enough being a consultant and having to deal with negative data about the health benefits of soy. Mark has an upbeat "infomercial" presentation that he can give where people run out of the room and drink soymilk, or he can give a presentation to academics which includes conflicting information. A consultant who presents a balanced picture, including conflicting information, is not likely to be asked to speak again. Mark has come to believe that it is their ties to products or money which prevents some people in the field from being as open minded as Mark thinks they should be about some issues. So we will find it increasingly difficult to do good science which simply seeks the truth.

Mark feels that the data showing that soy reduces breast cancer risk is pretty minimal, at best. The prostate cancer data is stronger. There have only been 3 really good case control studies on soy intake and breast cancer. One showed soy was very protective in premenopausal women, but with no protection in postmenopausal. The second showed slight protection in premenopausal, with no protection against postmenopausal, and the third showed no protection in either group. So there is no data showing that soy reduces postmenopausal cancer and some data showing it reduces premenopausal. But most breast cancer is postmenopausal.

Some breast tumors are estrogen-sensitive (also called estrogen-positive) and some are not. The ones that are estrogen-sensitive are more easily treated because they respond to hormonal treatments. Moreover, some tumors start out being estrogen-sensitive then later become estrogen-insensitive. In vitro, genistein stimulates the growth of *estrogen-sensitive* breast cancer cells at low concentrations but at higher concentrations it inhibits the growth. But the lower concentrations are probably more representative of real-life situations. Mark now has a color slide titled "contraindications for soy" which he uses at lectures. He thinks there is a potential contraindication for every situation in which phytoestrogens might be used–from infants, to young children, to women trying to get pregnant, to postmenopausal women with a high risk of developing estrogen-sensitive breast tumors. Thus, we must start to recognize that there are some real "down-sides" to soy. For example, he thinks that postmenopausal women who have or have had estrogen-sensitive tumors should not be consuming soy. Even though soy may reduce the risk of prostate cancer, there is also some evidence that it may reduce testicle size–definitely NOT a plus for men. So to real scientists, the situation is looking more complex, and the health benefits of soy don't appear nearly as clear cut as they did a year or two ago. Looking just at the estrogenic component of soy, estrogens do wonderful things for certain people at certain times in their life and they may have negative effects at other times.

Mark feels very frustrated at the way many people are exaggerated the benefits and ignoring the down-side of soy isoflavones. He sometimes thinks he would like to do an exposé of this important problem. Mark still can't point to any decent animal studies showing that isoflavones have any anticancer effect. The data on soy are insufficient, and much weaker than the data on fruits and vegetables in this area. Mark's basic feeling is that if the soy industry is quick to embrace the potential health benefits of soy, we need to also be open-minded enough to consider any downside. He doesn't find at the moment that people are doing that. "This is potentially a hugely devastating issue for the entire soy industry." When the proceedings of the Brussels symposium are published, 10,000 professionals are going to see the well-argued position that soy infant formula is not safe for infants, and other concerns will be expressed in there as well.

Ken Setchell, who helped found the field of research on the medical benefits of soy isoflavones, is a brilliant scientist (perhaps a genius), told Mark recently that he thought the reason soy lowers cholesterol levels is because it contains no cholesterol.

There is a chance that this sense of complexity and frank discussion of the "down-sides" of soy may not emerge that strongly from the Brussels symposium because so many of the researchers who are presenting have strongly vested interests in the hypotheses they are testing. There will be a few scientists presenting on negative aspects of soy isoflavones; Mark had to "dis-invite" one speaker because symposium organizers were upset that she was too strongly anti-soy. She has been linked with the Jameses in New Zealand. Address: PhD, 1543 Lincoln St., Port Townsend, Washington 98368. Phone: 360-379-9544.

1383. Natural lifestyle magazine and mail-order market:

Spring-summer '96. 1996. Asheville, North Carolina: Natural Lifestyle Supplies. 63 p. Catalog. 28 cm.
• ***Summary:*** A macrobiotic mail-order catalog with several nice articles, it sells many types of soyfoods and related products, including the full line of Kushi Cuisine, organic soybeans (yellow and black), azuki beans, amazake, Rice Dream soymilk, Edensoy soymilk, Westbrae Malteds, Nasoya Vegi-Dressings, Nayonaise, Farmhouse Tekka [miso], organic soy sauce, fresh tofu, snow-dried tofu, kuzu, and miso. Publisher: Tom Athos. Editor and graphic design: Debbie Athos. Address: 16 Lookout Drive, Asheville, North Carolina 28804-3330. Phone: 1-800-752-2775.

1384. **Product Name:** Regenezyme: Soybean Sprout Concentrate [Powder, or Chewable Caplets].
Manufacturer's Name: New Millennium Foods, Div. of Sedna Specialty Health Products.
Manufacturer's Address: P.O. Box 347, Hannibal, Missouri 63401. Phone: 1-800-223-0858.
Date of Introduction: 1996 July.
Ingredients: 1999/10: "Low temperature dried, enzyme-rich soybean sprouts, which contain naturally occurring isoflavones, including genistein and daidzein complexes, mixed carotenoids (lutein, zeaxanthin, cryptoxanthin, alpha and beta carotene), vitamin E and quercitin."
Wt/Vol., Packaging, Price: Powder: 150 gm (5.3 oz) plastic jar. Retails for $28.00 (1999/10). Caplets: 90 caplets (750 mg each) per bottle.
How Stored: Shelf stable.
New Product–Documentation: Talk with Irene Stewart of New Millennium Foods. 1999. Oct. 20. Her company buys its powdered soy sprouts from a small grower of soy sprouts in Colorado. They are organic and certified non-GMO. The company moved from Missouri to North Carolina in April or May 1997. Six capsules of the powder provide 9 mg of total isoflavones, whereas 3 teaspoons of the powder provide 14 mg of total isoflavones. The powder product is still on the market; the caplets have been replaced by Regenezyme Plus capsules, which are a more concentrated source of soy isoflavones. Product with Label sent by Irene Stewart. 1999. Oct. 20. The white plastic jar is 3½ inches in diameter and 3½ inches high. On the front panel is a square color illustration of a green soybean with a green soybean leaf and dark brown background. "One level teaspoon contains: 2.2 grams soybean sprout concentrate. Directions: 2-3 level teaspoons daily or as directed by a health professional." One serving (3 teaspoons) provides 14 mg of soy isoflavones. There are 23 servings per jar. Soyfoods Center taste test: The powder is light tan; it has an appealing fragrance but a rather beany flavor–probably due to the method of heating/cooking.

1385. McCord, Holly; Yeykal, Teresa A. 1996. Menopause naturally: Got hot flashes? get soy! *Prevention* (*Emmaus, Pennsylvania*). Aug. p. 65-70. [1 ref]
• ***Summary:*** About 75% of American post-menopausal women experience hot flashes and night sweats, along with sleep disturbances and mood swings. Until now, the only antidote for these unpleasant symptoms has been hormone-replacement therapy (HRT), a prescription medicine the replace the estrogen that women's bodies start making less of. But recently researchers have found that the foods made from the soybean may offer a practical alternative.

"The trail of evidence linking soy with a hot-flash-free menopause starts in Asia." There isn't even a word for hot flash in Japanese. Sherwood Gorbach, M.D., at Tufts University School of Medicine, in Boston, Massachusetts, was one of the first to suggest that the reason for this may lie in the Asian diet, which is rich in soyfoods that contain isoflavones–a natural plant form of estrogen. In one day, a typical Asian woman–who eats about a quarter pound of soyfoods–may be getting 30 to 50 milligrams of isoflavones from her food.

Three clinical studies are now under way to see if and how soy isoflavones work to relieve menopausal symptoms. At Bowman Gray School of Medicine of Wake Forest University (Winston-Salem, North Carolina), Gregory Burke, MD, heads a study of 240 women over age 45 experiencing hot flashes or night sweats. Every day for 2 years the women will drink an 8-ounce soy beverage containing either 1 mg, 34 mg, or 50 mg of isoflavones without knowing which level of isoflavones they're receiving. Researchers will see if more isoflavones relieve their menopausal symptoms or anxiety or mood swings.

Two studies at Tufts University, in Dr. Gorbach's department, are following 60 women with hot flashes. For 3 months, these women will eat either two specially designed almond- or chocolate-flavored soy breakfast bars that each contain 20 mg isoflavones (for a daily total of 40 mg isoflavones) or two placebo bars without isoflavones. Researchers will track the women's reports of hot flashes and night sweats, and their levels of estrogen and other hormones. Though these studies have not been completed, preliminary data look promising says Dr. Gorbach.

A table (p. 67) shows the amount of isoflavones (in mg) in a typical serving of various soyfoods. In descending order: Nutlettes breakfast cereal* (½ cup): 122 mg isoflavones + 140 calories. Beef(Not) textured soy protein granules* (¼ cup dry): 62 mg + 70 calories. Roasted soy nuts (¼ cup): 60 mg + 195 calories. Tempeh (½ cup): 35 mg + 165 calories. Low-fat tofu (½ cup): 35 mg + 54-75 calories. Regular tofu (½ cup): 35 mg + 105-120 calories. Take Care High Protein beverage powder (Protein Technologies International; 2 scoops): 35 mg + 100-130 calories. Regular soymilk (1 cup): 30 mg + 130-150 calories. * = Available from Dixie USA, 1-800-347-3494.

Even if this research doesn't show positive results, other studies show that soy lowers cholesterol and may prevent breast cancer and osteoporosis. "A serving of soy every

day could turn out to be a good bet," says Dr. Gorbach. Researchers recommend consuming in the range of 30-50 mg/day of isoflavones. More than 100 mg/day could be harmful, so its is best to get your isoflavones from food instead of pills. Contains two recipes: Creamsicle Cooler (shake with soft tofu; 35 mg of isoflavones). Southwestern Skillet (with Beef(Not); 62 mg of isoflavones).

1386. Associated Press (AP). 1996. Soybean protein may relieve hot flashes. *Marin Independent Journal* (*Novato, California*). Nov. 11. p. A4.
• ***Summary:*** The article begins: "New Orleans–Eat tofu for hot flashes? The idea is not as weird as it sounds. At the American Heart Association's annual scientific meeting yesterday, researchers discussed the growing evidence that soybean protein–commonly found in tofu–may indeed relieve the miseries of the change of life."

Dr. Gregory Burke, of Bowman-Gray School of Medicine in Winston-Salem, North Carolina, is investigating the effects of soy on menopause. His study involved 43 women, ages 45-55, who experienced at least one bout of hot flashes or night sweating daily. For 6 weeks they added 20 grams of powdered soy protein into their diets, mixing it with their orange juice or sprinkling it on cereal. For another 6 weeks they did the same with powdered carbohydrate, but they did not know which was which. While using the soy protein, the women reported significantly less intense symptoms–although they occurred just as frequently. Experts believe that the active ingredients in soy protein are phytoestrogens–the plant form of the female hormone estrogen. Human estrogen is widely used to relieve the effects of menopause–although some women are reluctant to take it because of side effects.

Burke plans another study in which larger doses of soy protein will be tried on 240 women. A recent study at the University of Manchester in England suggested that soy can reduce the frequency of the hot flashes as well.

1387. Himelstein, Vicky. 1996. Amazing tofu diet to beat hot flashes: And here's how to make 'tasteless' health food really delicious. *Star.* Nov. 26. p. 1, 33.
• ***Summary:*** *Star* is a popular tabloid newspaper, sold at supermarket checkout stands, featuring sensational stories and celebrities. On the cover is a color photo of TV star Roseanne in a large rectangle. The text reads: "Roseanne's holiday diet: Eat what you want and lose weight, plus Tofu diet to beat hot flashes."

This article, based on an Associated Press story, begins: "If you're in the throes of menopause and suffer from uncomfortable hot flashes, take heart. You may be able to beat the heat by simply adding tofu to your diet. Startling new research reveals that tofu, a soybean-rich food, can cool the miseries of menopause fast, which may be the reason Asian women–whose diets are rich in soy–suffer fewer, less severe hot flashes and night sweating than American Women."

The article then summarizes a study by Dr. Gregory Burke, of Bowman Gray School of Medicine in Winston-Salem, North Carolina. Investigating the effects of soy on menopause, his 6-week study involved 43 women, ages 45-55. Tofu contains "phytoestrogen–the plant form of the female hormone estrogen." The Star adds: "Doctors are recommending that women eat tofu–a custard-like extract from soybeans–and drink soy milk. The challenge is now for cooks to make tofu taste good. 'Tofu is a white spongy cube that's very bland when you eat it raw,' says Star nutritionist Ann Newswanger. 'But it's cholesterol free, and absorbs flavor from other ingredients. The possibilities are endless–have it for meals and in desserts." Three recipes are given: Tofu raspberry mousse. Poppy seed dressing. Spicy tofu stir-fry with vegetables.

1388. Fenner, Gregory P. 1996. Low-temperature treatment of soybean (*Glycine max*) isoflavonoid aglycon extracts improves gas chromatographic resolution. *J. of Agricultural and Food Chemistry* 44(12):3727-29. Dec. [10 ref]
• ***Summary:*** Discusses: Soybean meal, daidzein, genistein. Address: Crop Science Dep., North Carolina State Univ., Box 7620, Raleigh, NC 27695-7620.

1389. Body Shop (The). 1997. Purchase order for candles from The Candle Project in Iowa City. Wake Forest, North Carolina. 1 p.
• ***Summary:*** Date of purchase order: 9 Jan. 1997. Ordered from: The Candle Project, First National / Steve Conklin, 204 East Washington Street, Iowa City, IA 52240.

Order for: 200 cases each Travel Candle Relaxing, Travel Candle Reviving, Travel Candle Marinis, Travel Candle Vanilla. Price: $18/case or $3,600 for 200 cases. Total price: $14,400. Ship via truck. Address: Megan Udovich, Buyer, 5036 One World Way, Wake Forest, North Carolina 27587.

1390. Candleworks, Inc. 1997. Invoice for candles shipped to The Body Shop. Iowa City, Iowa. 1 p. Feb. 4.
• ***Summary:*** Ship and bill to: The Body Shop, 5036 One World Way, Wake Forest, North Carolina 27587. 200 of item No. 337. Aromatherapy–Reviving. Price: $49.20 per 10. Discount: 12.6%. Extended price: $8,600.16.

400 of item No. 338. Aromatherapy–Relaxing. Price: $52.80 per 10. Discount: 12.6%. Extended price: $18,480.00.

Total price: $27,080.16. No freight or sales tax. Address: P.O. Box 975, Iowa City, Iowa 52240.

1391. Carter, Thomas E., Jr. 1997. Public variety release summary: Table 1. Raleigh, North Carolina. 7 p. Unpublished manuscript. 35 cm. [43 ref]
• ***Summary:*** This table is titled "Pedigree and related

information for North American varieties released during 1992 and Feb. 1997." For each variety the following information is given: Variety name. Maturity group. Year released. Pedigree. Prior designation. Developer. PI No. Reg. Lic. Reference. Note: The letters "AC" before a variety name stand for Agriculture Canada.

The varieties are: 9063, AC Albatros, AC Brant, AC Colibri, AC Cormoran, AC Harmony, AC Hercule, AC Pinson, AC Proteus, Accomac, Achiever, Agassiz, Alpha (1996), Alpha (1992), Athow, Benning, Bronson, Cache, Calhoun, Carver, CF461, CF492, Charleston, Chesapeake, Ciaric, Cisne, Colfax, Conrad 94, Council, Danatto, Defiance, Delsoy 5500, Dillon, Doles, Faribault, Fillmore, Flint, Freeborn, General, Glacier, Graham, Granite, Haskell, Hendricks, Holladay, Holt, IA1005, IA1006, IA2007R, IA2008R, IA2011, IA2012, IA2013, IA2016, IA2017, IA2018, IA2019, IA2020, IA2021, IA2022, IA2023, IA2024, IA2025, IA2027, IA2028, IA2029, IA2030, IA2032, IA2033, IA2034, IA2035, IA2036, IA3001, IA3002, IA3003, IA3004, IA3005, IA3006, IA3007, IA3008, IA4001 (Note: IA varieties are from Iowa), Iroquois, K5292, Kenwood 94, KS3494, KS4694, KS4895, Lambert, Lancaster, LN90-4524, Lyon, Macon, Magellan, Marcus 95, Maverick, Maxcy, Mercury, Micron, Mustang, Nemaha, ODell, Ohio FG1, Ohio FG2, Pace, Parker, Pearl, Piatt, Probst, Saline, Sandusky, Saturn, Stressland, Thorne, TNS, Toyopro, Traill, Vernal, Vertex, Wicomico, Yale. Address: Research Geneticist / Assoc. Prof., USDA-ARS, North Carolina State Univ., Raleigh, NC.

1392. Messina, Mark. 1997. Summary of findings: Heart disease. *Soy Connection* (*The*) (*Jefferson City, Missouri*) 5(1):3. Winter. Special edition: Highlights of the *Second International Symposium on the Role of Soy in Preventing and Treating Chronic Disease.* [4 ref]
• ***Summary:*** One obstacle to greater use of soy protein to lower blood cholesterol is the failure of scientists to understand the mechanism which causes this lowering–although there is no shortage of hypotheses. Dr. Cesare Sirtori, of the University of Milan, Italy, (a veteran researcher in this field and one of the keynote speakers) presented data showing that cholesterol reduction is due to enhanced LDL cholesterol degradation stimulated by peptides formed from the hydrolysis of the 7S globulin (a soy protein) by the liver. Dr. Shigeru Yamamoto and colleagues from the University of the Ryukyus in Japan, suggest it is the undigested peptides from soybean protein that lower cholesterol.

However, work by Ms. Mary Anthony and colleagues, from Bowman Gray Medical School in North Carolina, suggest that isoflavones, not protein, are the key. "Dr. Sirtori indicated that much of his clinical work demonstrating cholesterol reduction involved the feeding of soy products that contained minimal amounts of isoflavones, although his assertion met with some surprise."

"Elegant work presented by Dr. William Wong from the USDA's Agricultural Research Service (ARS) suggests that soy lowers cholesterol by enhancing cholesterol excretion through bile acid production, specifically via the chenodeoxycholic pathway.

"One of the most exciting findings of the symposium was the observation that soy increases HDL cholesterol. Relatively few dietary approaches have been shown to raise HDL cholesterol. Three human studies, by Susan Potter and colleagues from the University of Illinois [USA], Dr. Elzbieta Kurowska and colleagues from the University of Western Ontario [Canada], and Drs. Karin Nilausen and Hans Minertz from the University of Copenhagen [Denmark], indicated that HDL increases in response to soy consumption. In some individuals the results are quite dramatic with HDL increasing as much as 50 percent, although typical increases are more in the range of 5-10 percent. It appears that the lower the initial starting HDL cholesterol level, the greater the response to soy. The combined effect of a decreased LDL and an increased HDL strongly support the use of soy for reducing heart disease risk." Address: PhD, Symposium Chairperson, Port Townsend, Washington.

1393. Messina, Mark. 1997. Summary of findings: Menopause relief. *Soy Connection* (*The*) (*Jefferson City, Missouri*) 5(1):3. Winter. Special edition: Highlights of the *Second International Symposium on the Role of Soy in Preventing and Treating Chronic Disease.* [4 ref]
• ***Summary:*** "One hypothesis that appears with increasing frequency in the media is that soy foods may be useful in relieving menopause symptoms such as the inability to regulate body temperature which often manifests as night sweats and hot flashes. In support of such speculation is the reported low incidence of symptoms among Japanese women and the estrogenic effects of isoflavones. Much of the data presented at the symposium were preliminary and inconsistent.

"Research presented by Dr. Margo Woods and colleagues from Tufts University, and Dr. Fabian Dalais and colleagues from the Monash Medical Center in Australia suggest that, at best, soy has relatively little effect on the frequency of hot flashes. In contrast Dr. Claudia Harding, from the University Hospital of South Manchester, United Kingdom, indicated that the consumption of soyfoods providing 80 mg of isoflavones per day reduced the frequency of hot flashes ($P < 0.03$).

"Work presented by Dr. Gregory Burke and colleagues, from Bowman Gray Medical School [North Carolina], indicated that soy modestly reduced the severity of menopausal symptoms although frequency was not affected. (This research was highly publicized after it was also presented at the American Heart Association meeting on Nov. 9 [1996]).

"Upon the basis of the existing data, it is difficult to reach any definitive conclusions about the effects of soy intake on menopause symptoms. Several studies addressing this issue are currently underway. Soon it should be possible to make more definitive conclusions about the effects of soy on hot flashes." Address: PhD, Symposium Chairperson, Port Townsend, Washington.

1394. Messina, Mark. 1997. Summary of findings: Osteoporosis. *Soy Connection* (*The*) (*Jefferson City, Missouri*) 5(1):4. Winter. Special edition: Highlights of the *Second International Symposium on the Role of Soy in Preventing and Treating Chronic Disease.* [4 ref]

• ***Summary:*** "The similarity in chemical structure between the soybean isoflavones and the anti-osteoporosis drug ipriflavone has prompted speculation that isoflavones may promote bone health. Until recently, however, there have been relatively little data in support of such an effect. Four animal studies and two human studies reported in Brussels [Belgium] strongly suggest a role for soy/isoflavones in inhibiting bone resorption, stimulating bone formation or both, although all of this work should still be considered preliminary.

"Dr. Bahram Arjmandi and colleagues from the University of Illinois found that a diet containing soy helped minimize bone loss in ovariectomized rats although soy was not effective in reversing bone loss when soy treatment was begun 35 days after surgery. Dr. John Anderson and colleagues from the University of North Carolina reported that in ovariectomized rats, at optimal concentrations genistein administration results in an equivalent percentage bone retention as estradiol. Work presented by Dr. Henry Blair and colleagues from the University of Alabama suggests that genistein inhibits bone resorption by inhibiting tyrosine kinase activity and that in vivo, the inhibition of bone resorption occurs at concentrations that are considerably less toxic than other agents that inhibit bone resorption. In contrast to the work of Dr. Blair, research by Dr. Paolo Fanti and colleagues from the University of Kentucky suggests that genistein inhibits bone loss in ovariectomized rats by stimulating bone formation, rather than by inhibiting bone resorption.

"Dr. John Erdman and colleagues from the University of Illinois presented the results of a six month feeding study involving three groups of postmenopausal women. Women received a diet without soy, a diet containing soy that provided a moderate amount of isoflavones, or a soy-containing diet that provided a high amount of isoflavones. Women in the group consuming the diet highest in isoflavones experienced an increase in bone mineral density and bone mineral content in the lumbar spine whereas the other two groups experienced a decrease. These results are consistent with results from a study of postmenopausal women conducted by Dr. Fabian Dalais and colleagues from the Monash Medical Center, Australia. They found that after 12 weeks of soy consumption, bone mineral density had increased compared to the initial values.

"New soy products enter the marketplace seemingly every week and the accompanying promotion efforts often go well beyond the data. As research on soy continues to accumulate, and consumer interest in soy foods increases, it is incumbent upon the nutrition community to be able to separate the hype from the data.

"Of course it is not realistic to expect most nutritionists to become soy experts. Perhaps the following points may help to put soy foods in perspective. First, on the basis of their nutrient profile alone, soy foods warrant a bigger role in the American diet. Second, the phytochemical composition of soybeans makes them unique. Third, in many respects, soy research is still in its infancy although the pace of investigation is quickening. Finally, evidence related to the effects of intake on chronic disease risk ranges in quality from fairly speculative to fairly solid. The relationship between soy intake and cancer risk is quite speculative, whereas, solid research indicates soy protein when consumed in sufficient quantities lower LDL-cholesterol in hypercholesterolemic individuals. Animal studies and human research suggest soy / isoflavones promote bone health. The data are still preliminary, but this area of research holds tremendous potential. The question of menopausal symptom relief remains an open one, although it certainly is reasonable for women to try soyfoods for relief of symptoms related to menopause. Within the next 12-18 months, the effectiveness of this approach will be better understood." Address: PhD, Symposium Chairperson, Port Townsend, Washington.

1395. DeBona, Don. 1997. Update on American Miso Co. (Interview). *SoyaScan Notes.* March 20. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Last Monday, March 17, Don ended his work at American Miso Company (AMC)–after 13 years of making miso. Monday was St. Patrick's Day and Don is more Irish than Italian. The week before, Barry had said to Don, "You know, this is not working out." During those 13 years, the company's annual miso production has grown 400-500%, until now AMC makes about 200 metric tons of miso a year, and has about 70% of the miso market on the East Coast of the United States. When Don arrived at the company there were 8 vats of long-term miso, each containing about 4,000 kg; now there are 48 such vats.

In mid-1995 Don decided to end his minority partnership with Barry Evans. He sold all of his shares in the company to Barry, soon after Barry's release from prison in California in the fall of 1995; the terms of the sale are confidential, but Don stayed on as an employee with a yearly salary. Barry really resented the fact that Don ended his partnership, but Don had great difficulty being partners with Barry–just as John Belleme had before him. Because of this

feeling, Don was able to get "only a fair deal" financially for his share of the company. After the break-up, their relationship has continued to grow worse.

Don needs to have income because he has three kids, including two teenagers who will soon be entering college; his youngest is age 10. Now Don is looking for a new job. He still lives in the same house by the miso factory; he owns that house. Since he sold his share in AMC to Barry Evans, Greg Gonzales (who formerly ran errands for Barry in Los Angeles) has been working at AMC. Don hasn't really taught him how to make koji and miso–because he was never asked to–but Greg has learned by observation. Now Greg does all the work, but he is not that interested in it and he has a long way to go until he understands the important subtleties of making koji. The company will continue to exist but the quality of the miso is likely to fall.

Barry got out of jail in the summer of 1995. Since then he has been spending a lot of money–not on his companies but on personal belongings; he now has three houses in Asheville. This spending binge put both of Barry's companies, American Miso Co. and Great Easter Sun, "way out on a limb financially." Barry made it very uncomfortable for Don to stay on at AMC. Barry has not visited AMC even once in 3 years.

Don is considering writing a history of the company, now that he has a little spare time. He is starting a consulting company and would like to train others around the world how to make miso. Address: General Manager, American Miso Co., Route 3, Box 541, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1396. DeBona, Don; Chaplin, Paul. 1997. Update on miso in Europe (Interview). *SoyaScan Notes.* March 20. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Don attended Biofach in Germany this month; this is the forth time he has attended. He has had two students who came from Europe to study miso-making with him at American Miso Co. in North Carolina. Jan (pronounced *Yon*) Kerremans, who worked at Lima Andiran in southern France, studied with Don for 2 months, Oct. 1984 to Nov. 1984. Jan was a minority partner with Pierre Gevaert. Jan now still works for Lima, but not as a miso maker; originally Flemish, he married a French woman, lives in Paris, and is Lima's sales rep.

Paul Chaplin from Wales studied with Jan Kerremans at Lima in France during May and June 1984, then with Don for 2 months, in October and November 1985. His miso manufacturing business in Wales is still tiny, but it is growing well. Total turnover (income) in fiscal 1996 (Nov. 1995 to Nov. 1996) was £28,000 (=$44,800). Paul's new address is: Source Foods (Organic Priority) 9 Cwm, Business Centre, Marine Street, Cwm, Ebbw vale, NP3 6TB, Wales, UK.

For both Jan and Paul, Don provided miso-making instruction, as well as room and board, free of charge. Barry Evans did not like Don to be teaching other people to make miso.

Pierre Gevaert was the founder of Lima. His son is named Daniel, and Daniel's wife is Valérie. Daniel studied miso-making with Jan Kerremans in southern France. In early 1990, after Pierre Gevaert died, Daniel and his wife took over Lima's miso company at Andiran in southern France. They changed the company name to Danival from Lima-Andiran. The two of them now make two types of miso, and they also sell shoyu and tamari–but it is not known if they make the latter two products or not. Lima and Danival are no longer in contact with one another because there are bad feelings between them; Lima purchases their miso from American Miso Co.–much to Danival's chagrin.

Other new miso companies in Europe: Noka, run by Karl Selgmann, in Alzey, Germany. Karl used to be with Mr. Hiroshi Kozaki of Kanta Kozaki in Urbach; that company started in 1990. Paul Chaplin has visited Noka.

Two new miso makers in Yugoslavia are Sladjan Randjelovic and his wife, Vladimirka, of Lion Health Food Co. (Zagorska 12/9, YU-11080 Zemun, Belgrade, Serbia / Yugoslavia). Their business card says: "Belgrade, London, and Beijing." Vladimirka is actively involved in the business. They are both very macrobiotic. They already make *mizuamé* (rice syrup or rice malt). Their miso was of fairly good quality. They also made an interesting miso with added shiitake and kombu.

Hans Weisseneder is making miso for Sojvita in Lichtenwoerth, Austria. He had photos of his vats which are in a wine cellar outside of Vienna.

In Europe, imports of miso from Japan are almost certainly larger than total European miso production. Address: General Manager, American Miso Co., Route 3, Box 541, Rutherfordton, North Carolina 28139. Phone: 704-287-2940.

1397. Macdonald, Bruce. 1997. The complex relationships between Eden Foods, Muso Shokuhin, Macrobiotic Company of America, Gold Mine Natural Food Co., Sierra Natural Foods, and Ohsawa Japan (Interview). *SoyaScan Notes.* April 4. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** In Oct. 1974, Michael Potter visited Yuko Okada at the Muso Company in Osaka, Japan, then decided to import Japanese food products exclusively from Muso. Then in Jan. 1984 (following major losses from the bankruptcy of Erewhon (in Nov. 1981) and other American natural foods distributors–including Shadowfax, Laurelbrook, and Good Food Company), the Muso Company of Japan appointed Eden Foods its General Agent for North America. But in subsequent years, as the value of the dollar continued to fall against the yen, making Japanese imports more expensive, Eden began to buy less expensive grades

of some products (especially seaweeds and umeboshi) from Muso. In this way, Eden avoided price increases. But strains grew in the relationship. Muso did not like being dependent on one wholesaler in America and Eden wanted the freedom to shop around. So in the mid-1990s there was an above-board agreement that Muso no longer had to sell its products in the USA exclusively to Eden. But even before that, Yuko had been selling to other companies such as Republic of Tea, Smith & Hawken (Japanese tools), and Gold Mine Natural Food Co.

Jean Richardson of Gold Mine trademarked the name "Ohsawa," much to the chagrin of Ohsawa Japan. When Bruce working at MCOA, he thought of challenging this trademark, and he feels he could have done so successfully, but at a cost of at least $30,000 in legal fees. This is even more ironic because MCOA is the exclusive importer of products from Ohsawa Japan. So the trademark borders on misrepresentation. The Ohsawa Japan story goes back to Bob Kennedy, who had been dealing with Ohsawa Japan since the beginning. When Michio Kushi began importing, he did so from Muso–not from Ohsawa Japan. Several years later he also began to import from Mitoku; today Michio recommends only Mitoku products. When Bob Kennedy stopped importing foods from Japan, he sold his business (after Heinz returned the rights to him) to what had been the warehouse of Rainbow Foods. Rainbow started as a store in San Francisco, California, then they grew a wholesale business. A religious group ended up buying that wholesale business from them, and they renamed it Sierra Natural Foods. Sierra bought the rights to import from Ohsawa Japan from Bob Kennedy, then started importing containers. They had also gotten the Soken distributorship, and they started expanding so fast that they couldn't finance the rapid growth; this (and perhaps some mismanagement) soon led to their bankruptcy. At the time they owed Ohsawa Japan about $200,000. Ohsawa Japan decided to stop selling foods to America. So they asked Mitoku to be their sub-distributor for America. So even today Bruce buys his Ohsawa Japan products through Mitoku. But Gold Mine can't buy from Mitoku because Mitoku won't give out any more distributorships. Mitoku's main distributors now are U.S. Mills (Erewhon brand), Great Eastern Sun, Granum, and MCOA. Address: President, Macrobiotic Company of America, Asheville, North Carolina 28806. Phone: 704-252-1221.

1398. Canty, David J.; Jolitz, Amanda J.; Ziesel, Steven H. 1997. Lecithin & choline: a clinical monograph. Research update on health and nutrition. Fort Wayne, Indiana: Central Soya Co. 24 p. 28 cm. [136 ref]

• ***Summary:*** Contents: Objectives. Summary. Introduction. Historical perspective. Dietary sources and intake. Multiple functions: Metabolic roles, cell signaling. Reproduction and development. Liver function and health. Heart function, decreasing cardiovascular risk, memory improvement. Physical performance. Beneficial drug interactions. Choline: An essential nutrient. Conclusions and recommendations. Exam for credit. Exam for credit mail-in answer cards. References. Abbreviations.

Copyright: Central Soya Co., Fort Wayne, Indiana. A grant from Central Soya also paid for all or most of this brochure. Address: 1. BS, MS, Adjunct Faculty and Doctoral Candidate, Dep. of Nutrition and Food Studies, New York Univ., New York, N.Y.; 2. MS, RPh, Clinical Coordinator, Elgin Mental Health Hospital, Elgin, Illinois; 3. M.D., PhD, Prof. and Chair, Dep. of Nutrition, Univ. of North Carolina, Chapel Hill, North Carolina.

1399. Body Shop (The). 1997. Purchase order for candles from The Candle Project in Dewitt, Iowa. Wake Forest, North Carolina. 1 p.

• ***Summary:*** Date of purchase order: 27 June 1997. Ordered from: The Candle Project, P.O. Box 58, Dewitt, Iowa 52742-0058.

Order for: A total of 1,225 cases of the following types of candles: Miscellaneous, Candle Reviving, Travel Candle Leap, Travel Candle Relaxing, Travel Candle Vanilla, Travel Candle Marinis, Travel Candle Reviving. Price: $18/case (average). Total price: $31,260. Ship via truck. Address: Megan Udovich, Buyer, 5036 One World Way, Wake Forest, North Carolina 27587.

1400. Mueller, Ed. 1997. Brief history of Takoma Soy Inc. (Interview). *SoyaScan Notes.* July 21 and 25. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Takoma Soy was incorporated on 5 March 1992 and started operation on 1 April 1992–sharing the same space as Olive Tree Works in Takoma Park, Maryland. Takoma Soy purchased tofu from Spring Creek Natural Foods (Spencer, West Virginia) and sold it at cost to Olive Tree. Takoma Soy is now a full-line natural foods distributor, carrying products which include Spring Creek Tofu (from Spencer, West Virginia), Miso Master miso (from North Carolina), and tempeh from Cricklewood (Mertztown, Pennsylvania). They recently purchased (using a bank loan) a property that used to be a Bible camp. On the property are a 12,000 square foot building, a lodge house (with 5-8 bedrooms), and 3 cabins. At its peak the camp had 300 to 500 day campers and up to 150 overnight guests. Ed would like to convert the main building into a tofu factory. He is working on a joint venture that would probably set up a new company, with Twin Oaks and Olive Tree involved as partners. Twin Oaks plans to stop making tofu, buy their tofu from Takoma Soy in Maryland, and focus on making second generation tofu products.

Ed was a Peace Corps volunteer in Sierra Leone. His vision for the property is to develop a center where people can come to learn agricultural skills, including how to make tofu, bake bread, etc. Address: 11 South Pennsylvania Ave.,

Hancock, Maryland 21750. Phone: 301-678-5283.

1401. Candle Project. 1997. Bill of Lading for candles shipped to The Body Shop. Iowa City, Iowa. 1 p. Aug. 1.
• ***Summary:*** Consignee (sent to): The Body Shop, 5036 One World Way, Wake Forest, North Carolina 27587. For purchase order #034366-00. For 3 pallets, weighing 2,400 lbs. Via Overnight Transportation Co. Address: 2920 Industrial Park Rd., Iowa City, Iowa 52240.

1402. National Oilseed Processors Association. 1997. Yearbook and trading rules 1997-1998. Washington, DC. [iv] + 127 + 11 p. No index. 23 cm.
• ***Summary:*** On the cover (but not the title page) is written: Effective August 1, 1997. Contents: Constitution and by-laws. Officers and directors. Executive office. Members. Standing committees. Trading rules on soybean meal. Appendix to trading rules on soybean meal: Official methods of analysis (moisture, protein, crude fiber, oil {only method numbers listed}), sampling of soybean meal {at origin} (automatic mechanic sampler, pneumatic probe sampler, probe sampler), sampling of soybean meal (at barge loading transfer facilities), official weighmaster application, semi-annual scale report, certification of installation of automatic sampler & mechanical divider (at origin), semi-annual certification of automatic sampler & mechanical divider (at origin), voluntary checklist for semi-annual certification of sampler & divider (at origin), certification of installation of automatic sampler & mechanical divider (at barge loading transfer facility), semi-annual certification of automatic sampler & mechanical divider (at barge loading transfer facility), voluntary checklist for semi-annual certification of sampler & divider (at barge loading transfer facility), official referee laboratories (meal), official NOPA soybean meal sample bag. Soybean meal export trading rules: Minimum blending procedures for export meal blended at ports, sampling of soybean meal (at vessel loading facilities), weighing of soybean meal (at vessel loading facilities), certification of installation of automatic sampler & mechanical divider (at vessel loading facility), semi-annual certification of automatic sampler & mechanical divider (at vessel loading facility), semi-annual certification of scales at vessel loading facilities. Trading rules on soybean oil. Sales contract. Definitions of grade and quality of export oils. Soybean lecithin specifications. Appendix to trading rules on soybean oil: Inspection, grading soybean oil for color (NOPA tentative method), methods of analysis (A.O.C.S. official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses; refining byproduct lipid, acidulated (refining byproduct lipid and tank bottoms), official weighmaster application, semi-annual scale report, official referee chemists (oil). Soybean oil export trading rules. Uniform soybean oil export contract. Foreign trade definitions (for information purposes only) Appendix 1.

The section on officers, executive committee, and board of directors (p. 7-8) gives the name, company affiliation, and phone number of each person. Officers (executive committee)–Chairman: William B. Campbell, Central Soya Company, Inc. Chairman-elect: Richard Galloway, Quincy Soybean Company. Secretary / Treasurer: Albert J. Ambrose, Harvest States / Honeymead Processing and Refining. Immediate past chairman: John A. Burritt, Ag Processing Inc a cooperative.

Executive staff: President: Sheldon J. Hauck. Executive vice president: Alen F. Johnson.

Board of directors (alphabetically by company; each member company may have up to two representatives on the board; only the first of these may vote): James W. Lindsay & John A. Burritt, Ag Processing Inc a cooperative. John G. Reed, Jr. & John D. McNamara, Archer Daniels Midland Co. Archie Gwathmey & Charles Bussey, Bunge Corporation. Wayne Teddy & John March, Cargill, Inc. William B. Campbell & Carl Hausmann, Central Soya Co., Inc. James D. Tibbets & Al Ambrose, Harvest States / Honeymead Processing and Refining. Patrick E. Wright & Henry E. O'Bryan Owensboro Grain Co., Inc. Richard L. Wiley & L. Weldon Sander, Perdue Farms, Inc. Richard Galloway & Larry Horn, Quincy Soybean Co. Gerard A. Delatte & Richard E. Bell, Riceland Foods, Inc. Thomas L. Harper, Southern Soya Corp. Rodney Christianson & David Thompson, South Dakota Soybean Processors, D. Daryl Houghton & George C. White, Townsends, Inc. Cliff Meeuwsen & Arlen Meeuwsen, Zealand Farm Soya.

Executive office, Washington, DC: President, Sheldon J. Hauck (Email: shauck@nopa.org). Executive vice president: Allen F. Johnson. Director of regulatory affairs: David C. Allor. Executive asst.: Hady J. Nash. General counsel: Elroy H. Wolff, Sidley & Austin. Special consultant: C. Lockwood Marine, Ft. Wayne, Indiana.

Members (listed alphabetically by company; within each company, first the name of the official Association representative {who is on the Board and votes}, followed by the other personal members listed alphabetically by surname. For example, Archer Daniels Midland Co., the company with the most personal members, has 34. After the name of each personal member is given with his address and phone number. In the listing below, the number of personal members is shown in parentheses after the name of each company, followed by city and state of the various locations): Ag Processing Inc a cooperative (25); Eagle Grove, Iowa; Manning, Iowa; Mason City, Iowa; Sergeant Bluff, Iowa; Sheldon, Iowa; Dawson, Minnesota; St. Joseph, Missouri. Omaha, Nebraska. Archer Daniels Midland Co. (23); Archer Daniels Midland Co. (34); Little Rock, Arkansas; Augusta, Georgia; Valdosta, Georgia; Decatur, Illinois; Galesburg, Illinois; Granite City, Illinois; Taylorville, Illinois; Frankfort, Indiana; Des Moines, Iowa; Fredonia, Kansas; Destrehan,

Louisiana; Mankato, Minnesota; Red Wing, Minnesota; Kansas City, Missouri; Mexico, Missouri; Clarksdale, Mississippi; Fremont, Nebraska; Lincoln, Nebraska; Fostoria, Ohio; Kershaw, South Carolina; Memphis, Tennessee. Bunge Corp. (16); Decatur, Alabama; Cairo, Illinois; Danville, Illinois; Emporia, Kansas; Destrehan, Louisiana; St. Marks, Mississippi; Vicksburg, Mississippi; St. Louis, Missouri. Cargill, Inc. (19); Guntersville, Alabama Osceola, Arkansas; Gainesville, Georgia; Lafayette, Indiana; Cedar Rapids, Iowa; Des Moines, Iowa; Iowa Falls, Iowa; Sioux City, Iowa; Washington, Iowa; Bloomington, Illinois; Chicago, Illinois; Wichita, Kansas; Burnsville, Minnesota; Minneapolis, Minnesota; South Savage, Minnesota; Wayzata, Minnesota; Kansas City, Missouri; Fayetteville, North Carolina; Raleigh, North Carolina; Sidney, Ohio; Memphis, Tennessee; Chesapeake, Virginia. Central Soya Co., Inc. (11); Gibson City, Illinois; Decatur, Indiana; Fort Wayne, Indiana; Indianapolis, Indiana; Belmond, Iowa; Bellevue, Ohio; Marion, Ohio; Delphos, Ohio; Chattanooga, Tennessee. Harvest States / Honeymead Processing and Refining. (5); Mankato, Minnesota. Owensboro Grain Co., Inc. (4); Owensboro, Kentucky. Perdue Farms, Inc. (4); Salisbury, Maryland; Cofield, North Carolina. Quincy Soybean Co. (4); Helena, Arkansas, Quincy, Illinois. Riceland Foods, Inc. (5); Stuttgart, Arkansas. South Dakota Soybean Processors (3); Volga, South Dakota. Southern Soya Corp. (2); Estill, South Carolina. Townsend's Inc. (2); Millsboro, Delaware. Zealand Farm Soya (3); Zealand, Michigan.

Associate Members: AC Humco, Memphis, Tennessee. ADM Agri-Industries Ltd., Windsor, Ontario, Canada. Alfred C. Toepfer International, Inc., Minneapolis, Minnesota. Amber, Inc., Tarrytown, New York. C&T Quincy, Richmond, Virginia. Canamera Foods, Oakville, Ontario, Canada. Columbia Grain & Ingredients, Inc., Wellborn, Florida. Commodity Specialists Company, Minneapolis, Minnesota. Con Agra Poultry Co., El Dorado, Arkansas. Continental Grain Co., Chicago, Illinois. ContiQuincyBunge, New York City, New York. Garnac Grain Co., Overland Park, Kansas. Hunt-Wesson, Inc., Fullerton, California. Iowa Select Farms, Iowa Falls, Iowa. Lipton, Englewood Cliffs, New Jersey. Louis Dreyfus, Wilton, Connecticut. Noga Commodities (Overseas), Inc., New York City. Oleostates, Inc., Tucson, Arizona. Pilgrim's Pride Corp., Pittsburg, Texas. Procter & Gamble Co., Cincinnati, Ohio. Schouten USA Inc., Minneapolis, Minnesota.

Standing committees: For each committee, the function of the committee, the names of all members (with the chairman designated), with the company and company address of each are given–Crusher committees: Canola, flaxseed, safflower seed, sunflower seed. International trade committee. Government and public relations committee. Industry and grower relations committee. Soybean meal trading rules committee. Soybean oil trading rules committee. Technical, research, environmental, and safety, health, and loss prevention (TESH) committee. Technical. Address: 1255 Twenty-Third St., N.W., Washington, DC 20037. Phone: 202/452-8040. Fax: 202/835-0400.

1403. Hesser, Amanda. 1997. Miso goes beyond Japanese cooking. *New York Times.* Sept. 3. p. C1, C8 (NY City ed.); p. B1, B8 (Natl). Living Arts section. [1 ref]

• ***Summary:*** An excellent, long article. The version in the New York City edition (described below) is considerably longer than that in the national edition. Nina Simonds believes that miso is no longer an exotic food as it one was; it has now become much more mainstream. Many varieties of miso are now sold in America. William Shurtleff, co-author of *The Book of Miso,* notes that "It brings a savory flavor to vegetarian meals that is very hard to find. Miso provides a bridge between a steak and a vegetarian diet."

Katagiri & Company, on the Upper East Side of New York City, sells more than 20 varieties. In Japan, miso soup maintains a reputation as a cure-all, much like chicken soup is to westerners.

Contains three miso recipes. One sidebar, titled "The package says a lot," gives the name, address and phone number of six different sources for misos: The Health Nuts, Integral Yoga Natural Foods, Katagiri & Company, Whole Foods Market (all 4 in New York City), South River Miso Co. (Conway, Massachusetts), and Natural Lifestyle Supplies (Asheville, North Carolina–Sells Miso Master, Onozaki, Mitoku, and South River misos).

Photos show: Nine different brands of packaged miso. A bowl of miso soup, with chopsticks.

1404. Anderson, Jean. 1997. The American century cookbook. 1st ed. New York, NY: Clarkson Potter. xii + 547 p. Illust. Index. 24 x 19 cm. [586* ref]

• ***Summary:*** Contents: Acknowledgments. Introduction. How to use this book. Appetizers and snacks. Soups. Meat, fish & fowl. Casseroles. Eggs, cheese, pasta & grains. Vegetables. Salads and salad dressings. Breads and sandwiches. Puddings, pies & other desserts. Cakes & frostings. Cookies & candies. Permissions. Bibliography. Index.

The Introduction begins: "For the past ten years, I have been traveling backward in time. Back across the decades to 1900 and beyond. My quest: To trace this [20th] century's role in our culinary coming of age. To track the recipes, foods, food trends, food people, appliances, and gadgets that have had an impact on our lives from 1900 onward." This is a marvelous book about mainstream American food, but it is also somewhat strange. Marvelous because: (1) It is the culmination of a life's work as a food writer; she is the author of more than 20 cookbooks, the winner of numerous awards related to food writing, and a member of the James Beard Who's Who of Food and Wine in America, and a regular writer for leading national food magazines. (2) The

historical research that has gone into this book is superb, and beautifully presented, with hundreds of old graphics (photographs, illustrations, ads, packages, labels, posters, etc.). (3) The book itself beautifully designed, and the format is original and very inviting, with numerous interesting sidebars and timelines, in addition to the graphics.

The book is strange because: (1) The author seems largely unaware (except for a brief mention in the Introduction, p. 4) that the 20th century was also the century of the rise of the natural foods, organic foods, vegetarian, and soyfoods movements in America–starting in the 1960s, with a smaller health food movement from 1900 to the late 1950s; the words "natural," "organic," "soy," and "health" do not even appear in the book's substantial index–although the word "granola" does–in connection with a recipe that contains an incorrect history. Among the various soyfoods, only tofu is mentioned–but not in a recipe. In a timeline, under 1980s: "Tofu comes to the supermarket." Note: Actually, tofu was first sold in a supermarket chain in 1958 in Los Angeles.

The books contains two vegetarian recipes: (1) Vegetarian (meatless) Moussaka (p. 166-67), a recipe the author developed in 1973 for an article she was writing in *Family Circle.* She had eaten and liked meatless moussakas in Greece. (2) Vegetarian Black Bean Chili (p. 250-51), a 1960s recipe that won "Best of the 1991 New York State Fair." There is (fortunately) a timeline entry (1971) and four recipes related to Alice Waters and Chez Panisse restaurant in Berkeley, California. (2) The book contains many unhealthy (though popular) recipes. It is overloaded with recipes for meats, fish, and fowl–the very foods that are causing a health crisis in America, with heart disease and stroke as major causes of death and disability. Other recipes (also popular) contain large amounts of refined foods, such as white sugar, white flour, etc.–Ingredients that people interested in healthy foods generally prefer not to eat. (3) There are some glaring omissions: Under appliances–nothing about the blender, or the juicer.

Compare the recipes in this book with those in the latest edition of the *Joy of Cooking* (also 1997) and you will see clearly that the latter has kept pace with America's changing cookery and attitudes toward food, nutrition, good health, and the important connection between diet and health.

Note: Jean Anderson, a member of the "old school," was born in 1929. Address: Chapel Hill, North Carolina, and New York City.

1405. Anthony, Mary S.; Clarkson, T.B.; Bullock, B.C.; Wagner, J.D. 1997. Soy protein versus soy phytoestrogens in the prevention of diet-induced coronary artery atherosclerosis of male cynomolgus monkeys. *Arteriosclerosis, Thrombosis, and Vascular Biology* 17(11):2524-31. Nov. [49 ref]
• ***Summary:*** Must soy protein accompany soy isoflavones for the isoflavones to be effective in lowering the risk of coronary disease? The monkeys were divided into three groups, fed casein, soy protein with trace isoflavones, and soy protein with more isoflavones. The monkeys were killed and dissected. A stepwise reduction in atherosclerosis was found with increasing isoflavone content. Address: Comparative Medicine Clinical Research Center, Bowman Gray School of Medicine, Wake Forest Univ., Winston-Salem, North Carolina 27157-1040.

1406. Lee, Jill. 1997. New soybeans fill tofu niche. *Agricultural Research* (*USDA*) 45(11):13. Nov.
• ***Summary:*** Thomas E. "Tommy" Carter, at the USDA-ARS [Agricultural Research Service] Soybean and Nitrogen Fixation Lab. (Raleigh, North Carolina) breeds special varieties of soybeans for use in making tofu. Although they have lower yields and demand extra care, they bring extra profits to farmers. "Tofu is gaining in popularity." USDA's Economic Research Service estimates that Japan uses about 20 million bushels each year for making a tofu; most of these are imported from China and the United States. But tofu is also made in the USA, where there are about 100 tofu makers, whose tofu has a retail value of about $130 to $150 million / year. All this tofu is made from soybeans grown in America.

"U.S. shoppers are doubling their consumption of tofu about every 3 to 4 years, according to the Soyfoods Center of Lafayette, California, which monitors such trends." Address: ARS.

1407. Macdonald, Bruce. 1997. Macrobiotic Company of America is thriving and macrobiotics is making a making a comeback in America (Interview). *SoyaScan Notes.* Dec. 2. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Bruce's company focuses on high quality, macrobiotic foods. Company sales and number of accounts are growing rapidly. When he bought the company in Sept. 1993, they had about 900 accounts; this grew to about 2,500 in 1997 and 5,000 at present. The number of individual/personal accounts is growing the most rapidly. The main individual buyers seem to be aging baby boomers–those from the same generation as the people who founded the movement 30 years ago in the late 1960s and 1970s. Why are they buying? First, macrobiotics has been Americanized and de-mystified. Many of the teachers are now Americans and the heavy Japanese emphasis is disappearing. Second, the baby-boomers are realizing that they had better start eating well or they will soon pay the price in poor health and shorter longevity.

Bruce's best-selling macrobiotic products are kuzu, nori and wasabi powder (for people to make sushi at home), 4-year soy sauce (*nama shoyu*), and Johsen organic shoyu (in quarts or 10 oz bottles). He gets 100-200 catalog requests each week and does no advertising. Lenny Jacobs likes to say that macrobiotics is on the decline, but he doesn't know

what he's talking about. Address: President, Macrobiotic Company of America, Asheville, North Carolina 28806. Phone: 704-252-1221.

1408. Napompeth, Banpot. ed. 1997. World Soybean Research Conference V: Proceedings. Soybean feeds the world. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. Illust. Author index. 30 cm. [1159 ref]
• ***Summary:*** The book contains the following major divisions: Foreword. Preface. WSRC Continuing Committees. WSRC V National Organizing Committee. Opening addresses (4). Genetic improvement (31 papers). Crop protection (24). Crop science (35). Technology utilization (foods–13). Technology adoption (10). Plenary sessions (3). Special symposium: Soybean in tropical agriculture (10). Constitution for World Soybean Research Conference. Address: National Biological Control Research Center, Kasetsart Univ., Bangkok, Thailand.

1409. Eichenwald, Kurt. 1998. Court is told of suicide try as ex-Archer aide is absent. *New York Times.* Feb. 27. p. C3 (National ed.).
• ***Summary:*** Mark E. Whitacre, who now lives in Chapel Hill, North Carolina, tried to kill himself today hours before he was scheduled to be sentenced in Urbana, Illinois, on charges of embezzling millions of dollars from grain giant ADM. Mr. Whitacre admitted taking the money but said that it was part of a corporation-wide scheme at ADM to provide under-the-table payments to senior executives. Prosecutors have since concluded that his allegations were not true.

1410. Crouse, John R., III; Burke, Gregory L. 1998. Soy protein containing isoflavones reduces plasma concentrations of lipids and lipoproteins (Abstract). *Circulation* 97(8):816 (Abst. #17). March 3. *
• ***Summary:*** This study, now in abstract form, has been submitted to JAMA. It is available on the DuPont website. PTI paid for the study. 156 moderately cholesterolemic humans were studied for 9 weeks. They were divided into five groups, all getting the same amount of protein: One fed casein, one alcohol-washed soy with trace isoflavones, then 25, 42, and 58 mg of isoflavones per day. They found a stepwise reduction in cholesterol content with increasing isoflavone content of the soy protein isolate they consumed. The high-cholesterol group had about a 10% reduction in LDL ('bad') cholesterol. Address: Bowman Gray [North Carolina].

1411. Almonor, G.O.; Fenner, G.P.; Wilson, R.F. 1998. Temperature effects on tocopherol composition in soybeans with genetically improved oil quality. *J. of the American Oil Chemists' Society* 75(5):591-96. May. [18 ref]
• ***Summary:*** "Tocopherol, a natural antioxidant, typically accounts for a small percentage of soybean oil." "Soybean oil typically contains three primary types of tocopherol." Address: Crop Science Dep. and USDA, ARS, North Carolina State Univ., Raleigh, NC 27695-7620.

1412. Pearce, Steve. 1998. The early history of Nordisk, Novo, and Novo Nordisk (Interview). *SoyaScan Notes.* June 8. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Nordisk Insulinlaboratorium was started in 1923 in Copenhagen, Denmark as a manufacturer of insulin. Novo Terapeutisk was started in 1925 in Copenhagen, Denmark by the Pedersen brothers as another manufacturer of insulin. The Pedersen brothers had been working for Nordisk, but in April 1924 they got fired and formed Novo. Both companies began producing a new, revolutionary medical preparation, insulin, that had just been discovered by two Canadian scientists, Charles Best and Frederik Banting, who extracted it from the pancreas and used it to treat diabetes. Novo and Nordisk, which were independent competing companies in Denmark, merged in 1989 Today, Novo Nordisk is the world's largest maker of insulin. But in the USA, Novo Nordisk has a smaller share of the insulin market than Eli Lilly & Co.

Novo first started offering commercial enzymes in 1941; their first enzyme was trypsin. This was a logical progression, since insulin comes from the pancreas, which is also the body's storehouse of digestive enzymes. Address: Novo Nordisk, 77 Perry Chapel Church Rd., Franklinton, North Carolina 27525-0576. Phone: 919-494-3070.

1413. Bramblett, Billy. 1998. Frank Stevens has just purchased Quong Hop & Co. (Interview). *SoyaScan Notes.* July 9. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** About a year ago Frank Stevens offered to buy Wildwood Natural Foods for $2 million–which the owners considered to be much too low an offer. But Frank liked Wildwood's basic plan, which was to build a new manufacturing plant, and maybe buy some other smaller soyfoods companies on the West Coast–such as San Diego Soy Dairy, Quong Hop, and Island Spring. Stevens wanted to fund the whole plan, keeping the present management structure in place, but he wasn't willing to pay enough for Wildwood. At the time, he had the "enlightened" investor group Swander-Pace (from San Francisco) along with him; they were going to do some kind of joint venture together, but apparently Swander-Pace lost interest.

So about 2 months ago, Stevens bought control of Quong Hop in South San Francisco. Frank is kind of a plump good ole' boy from North Carolina, with a "gosh and golly" manner and a North Carolina drawl. He wears a starched shirt and tie, is very personable, but a little too slick for some of Wildwood's owners. Stevens has spent many years in more conventional food businesses–perhaps dealing with varieties of salad dressing, jerky, sauces, etc. Now he is trying to be a venture capitalist. Apparently he thinks

PROCEEDINGS

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1997

that soy is an industry with a bright future, so he decided to jump in. So far, Billy has seen no change in their products or management structure at Quong Hop.

Update: Talk with Martha Devine of Soy Devine in San Francisco. 1998. Aug. 21. She talked with one of Quong Hop's delivery truck drivers, who said that a new partner had joined the company, an American guy, who has invested a lot of money. It was a partner, not a buy-out. They are expanding their production facility in South San Francisco into the adjacent building, and they are adding many new products to their line. Address: Wildwood Natural Foods, 135 Bolinas Rd., Fairfax California 94930. Phone: 415-485-3940 X-47.

1414. Mueller, Ed. 1998. Update on Takoma Soy Inc. and Potomac Whole Foods (Interview). *SoyaScan Notes.* July 22. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Takoma Soy has not yet started making tofu; they hope to be in production in a couple of years. They are short on capital and using what they have to work on the building, and to build a bakery and community kitchen. Jon Kessler is still at Twin Oaks; he works in the field of soy, but he no longer works at their tofu shop. Potomac Whole Foods (PWF), their wholesale and distribution business, brings in the money. Ed Talked with Yaron the other day. Yaron is at Olive Tree Works; they are the people who use Oak Tree's tofu to make other products, such as savory tofu. "If we started a tofu business, we'd go into partnership with Olive Tree Works."

Ed is quite sure that Bean Mountain Natural Foods (of Weaverville, North Carolina) is out of business. He thinks that some of their equipment ended up at Twin Oaks.

Ed now buys and distributes tofu from Spring Creek, which makes a firm nigari tofu and is located in a relatively depressed part of West Virginia. So this is an ethical and social issue; Ed does not want to put them out of business, or even really compete with them. If Ed started making tofu then, of course, PWF wouldn't distribute their tofu–and that would hurt them because PWF is their biggest distributor. So Ed is thinking of making a softer tofu curded with calcium tofu, then using that as a base for other tofu products such as tofu mayonnaise, tofu puddings, etc. He would also like to make a good soymilk. In that way, Ed would not compete with Spring Creek.

Ed is still interested in starting a tofu school as part of his tofu factory.

Update: Talk with Jon Kessler of Sunergia. 1999. March 21. Ed is still working on his soy business. He hopes to be making commercial products by the end of 1999. Jon heard from Ed Mueller of Potomac Whole Foods and Bread of Life that Bud, Inc. of Baltimore has lost its lease and perhaps has ceased operations. Ed is hoping to move the Bud equipment up to Hancock, Maryland, and start a new tofu shop there. Address: 11 South Pennsylvania Ave., Hancock, Maryland 21750. Phone: 301-678-5283.

1415. 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.

1416. Black, Pam. 1998. Is soy the recipe for what ails you? *Business Week.* Oct. 26. p. 162-E18.

• ***Summary:*** The soybean gained prominence as a health food in the 1970s. Now even former junk-bond king Michael Milken is "promoting soy's potential to fight prostate cancer..." During the past decade, scientists have discovered estrogen-like active substances named isoflavones or phytoestrogens which may be responsible for "soy's health effects."

Researchers have proven that soy has cardiovascular benefits, primarily by lowering low-density lipoprotein, or LDL ("bad cholesterol"). The mechanism is not clear; the soy may keep LDL from being oxidized to form plaques that clog arteries. Soy increases flexibility of the arteries, which stiffen and harden with age. Thomas Clarkson, professor of comparative medicine at Wake Forest University School of Medicine (Winston Salem, North Carolina) emphasizes that some amount of soy protein must be consumed for the phytoestrogens to exert cardio-protective benefits. Isoflavone pills alone will not be effective. Scientists recommend consuming 30 to 60 mg of isoflavones per day with 7-10 gm of soy protein. A table shows good sources of soy protein, plus their content of isoflavones (mg) and protein (gm): Solgar Iso-Soy powder (1 oz) 103 / 12. GeniSoy natural protein powder (1 oz) 74 / 24. White Wave baked tofu (3 oz): 52 / 19. White Wave tempeh (3 oz) 47 / 18. Edensoy original drink (soymilk, 8 oz) 41 / 10. Soyboy Not Dogs (1.5 oz per dog) 35 / 7.

Soy's effects on cancer are less conclusive; most researchers doubt that soy is harmful. Soy has great appeal to women approaching or past menopause. Nutritionists think soy phytoestrogens may be safer than Premarin–which may increase the risk of breast cancer.

"And for those of you who've always turned up your noses at tofu, there is good news: Soy is available in such guises as hot dogs, burgers, cheeses, and ice cream."

1417. Culbertson, Ewell. 1998. The work of Seedex Inc. in Longmont, Colorado, and its president Akio Suzuki Colorado (Interview). *SoyaScan Notes.* Dec. 16. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Seedex is a Japanese seed company in Longmont, Colorado. Akio Suzuki, who is about age 60, was born and raised in Japan, but has a PhD in agriculture from North Carolina State University, is the company president. Seedex's main business is sugar beet seeds, but they are looking at edamamé as a possible new seed product. Seedex has a relationship with two seed companies in Japan that breed edamamé and are working on about 20 varieties. Seedex has also worked closely with Dwayne Johnson for the last 4-5 years in developing new varieties of edamamé. Last August (4 months ago) Seedex paid for Dwayne to go to Japan to study seed harvesting equipment for mature dry soybeans.

When a grower, such as Ewell, buys good quality edamamé seed from Japan it costs $12-$26 per pound. When seeded at the rate of 80 lb/acre this comes to $960 to $2,080 per acre just for the seed! Seedex now has excess edamamé seed that they would like to sell.

Ewell believes that edamamé has a bright future in America since consumption is now growing rapidly in various parts of the country. Mr. Suzuki seems to have a much less optimistic view of the crop and its future; therefore, Ewell feels, the pace of the Seedex development program is slow and somewhat half-hearted. Address: Pachamama Organic Farm, 10771 North 49th St., Longmont, Colorado 80503. Phone: 303-776-1924.

1418. Anthony, Mary S.; Clarkson, T.B.; Williams, J.K.

1998. Effects of soy isoflavones on atherosclerosis: Potential mechanisms. *American J. of Clinical Nutrition* 68(6S):1390S-03S. Dec. Supplement. [28 ref]
• ***Summary:*** Cross-cultural comparisons of coronary heart disease (CHD) have show that age-adjusted mortality rates are 6-fold lower in Japan than in the United States in men aged 40-69 years. There is strong evidence that soy isoflavones ate the active components in soy. Address: 1. Comparative Medicine Clinical Research Center, Bowman Gray School of Medicine of Wake Forest Univ., Medical Center Boulevard, Winston-Salem, North Carolina 27599-7400.

1419. Burke, Gregory L.; Hughes, C.L., Jr.; Anthony, M.S. 1998. Hormonal effects of soy–Postmenopausal studies: The potential use of a dietary soy supplement as a postmenopausal hormone replacement therapy (Abstract). *American J. of Clinical Nutrition* 68(6S):1532S. Dec. Supplement.
• ***Summary:*** "Traditional hormone replacement therapy (HRT) reduces the cardiovascular and osteoporosis disease burden and reduces vasomotor symptoms in postmenopausal women. Despite these beneficial effects, questions remain about the risk-benefit ratio of HRT use because of the possibility of increased risk for estrogen-dependent reproductive cancers (breast and endometrium). Alternatives to HRT such as dietary soy (or isoflavones) intake may offer great public health benefit. Ecologic data suggest that substantial differences in chronic disease rates exist between areas with high versus low intakes of dietary soy. The potential for dietary soy supplementation to serve as an alternative to HRT has been suggested by animal studies and a few limited human clinical trials. In a short term double-blinded crossover clinical trial of 43 perimenopausal women (6-wk treatment periods), slight improvements in reported menopausal symptom severity and health related quality of life was observed in women consuming a soy protein isolate supplement compared with an isocaloric carbohydrate placebo supplement. Early evidence suggests that women with vasomotor symptoms have excellent adherence to soy protein supplementation regimens. In addition, improvements were observed in lipid / lipoprotein profile and blood pressure levels in this relatively normocholesterolemic and normotensive sample of women. Current data from human and animal studies suggest that soy supplementation does not appear to be associated with other traditional HRT-related outcomes, such as hypertriglyceridemia and adverse changes in the breast and endometrium. Longer term and larger studies are needed to better address the issue of potential adverse outcomes associated with isoflavone intake." Address: 1. Dep. of Public Health Sciences; 2. Obstetrics and Gynecology; 2-3. Comparative Medicine. All: Bowman Grey School of Medicine of Wake Forest Univ., Winston-Salem, North Carolina.

1420. Zeisel, Steven H.; Szuhaj, Bernard F. eds. 1998. Choline, phospholipids, health, and disease. Champaign, Illinois: AOCS Press. xxviii + 148 p. Proceedings of the 7th International Congress of Phospholipids, held Sept. 1996 in Brussels, Belgium. Illust. Index. 24 cm. [633 ref]
• ***Summary:*** Contains many "Meeting abstracts" at the beginning, plus 13 chapters by various authors and a list of attendees. Address: 1. Univ. of North Carolina at Chapel Hill, Chapel Hill, North Carolina; 2. Central Soya Co., Inc., Fort Wayne, Indiana.

1421. **Product Name:** Revival (Doctor-Formulated Soy): Chocolate Daydream.
Manufacturer's Name: Revival.
Manufacturer's Address: 1031 E. Mountain St., Building 302, Kernersville, NC 27384. Phone: 336-0722-2337.
Date of Introduction: 1998??
Ingredients: Chocolate: Soy protein isolate, fructose, sucrose [white sugar], Dutch processed cocoa, calcium phosphate, maltodextrin, soy lecithin, salt, potassium chloride, artificial flavor, undegraded carrageenan, carboxymethylcellulose, xanthan gum.
Wt/Vol., Packaging, Price: 2.3 oz (64 gm) foil packet. One serving.
How Stored: Shelf stable.
New Product–Documentation: Packet and news release sent by Revival. 2003. Sept. 3.

1422. Suzuki, Akio. 1999. The work of Seedex Inc. in Longmont, Colorado (Interview). *SoyaScan Notes.* Jan. 6. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Seedex is a Japanese seed company in Longmont, Colorado. Akio, the company founder and president, earned his PhD from North Carolina State University in 1968; his thesis concerned his basic research on tobacco genetics. Upon graduation he went to work for the Great Western Sugar Co. headquartered in Denver (owned by the Hunt brothers–the famous Texas speculators), where he worked for 17 years. In April 1985 he left Great Western (which he could see was on the verge of bankruptcy) and started to work for Mitsui Co., the Japanese trading company and conglomerate; Great Western went bankrupt 2 or 3 months later. His first job with Mitsui was to develop and establish a seed company in Colorado that focused on breeding sugar beets. He founded Seedex in 1987, with financial help from Mitsui which became the majority stockholder; Akio became and still is a minority stockholder. Mitsui is now the parent company of Seedex.

Akio believes that it would be difficult to export edamamé (even if they were of superior quality) from Colorado to Japan because Japan now buys most of their edamamé from China, and prices from China are currently very depressed (low). However Japanese are becoming

increasingly interested in organically grown foods, so there may eventually be an opportunity to export organic edamamé to Japan.

Edamamé is listed as a typical garden vegetable (just like tomatoes or cucumbers) in most seed catalogs in Japan. The seed that is used has been specially bred over many centuries to produce delicious edamamé. Address: PhD, Founder and President, Seedex, Subsidiary of Mitsui & Co. (USA) Inc., 1350 Kansas Ave., Longmont, Colorado 80501. Phone: 303-678-7333.

1423. Bernard, Richard L. 1999. Specialty soybean cultivars from 1990 to present: Public institutions, U.S. and Canada. Urbana, Illinois. 2 p. Feb. Unpublished typescript.

• ***Summary:*** This list excludes introductions and privately developed cultivars. For each variety is given: Originating organization name and soybean breeder, cultivar name, year released, typical seed size, and parentage. The organizations and named varieties listed in this table are: (1) Agriculture Canada, Ottawa–Cober: AC Pinson, AC Colibri, Micron, AC Colombe (1995-96–small seeded). (2) Virginia Polytechnic and State Univ. (Blacksburg)–Buss: MFS-551 to 591 (1993-97). (3) North Carolina State Univ & USDA–Carter: Pearl (1994g). (4) University of Minnesota–Orf: Black Kato, Toyopro, UM3 (1995-98). (5) North Dakota State Univ.–Helms: Danatto, Norpro (1996-97). (6) Univ. of Nebraska–Graef: Saturn, Mercury, NE2696LS, NE3496SS (1994-96). (7) Ohio State Univ.–S.K. St. Martin & R.J. Fioritto: Ohio FG1, Ohio FG2 (1994). (8) Univ. of Illinois–R. Bernard: KS-2 (1998). (9) Iowa State Univ. and Puerto Rico–Fehr: 45 varieties, all with names such as HP201, IA 1002, or LS201 (1990-98). Fehr is breeding all types of specialty soybeans (see symbols, below).

Symbols: g = general public release; others are exclusive or by license or contract. p = high protein. lx2 = no lipoxygenase-2. lx0 = no lipoxygenase. Address: Prof. of Plant Genetics (Retired), Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801.

1424. Bernard, Richard L. 1999. Summary of research & breeding programs for food type soybeans. Urbana, Illinois. 3 p. Feb. Unpublished typescript.

• ***Summary:*** This list excludes introductions and privately developed cultivars. Each entry includes: Originating organization and soybean breeder, food uses (mainly natto and tofu), and breeding objectives. For natto, 100 beans should usually weigh less than 10 gm, whereas for tofu, 100 beans should usually weigh more than 20 gm.

(1) Agriculture Canada, Ottawa–E.R. Cober: Natto and tofu. (2) Agriculture Canada, Harrow–V. Poysa: Natto and tofu. (3) Virginia Polytechnic and State Univ. (Blacksburg)–G.R. Buss: Natto and tofu. (4) North Carolina State Univ.–T. Carter: Natto and tofu. (5) South Carolina State Univ.–E. Shipe: Natto. (6) Georgia State Univ.–R. Boerma & R. Mian: Tofu. (7) Univ. of Minnesota–Orf: Natto and tofu. (8) North Dakota State Univ.–T. Helms: Natto, sprouts, and tofu. (9) Ohio State Univ.–S.K. St. Martin & R.J. Fioritto: Tofu. (10) Univ. of Illinois–R. Bernard: Natto and edamame. (11) Iowa State Univ. and Puerto Rico–W.R. Fehr: Natto, tofu & edamame. (12) Missouri–S. Anand & D. Sleper: Natto and tofu. (13) Univ. of Nebraska–G.L. Graef: Natto, sprouts, tofu, green vegetable [edamame]. (14) Washington State Univ., T. Lumpkin: Edamame.

Small-seeded parents: Camp, Chico, Chohakuzan, Jizuka, Kosuzu, Nattosan, Pearl, Pureunkong, Vance.

Large-seeded parents: Benning, Danbaekong, Enrei, Hyuga, Misuzu Daizu, Nakesennari, Saturn, Shiromeyutaka, Suzuyutaka, Tamahikari, Tanbaguro, Totoshirome.

Edamame parents: Disoy, Magna, Prize, Grande, Vinton 81, Verde, Emerald, LS201, LS301, Saturn. Address: Prof. of Plant Genetics (Retired), Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801.

1425. Parks, Tom. 1999. Re: Update on the use soybeans and soyfoods in the NASA space travel. Letter to William Shurtleff at Soyfoods Center, May 28. 2 p. Typed, with signature on letterhead. Preceded by a phone call.

• ***Summary:*** Of all the food uses of soybeans he investigated for use in outer space, the one that made the most sense was green vegetable soybeans. They require very little processing, are a delicious whole food, and generate no waste except for the pods. Dave Raper at North Carolina State did the early greenhouse studies on growing soybeans for use in outer space.

The people who would probably know the most about use of soybeans as a food source in space travel are Dr. Bob McElroy at NASA-Ames in Sunnyvale, California (phone: 650-604-5573) and Charles T. Bourland of the Johnson Space Center in Houston, Texas (phone: 281-483-3632). He was the chief food scientist at NASA, responsible for putting together the meals. Before coming to NASA 12-15 years ago he worked for a firm that did contract work for NASA. At Rutgers, New Jersey, contact Dr. Joe Kokini (phone: 732-932-8978). Tuskegee (Alabama) has also done a little work during the past 10 years on soybeans for food in space; contact Dr. Phil Loretan.

Don Heninger at the NASA–Johnson Space Center (Houston, Texas 77058) is willing to reprint some of the early reports on soy in space travel. His phone is 218-483-5034. Address: Food and AgroSystems Inc., P.O. Box 62185, Sunnyvale, California 94088. Phone: 408-245-8450.

1426. **Product Name:** Organic Miso Tamari.
Manufacturer's Name: American Miso Co., Inc.
Manufacturer's Address: 4225 Maple Creek Rd., Rutherfordton, NC 28139. Phone: 828-287-2940.
Date of Introduction: 1999 May.
Wt/Vol., Packaging, Price: 5 oz or 10 oz bottle.

How Stored: Refrigerated.
New Product–Documentation: Talk with John Belleme. 1999. Nov. 18. This product was first sold in about May 1999, but it did not appear in the Great Eastern Sun catalog until November.

1427. **Product Name:** Regenezyme Plus: Soybean Sprout Concentrate [Capsules].
Manufacturer's Name: New Millennium Foods, Div. of Sedna Specialty Health Products.
Manufacturer's Address: P.O. Box 1453, Andrews, North Carolina 28901. Phone: 1-800-223-0858.
Date of Introduction: 1999 May.
Ingredients: Soy sprout concentrate, and soy isoflavone concentrate (see below).
Wt/Vol., Packaging, Price: 180 capsules (512 mg each) per bottle. Retails for $34.50 (1999/10).
How Stored: Shelf stable.
New Product–Documentation: Talk with Irene Stewart of New Millennium Foods. 1999. Oct. 20. Her company buys its powdered soy sprouts from a small grower of soy sprouts in Colorado. They are organic and certified non-GMO. The capsules are vegetarian. The soy sprout powder is fortified with powdered isoflavones by the supplier before encapsulation. Six capsules supply 36 mg of total isoflavones. Product with Label sent by Irene Stewart. 1999. Oct. 20. The white plastic bottle is 2½ inches in diameter and 5 inches high. On the front panel is a square color illustration of a green soybean with a green soybean leaf and dark brown background. "Regenezyme is a sprouted food concentrate–select sources of pure, organic soybean sprouts are low temperature dried under a specially designed method which protects the valuable enzymes from denaturation. Soy sprouts contain naturally occurring isoflavones, mixed carotenoids (lutein, zeaxanthin, cryptoxanthin, alpha and beta carotene), vitamin E and quercitin. Regenezyme Plus is a scientifically designed formula containing a concentrate of soy isoflavones (genistein and daidzein complexes). Each capsule contains: Soy sprout concentrate–500 mg (provides about 1 mg isoflavones). Soy isoflavone concentrate–12.5 mg (provides about 5 mg isoflavones). Suggested use: 6 capsules daily, or as directed by a health professional." One serving (6 capsules) provides 36 mg of soy isoflavones. There are 30 servings per jar. Soyfoods Center taste test: The powder is light tan; it has an appealing fragrance but a rather beany flavor–probably due to the method of heating/cooking.

Leaflet. 1999. "Regenezyme and Regenezyme Plus." Contains information about both products and soybean sprouts, plus a nutritional analysis of soy sprouts and an analysis of the isoflavone content of soy sprouts.

1428. U.S. and Canadian public soybean breeders and geneticists (Database printout). 1999. 8 p.
• ***Summary:*** This table has four columns: (1) State abbreviation (e.g., FL, GA, IL). (2) Surname and initials of person, with surname listed first. (3) Full address, including ZIP / Postal code. (4) Phone, fax, and email. The entries are sorted by state abbreviation, and within each state by surname.

Alabama: V.T. Sapra, D.B. Weaver. Arkansas: D.K. Ahrent. W.L. Mayhew. C.H. Sneller, D. Widick. Delaware: R. Uniatowski. Florida: A. Zimet. Georgia: H.R. Boerma, R. Mian, W. Parrot, P.L. Raymer.

Iowa: S.R. Cianzio, W.R. Fehr, John Imsande, Marcia Imsande, R.G. Palmer, R.C. Shoemaker. Illinois: R.L. Bernard, B. Diers, T. Hymowitz, D.A. Lightfoot, O. Myers, R.L. Nelson, C.D. Nickell, M. Schmidt, R.J. Singh, L. Vodkin. Indiana: G.R. Bowers, Guodong Zhang, S.A. Mackenzie, N.C. Nielsen, J.R. Wilcox. Kansas: W.T. Schapaugh. Kentucky: D.E. Hershman, T.W. Pfeiffer.

Louisiana: B.G. Harville, S.H. Moore. Maryland: S.J. Britz, D.R. Buxton, P.B. Cregan, P. Dadson, T.E. Devine, J.M. Joshi, W.J. Kenworthy. Minnesota: J.H. Orf. Missouri: S.C. Anand, P.R. Arelli, K.M. Clark, R. Hofen, H. Minor, D. Sleper. Mississippi: T.C. Kilen, J.M. Tyler, B. White.

North Carolina: J.W. Burton, T.E. Carter. North Dakota: T.C. Helms. Nebraska: G.L. Graef, D.J. Lee, J.E. Specht, P. Staswick. Ohio: R.L. Cooper, J.J. Finer, R.J. Fioritto, D.G. Lohnes, S.K. St. Martin, T. VanToai, L.H. Edwards. Pennsylvania: O.E. Hatley, B.W. Pennypacker.

South Carolina: E.R. Shipe, H.T. Knap. South Dakota: R.A. Scott. Tennessee: P.M. Gresshoff, V.R. Pantalone. Virginia: P.S. Benepal, H.L. Bhardwaj, G.R. Buss, T. Mebrahtu, Pengyin Chen, N. Rangappa. Washington state: T. Lumpkin.

West Virginia: R.W. Zobel.

Support Units: Illinois: W.E. Rayford, D.I. Thomas. Maryland: J. Strachan.

Foreign: Canada: G.R. Ablett, I. Rajcan, E.R. Cober, V. Poysa, D. Simmonds, H.D. Voldeng. Puerto Rico: S.R. Cianzio, S. Torres.

Retired Geneticists and Breeders: Canada: J.W. Tanner. Arkansas: C.E. Caviness. Iowa: D.E. Green. Pennsylvania: R.C. Leffel. Texas: R.D. Brigham.

1429. MacElroy, Bob. 1999. Recollections of NASA's early research on growing soybeans for the space program (Interview). *SoyaScan Notes.* June 24. Conducted by William Shurtleff of Soyfoods Center. [2 ref]
• ***Summary:*** Bob was manager of the CELLS program at NASA and supervised a lot of research on plant growth. The basic proposals were drawn up in about 1978 and funding began in about 1980. The basic issue was productivity of various food plants grown hydroponically in a closed environment. The research work on soybeans was done by David Raper of North Carolina State University at Raleigh. He was in the department of soil science there and is now a professor of horticulture at Raleigh. Phone: 919-515-2644.

NASA was looking at growing plants in two different environments: In flight, and after landing on the moon or Mars. A major problem with in-flight plant production is light. Installing windows in spacecraft is too expensive, so the light must be piped in from a solar collector via fiber optic cables. It takes 9-12 months to travel to Mars. Scientists realize it no longer makes sense to try to grown much food on the spacecraft, but there is a psychological advantage of growing small amounts of food (about 3% of calories) using a hydroponic "salad machine" that produces fresh lettuce, etc. The astronauts like the fresh food and they enjoy the work of growing it. In a space station, it makes sense to grow foods on board; analyses show that the investment pays off in about six years. Once the mission lands on Mars and constructs a base, it is very important to grow food at the base–again hydroponically.

The first work on utilization of soybeans on spacecraft was organized and coordinated by Cary Mitchell, a professor of horticulture at Purdue University, Indiana. Phone: 650-604-0248. The first research was probably done by Hoff and Howe at Purdue University. Howe was a Chinese-American woman (now retired). The people at Purdue also worked with Marcus Karel, a professor of food science at MIT (Massachusetts Institute of Technology) during the mid-1980s; Marcus is now at Rutgers, in New Jersey. Address: Deputy Program Manager, Gravitational Biology and Ecology Program, Mail Stop 19-20, NASA Ames Research Center, Moffett Field, California 94035. Phone: 650-604-5573.

1430. Pan, Yuanlong; Anthony, M.; Clarkson, T.B. 1999. Effect of estradiol and soy phytoestrogens on choline acetyltransferase and nerve growth factor mRNAs in the frontal cortex and hippocampus of female rats. *Proceedings of the Society for Experimental Biology and Medicine* 221(2):118-25. June. [35 ref]
• ***Summary:*** "Our data suggest that soy phytoestrogens may function as estrogen agonists in regulating ChAT [choline acetyltransferase] and NGF [nerve growth factor] mRNAs in the brain of female rats."

"Alzheimer's disease is strongly associated with decreased ChAT activity and loss of cholinergic neurons." Address: Comparative Medicine Clinical Research Center, Wake Forest Univ. School of Medicine, Winston-Salem, North Carolina.

1431. *Soybean Digest.* 1999. Global Soy Forum: A roundup of the world's best soybean research. June. p. 5-7, 10-13, 16-17, 20, 22, 24-25, 28, 30, 32, 34, 36-37, 39-42.
• ***Summary:*** This special issue previews the forthcoming Global Soy Forum '99, to be held in Chicago August 4-7. It summarizes key papers to be presented. Contents: Let's face the challenge (p. 5). A special invitation to *Soybean Digest* readers, by co-chairs Dave Erickson and Long (p. 6). Program (p. 7). Genetic improvement (p. 10-13). Crop & soil management (p. 16-17, 20, 22). Pest management (p. 24-25, 28, 30). Processing and utilization (p. 32, 34, 36-37). Management & marketing (p. 39-42).

A pie chart (p. 5) shows world soybean production in 1997: USA 47%, Brazil 20%, Argentina 11%, China 10%, India 3%, Canada 2%, Paraguay 2%, EU [European Union] 1%, other 4%.

Note: This event is surrounded by an amount of hype usually not found with professional agricultural conferences. On page 6, co-chairs Erickson and Long state: "In August, you have an opportunity to be part of an event that soybean farmers will be talking about for years to come. Global Soy Forum '99–the first worldwide assembly of the soybean industry... this is truly the event of the century for our industry. We're expecting 1,000+ participants, representing more than 45 countries..."

Note: What nonsense! In fact, this is the sixth World Soybean Research Conference. The constitution of the World Soybean Research Conferences states that they will be held "about every five years to consider research progress since the previous conference." The first such conference was held on 3-8 Aug. 1975 at the Ramada Inn in Champaign, Illinois (USA), and sponsored by four U.S. organizations, including the University of Illinois; 622 people from 48 countries attended. The second was held in 1979 at North Carolina State University (USA). The third was held in Aug. 1985 at Iowa State University, Ames, Iowa (USA); 1,050 persons from 66 countries attended. The fourth was held in March 1989 in Buenos Aires, Argentina–for the first time outside the USA. The sixth was held in Feb. 1994 in Chiang Mai, Thailand.

Like most past World Soybean Research Conferences, this one focuses on soybean production, and has relatively little about soybean utilization or soyfoods. One paper in the Utilization section is titled "Is tofu safe to eat?"

1432. Belleme, John. 1999. The story of how the Oak Feed Miso, Inc. was established, and its relationship to the Erewhon Miso Co. Part I. 1943 to 1978 (Interview). *SoyaScan Notes.* Aug. 22. Conducted by William Shurtleff of Soyfoods Center. With updates in Nov. 1999.
• ***Summary:*** Without John Belleme's perseverance and determination, the American Miso Co. would almost certainly never have come to be.

John was born on 3 Jan. 1943 in Union City, New Jersey–right across the Hudson River from the Empire State Building. His father died when he was young, so he and his brothers and sisters were raised by their mother. Years later John found that he was dyslexic–but in school this undiagnosed dyslexia caused him many problems and great frustration. He failed first, second, and third grades, so he was much older than his classmates. The frustration sent him to reform school at age 13½ and at age 14 he was

"kicked out of New Jersey." His mother moved the family to Miami, Florida. He was old enough to drive a full-sized motor cycle to the sixth grade. He managed to graduate from high school (just short of age 21) in Miami, went to junior college in Miami for two years, then won a scholarship to the University of Miami. He had liked biology, science, and research since age nine, so once he settled down he became a good student–though because of dyslexia he could barely read or write when he started college. In the mid-1970s he graduated from the University of Miami after two years with high grades in science, and got a job at the Veteran's Administration (VA) hospital in downtown Miami. He was put on one of the first teams in the United States that used and did research using a Phillips electron microscope. Soon they were doing pioneering research. Soon John was quickly promoted to the position of research biologist, a title usually reserved for those with a PhD degree. Soon the team's research was being published in scientific journals. "It was very exciting." This job, which paid very good money, was mostly a photography job and the hospital had a huge, state-of-the-art darkroom. John worked with an amazing older man from Germany, who required him to carry a camera everywhere he went and to shoot and print his photos as a way of developing his photographic skills. Before long John was a very skilled photographer–and electron microscopist.

But after a while he was transferred to a chemotherapy, a job which he disliked. So he started graduate school to be a school psychologist–and first realized that he had dyslexia.

Sandy Pukel (pronounced pyu-KEL) was the center of a small but growing community of people interested in macrobiotics and natural foods in Coconut Grove, a suburb of Miami. Sandy had a tiny food store. John was with a girl who asked him to buy her some foods at this store. Before long, he was a regular shopper. Then he started to get interested in macrobiotics, and before long he found himself doing volunteer work at the little store on weekends. Sandy suggested that, to study macrobiotics in depth, he should go to Boston and study with Michio Kushi. After attending a few of Sandy's macrobiotic classes in Coconut Grove, John quit his VA job and left for Boston.

1976 July 4–John arrives in Boston and starts to live at the macrobiotic study house of Ken and Anne Burns. John wrote in 1987 that he "stayed for what was to be one of the most exciting years of my life." Ken is an exceptional teacher, and the house has a *dojo* atmosphere–like that of a martial arts practice place or Zen monastery. The temperature is kept at 40ºF during the winter, and life is spare but rich and deep. Through Ken, John and Jan got very interested in wild foods, and planned to publish a book on the subject. By the fall of 1976 John is interested in miso. He had read *The Book of Miso* by Shurtleff and Aoyagi and on Nov. 17 he attends an afternoon miso class and workshop they conduct at the Burnses' house. John is intrigued by the romance of going to Japan to learn how to do something. After the workshop he decides that he wants to travel to Japan, learn all he can about making miso in the traditional way, then come back to America and help to start a miso factory. John recalls: "I wanted to go to Japan and bring something back. I was going to do this or die."

After a year in Boston, John worked at Harvard Medical School for a while. Then he and Frank and Phyllis Head drove to Mexico in Frank's van with the idea of teaching the Mexican people about macrobiotics–with whole grain tortillas, etc. Living in a little village in rural Mexico in a house with no electricity and no running water, they managed to tough it out for one summer. Then multiple scorpion bites and general hardship drove them back to America. From Frank's father's estate in Texas, John phoned Sandy, who offered him a job.

1978–John had heard Michio Kushi talk about starting a shoyu factory in America. Michio hoped to involve Sendai Miso Shoyu Co., Erewhon, and some Oak Feed people such as Sandy Pukel and some of Sandy's investor friends. One day John–who was still a pretty small man on the totem pole–he said to Sandy, "Let's start a miso factory in America–rather than a shoyu factory." He then explained his idea about studying miso in Japan. Sandy's response was "Good! Michio and I have been wanting to do that for a long time too." John then started to take Japanese language lessons from Berlitz. Sandy established an Oak Feed Miso account on which John could write checks to pay for these lessons, for his travels related to miso in the USA, and for legal fees to form a corporation, etc. Sandy's main concern was running the Oak Feed Restaurant next to the store.

1978 Aug. 6–William Shurtleff is in Miami, Florida, visiting Robert Brooks and Mary Pung of Swan Foods, a soyfoods manufacturer. He presents a slide show (2-3 blocks from Oak Feed Store) on miso at which John Belleme, Sandy Pukel and one other person are present.

1978–Various groups come together in an attempt to start a miso company in America. The "Oak Feed group" initially consists of Sandy Pukel of Oak Feed Co., John and Jan Belleme, and a few other investors. The "Erewhon group" was composed of Michio and Aveline Kushi, Mitoku, Sendai Miso-Shoyu Co., and a few people from Erewhon. Michio communicated with the Japanese members of the "Erewhon group" (Mitoku, Sendai) by phone; they never attended meetings.

1978 Dec.–The Oak Feed and Erewhon groups meet shortly before Christmas at Michio and Aveline's home on 62 Buckminster Rd., Brookline (Boston), Massachusetts. Those present were Michio Kushi, Sandy Pukel, and John Belleme. They begin discussions about starting the "Erewhon Miso Co." Everybody agreed on that company name. John recalls: "It couldn't have been called anything else."

What was the need for a miso company in America? First, they wanted to have unpasteurized miso. All the miso being imported by Erewhon from Japan was pasteurized in

sealed plastic bags. Cold Mountain miso, made near Los Angeles, California, was sold unpasteurized in 14 oz plastic tubs. So the people interested in the new company began to criticize this product as being made with machines, non-organic, etc. Where would the factory be located? What might it be called? How big might it be? Who might be involved from Japan?

Sandy, Michio, and John all deserve some credit for the original idea of starting a miso factory in America. During 1978 and 1979 every time that Sandy or John went to Boston, they would talk with Michio about the miso company idea. Continued. Address: Honto Press, P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1433. Belleme, John. 1999. The story of how the Oak Feed Miso, Inc. was established, and its relationship to the Erewhon Miso Co. Part II. 1979 to 1980 (Interview). *SoyaScan Notes.* Aug. 22. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: 1979 Jan.–John Belleme in Coconut Grove, Florida, writes Bill Shurtleff in California on Oak Feed letterhead that he and Sandy are starting to look for land for the miso company. "Bill, If you were going to make miso in the U.S., based on climate, what state would you choose?" 1979 Feb.–Oak Feed Miso, Inc. is incorporated. Sandy Pukel and John Belleme are the principals.

1979 April–Barry Evans of Coconut Grove, Florida invests money and becomes an important shareholder in the new corporation and a member of the "Oak Feed group."

1979 spring–Members of the Oak Feed and Erewhon groups meet in North Carolina in the first attempt to locate a site for the miso plant. In attendance are Michio and Aveline Kushi, Sandy Pukel, John Belleme, Frank Head, and Junsei Yamazaki and his wife (both from California). Michio thought the Yamazakis should be there, so the group paid for their transportation. Junsei was tasting the soil, tasting the water–it was bizarre. Then Aveline insisted that they all rent a car and drive to Atlanta, Georgia, since she thought the miso factory should be near some big city like Atlanta. Every now and then Junsei would sniff the air or get out of the car and taste the soil. John recalls that this trip was disorganized, unsuccessful, and very frustrating.

Why were they looking for land in North Carolina? They knew some people who lived in North Carolina, and they knew a real estate man in North Carolina. But after the trip with Junsei Yamazaki, John began to think that it didn't really matter where they located the company. Sandy, who is from Coconut Grove (a suburb just south of Miami), Florida, does not like cold weather–not even as cold as North Carolina. John is also from Miami. Moreover, the miso factory was supposed to be a small part of the whole project, which was to be called the Oak Feed Land Project. That was Sandy's idea, and it was supposed to be an educational center, summer camp, Kushi Institute–similar to what ended up being at Becket. The Kushi's Ashburnham project had failed by this time. There is actually still a 4-by-8-foot sign on the property that says "Oak Feed Land Project." Sandy and John wanted a "land project" in a warmer climate that was closer to Miami. They learned that there is an isothermal belt in North Carolina, an unexplained warm stretch of land that runs through the Piedmont below the mountains in western North Carolina; this happens to be an excellent place to make miso because the warm climate brings the miso to maturity faster.

In mid-1979 Sandy Pukel, armed with this new information about the isothermal belt, went up to western North Carolina and bought one of the first pieces of land he was shown–129 acres. The land cost about $120,000 and the down payment was probably about $10,000 to $15,000. Rutherfordton, North Carolina, turned out to be the perfect location. "What would be a 2-year miso in Massachusetts using Mr. Onozaki's basic formula, was a 1-year miso in North Carolina." Moreover, Great Eastern Sun and the Macrobiotic Wholesale Company, and a large community of macrobiotic people in Asheville are in North Carolina because of this sequence of 'accidental' events born largely of ignorance.

After the land had been purchased, John and Jan rode to North Carolina from Miami on John's motorcycle and saw the land for the first time. They took $20,000 cash, which belonged to the new Oak Feed Miso, Inc., and deposited it in a safe-deposit box at the BB&T Bank near Rutherfordton; John kept the key. Sandy flew up to North Carolina while John was there. John and Jan, and Sandy and Jackie (his wife) all went together to the First Citizen's Bank in Tryon, North Carolina; after signing something, they returned to Miami. John purchased two round trip tickets to Japan, and set aside $5,000 for living expenses which he would take to Japan–using corporation funds from the safe-deposit box.

1979 Oct.–John and Jan Belleme (who have just been married) leave Florida to travel to Japan. On the way they visit Thom Leonard at his new Ohio Miso Co.; he has already made several thousand pounds of miso. Arriving in Japan in late October, they spend several weeks in Tokyo with Mr. Kazama "hanging around his office." The plan had been for the Bellemes to study miso making at Sendai Miso Shoyu, but basically John refused because he knew they had a big factory and he wanted to learn the more traditional way that he planned to use when he returned to America. After John handcuffs himself to Mr. Kazama's desk, he arranges for the Bellemes to study miso-making with the Onozaki family 10 miles north of Yaita city, in Tochigi prefecture, northern Japan–even though Mr. Kazama had not previously known the Onozaki family. Finally Mr. Kazama drives the Bellemes northward to visit Sendai Miso Shoyu Co. On the way back he drops them off in a country village outside Yaita at the home of the Onozaki family, who run a traditional koji and miso factory. Imagine their surprise when, out of the

blue, two Americans appear intent on learning the traditional Japanese art of making miso!

In November John and Jan begin to study miso making at the *Onozaki Kôji-ten,* while living with the Onozaki family. They paid the family a certain monthly fee for room and board, and an additional fee for the teaching and training. He and Jan also received a small monthly wage. At one point John requested an additional $5,000 from the corporation. The Onozaki family made and sold both miso and koji. About half the koji was sold, mostly 1-2 pound bags to individuals who used it at home, mostly to make amazake. When John was there, the Onozaki family made much more miso than koji. The Bellemes' study and training continue until the next summer. While in Japan, John wrote many letters back to macrobiotic friends in America as part of campaign to (1) try to prevent Sandy from giving away the miso company to the "Japanese group," (2) show that he was learning how to make the real traditional Japanese miso, and (3) argue that much of the so-called "traditional" miso being imported from Japan was actually made in modern factories.

1980 April–A letter from John Belleme, titled "Making miso in Japan" is published in *GOMF News* (Oroville, California). It is the first published account of his experiences with the Onozaki family. 1980 May–According to Mitoku's records, the first shipment of Onozaki rice miso from Onozaki Koji-ten in Tochigi prefecture is sent by Mitoku to Oak Feed Store in Miami, Florida; 84 cartons and 4 kegs. John Belleme contacted Mr. Kazama and arranged this shipment. At the time, Oak Feed Store was importing Japanese products from Mitoku and distributing to stores across the USA. Michio Kushi set up the connection and it was all done with his blessing.

1980 May–After their apprenticeship with Mr. Onozaki, John and Jan spend 3-4 weeks at Sendai Miso Shoyu–at Michio's request. Mr. Kazama drove them to Sendai. John studied the process and took lots of photographs.

1980 June–John and Jan Belleme return from Japan. The Oak Feed and Erewhon groups meet at Oak Feed Co. in Florida to determine ownership of Erewhon Miso Co. There were various contracts. In one, for example, said that Sendai Miso Shoyu and Mitoku would each own 15% of the company–even though it was not clear what they would contribute to the venture. It is finally decided that each of the two groups would own 50%.

1980 summer–John starts to locate and order the miso equipment he needs, which falls into three categories: (1) Purchased from USA: He orders wooden vats from the Arrow Tank Co. in Buffalo, New York. The pressure cookers (for soybeans) and boiler also came from the USA–mostly New Jersey. (2) Purchased from Japan: Two steamers for rice and barley, a rice milling machine, an automatic koji inoculating machine ["rice rocket"] (which they never used until many years later; John did all inoculating by hand), soybean washing machine, soybean crusher (to grind and crush the cooked soybeans), miso mixer (to mix the crushed soybeans with the koji and salt), the foot-activated piston filling machine, which originally filled bulk tubs, and later filled coffee bags and small plastic tubs. (3) Designed by John and fabricated locally: The tilting cooling table to cool hot soybeans then dump them into the soybean crusher, the conveyor that transports raw miso from the miso mixer up into the tall wooden vats, the clam that would come down from the ceiling and lift 400-500 lb of finished miso out of the vats; John also used it to mix miso from one vat to another in mid-season. Everywhere (except in the koji-making process) that Japanese miso makers used intense labor, John tried to use machines.

1980 fall–John and Jan Belleme go on the Erewhon payroll at $400/week, break ground, and start construction of the miso plant in Rutherfordton, North Carolina. On Sept. 29 the land for the new factory is being leveled. John pays initial expenses using funds in the BB&T safe deposit box.

1980 late–John starts to make small, experimental batches of miso in his house, in the sauna room. In his spare time, John starts to grow shiitake mushrooms, behind the main house, up on the hill. He and Jan had brought shiitake plugs from Japan. They used a chain saw to cut oak trees into logs for growing. He sold small amounts to Great Eastern Sun, but he was too busy with other things for shiitake to become a business, as he had once hoped. Continued. Address: Honto Press, P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1434. Belleme, John. 1999. The story of how the Oak Feed Miso, Inc. was established, and its relationship to the Erewhon Miso Co. Part III. 1981 (Interview). *SoyaScan Notes.* Aug. 22. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: 1981 Jan.–When it comes time to buy equipment and build buildings, the new company finds it has little or no money. It needs about $40,000. The person constructing the building, Doug Ashley, threatens to put a padlock on the building because John is unable to pay him. He also threatens to sue John. The project comes to a complete standstill for months as Barry and Sandy are trying to settle their conflict in Miami. During this time, when John has nothing else to do, he starts to write articles about his miso apprenticeship in Japan. And Jan corrects her dyslexic husband's multitude of misspelled words and prepares the stories for publication. Eventually he and Jan wrote over 100 published articles about Japan, Japanese foods, and miso. They contain some 400 of John's photographs.

During the conflict between Sandy and Barry, John finds himself in a very difficult position–in the middle and torn. At one point Sandy, who had been John's longtime close friend and macrobiotic mentor, decides that he no longer wants to be involved with Barry Evans and the miso company. Michio

Kushi and Mr. Kazama of Mitoku go along with Sandy, dropping their crucial support for the project. John barely knows Barry, but now he finds himself trying to convince Barry not to abandon the miso project. Barry asked John: "If I'm going to trade my ownership in Oak Feed Store for the miso factory, what value does that factory have? It's a piece of land and part of a building, but can you make miso? How are we going to sell it? Is it a business with potential?" John has to answer all questions with a convincing "yes!" even though he has not yet made miso by himself and has no idea what the market was. But by building up the value of the miso and downplaying the value of Oak Feed Store, John strains his relationship with Sandy. If Barry had abandoned the miso project, all of John's work in Japan might have been in vain. Moreover it would have left the land and the new building unpaid for–a total mess.

Soon John finds that his role had changed from potential miso maker to miso promoter and educator. His articles must put the wind in the sails of a ship that has stalled in the doldrums. "Every one of those stories had all kinds of intricate purposes to it." And each is written for various audiences with different goals. John has to convince: (1) All his readers that he is an expert on miso and that his miso would be unique–the best available. (2) Potential macrobiotic customers that the lighter, sweeter misos are good tasting and good for health. He could never build a company solely on long-term salty miso. (3) Michio Kushi, and macrobiotic counselors and teachers, not to say bad things about his miso. "I kept putting pressure on them until some were afraid of me–the miso mafia." (4) Barry Evans that the company would succeed and be a good investment. John sent Barry a copy of everything he wrote. John was not sure that Barry was completely committed until about 1984.

1981 Jan.–John Belleme's first article about his miso studies in Japan, titled "The Master of Hoops," is published in *East West Journal.*

1981 April–John Belleme's second article, titled "The Miso Master's Apprentice," is published in *East West Journal.*

1981 July–John Belleme's third article, titled "The Miso Master with a Big Heart: Making Miso in a Japanese Village," is published in *Soyfoods* magazine.

1981 early spring–Increasingly, the much-needed money starts to arrive from Barry. At about this time, and perhaps again earlier, "Barry Evans' money saved the company–there is no doubt about it."

1981 May–All of the miso-making equipment has arrived in North Carolina.

1981 July–The two groups meet at the newly constructed Erewhon Miso Co. plant to have an opening ceremony and celebration. About 25 people are present. The Shinto ceremony is conducted by Michio, with salt, daikon, azuki beans, etc. He goes from door to door, putting Japanese symbols on each door. Evan Root, who was there, was deeply moved by this ceremony. The Kushi's stay on the land for 3-4 days. John remembers that there was a lot of stress during this time. Barry and Sandy were in the middle of resolving their problem.

1981 Aug.–John and Jan start full-time, large-scale production of Erewhon Miso. They have not made any miso on a large scale for more than a year. Erewhon Trading Co. contributed the soybeans, grains, and Lima seasalt (from Belgium); they probably arrived a month or two earlier. Money is still in short supply.

1981 Nov. 10–Michio Kushi files a petition for Erewhon for protection under Chapter 11 of the Bankruptcy Act at the federal in court Boston. This is a disaster for the new miso company. The Bellemes' paychecks and the miso ingredients stop arriving from Erewhon. The miso company's name is soon changed to Oak Feed Miso Inc., but the company now has no means of packaging or marketing its products. None of the Belleme's miso is ever sold under the Erewhon labels or the Oak Feed label. Address: Honto Press, P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1435. Belleme, John. 1999. The story of how the Oak Feed Miso, Inc. was established, and its relationship to the Erewhon Miso Co. Part IV. 1982 to present (Interview). *SoyaScan Notes.* Aug. 22. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: 1982 Jan. 4–Barry changes the name of the company to American Miso Co. and announces that it is open for business.

1982 Jan. 31–Sandy Pukel and Barry Evans agree to an exchange of stock whereby Sandy gets out of Oak Feed Miso and Barry gets out of Oak Feed Store and Oak Feed Restaurant. They finalize the deal on Feb. 26, but it is retroactive to Jan. 31.

Barry starts The American Trading Co. (soon renamed Great Eastern Sun) to distribute their miso which would soon be ready for sale. For a while, Barry Evans and Sandy Pukel had been in a partnership in that import and distributing company. When Barry and Sandy split up, and Barry started Great Eastern Sun, Mr. Onozaki's miso started going to both companies. Marty Roth soon begins running GES.

1982 Jan.–At about the same time, during the first season, after John has made quite a bit of miso Mr. Onozaki visits the American Miso Co. in North Carolina for about 2-3 weeks at the Bellemes' invitation. They are interested in his comments on their miso plant and process, and they pay his way as a consultant and friend. He works with them making miso and gives them some very valuable suggestions (both big and subtle) for improvements–mainly in making the koji. Formal dinner is held in his honor.

1982 April–Mr. Onozaki's eldest daughter, Kaoru, and her husband, Haruo (Mr. Onozaki's adopted son), visit the miso factory and work for 3 months, living under the same roof as the Bellemes. Jan is pregnant when they arrive and

the Belleme's son, Justin, is born on 24 May 1982 in North Carolina.

1982 April 24–Richard Leviton, editor and publisher of *Soyfoods* magazine, visits the American Miso Co. in Rutherfordton, North Carolina, and writes an in-depth cover story about the miso-making process, equipment, and company, published in the summer (July) 1982 edition of his magazine. The best, most detailed coverage to date. The color cover photo (taken by Leviton) shows John, Kaoru, and Haruo making miso.

1982 fall–The Bellemes' first miso is ready for sale. It is a red miso made, Onozaki style, with approximately equal parts soybeans and rice. It is sold only in bulk. The logo is two crossed sheaves of grain in a circle–drawn by an artist friend of John Troy's. This miso is shipped to Great Eastern Sun and sold in bulk under the American Miso label.

Prior to about 1983-1984 all of the company's miso was sold in bulk through Great Eastern Sun to stores. Over the years, John had been working on selling miso refrigerated in one-pound plastic bags, each having a pressure-release valve. The unique bag was designed for coffee and made in Italy. Finally, at a food show in Atlanta, Georgia, two big refrigerated distributors–Cornucopia and Tree of Life–decided to carry the new products. Soon refrigerated distribution trucks began stopping by the miso factory in North Carolina to pick up 7 varieties of miso in 1-pound bags. It was a breakthrough. Demand increased dramatically.

1983 Oct. 1–At John and Janet's request, Barry Evans buys all their shares (900 shares, 35-45% of the ownership) in the American Miso Company. John agrees to work as a consultant for 6 months and to train a person to take his place. John Fogg has been handling the marketing account for Great Eastern Sun. John Belleme asks him to design a retail marketing program, logo, and label for American Miso. He comes up with the idea of "Miso Master." John cringes, because it implies that he is a miso master, whereas he still considers himself a beginner, and he is developing many new types of sweet miso that he has definitely not yet "mastered." Peter Harris draws the Miso Master logo, an illustration showing the head and shoulders of a Japanese miso master, with a knotted headband, in front of a large wooden vat of miso.

1984 Feb.–At the time he sells his stock to Barry, John establishes a new marketing company named Just In Foods, Inc. (John's son is named Justin) for his miso and miso products. It is owned by John and Jan and Barry Evans. John is training Don DeBona to take his place at American Miso Co. His new responsibility will be to work as a marketing person between the miso factory and Great Eastern Sun (a distributor).

1985–John creates another entity named Institute of Fermented Foods (it was never registered or official) as part of his ongoing struggle with Barry Evans. The name appears on the label of many creative miso products Chick Peaso (Chick Pea Miso) and Mellow Ebony Miso (with Black Soybeans).

1985 Dec.–John and Jan leave the American Miso Co. due to ongoing conflicts with Barry Evans. Over the years, John had negotiated with Barry to give him more and more ownership in the company–because he was doing all the work. He eventually owned about 30% of the shares, which Barry bought back from him a year or two before he left–at John's request.

1985–John (who has nothing to do), with Sandy and Blake Rankin form a company named Granum East, based on Sandy's wholesale company in Florida. They plan to sell macrobiotic foods to distributors. It was nothing more than a telephone in John's home office. John would call up Great Eastern Sun (GES) customers and offer them a 10% larger discount than they could get from GES. Within 18 months the company had $700,000 worth of GES' business. Barry was forced to buy the company from them.

John reflects on Sandy's financial role in the company: Sandy has an incredible money karma; he lets it go out and come in without holding onto it, without any attachment. John was later in a seitan business with Sandy; it failed and lost about $300,000. When Sandy found out about these losses, he hardly batted an eyelash–and he's not a rich person. He helped people out all over Miami, and not only with money. He'd give them food, or whatever they needed. It was just amazing to see. Then all of a sudden a large amount of money or good fortune would just drop in his lap. Address: Honto Press, P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1436. National Oilseed Processors Association. 1999. Yearbook and trading rules 1999-2000. Washington, DC. ii + 126 + 11 p. 22 cm.

• ***Summary:*** On the cover (but not the title page) is written: Effective August 1, 1999. Contents: Constitution and by-laws. Officers and directors. Executive office. Members. Standing committees. Trading rules on soybean meal. Appendix to trading rules on soybean meal: Official methods of analysis (moisture, protein, crude fiber, oil {only method numbers listed}), sampling of soybean meal {at origin} (automatic mechanical sampler, pneumatic probe sampler, probe sampler), sampling of soybean meal (at barge loading transfer facilities), official weighmaster application, semi-annual scale report, certification of installation of automatic sampler & mechanical divider (at origin), semi-annual certification of automatic sampler & mechanical divider (at origin), voluntary checklist for semi-annual certification of sampler & divider (at origin), certification of installation of automatic sampler & mechanical divider (at barge loading transfer facility), semi-annual certification of automatic sampler & mechanical divider (at barge loading transfer facility), voluntary checklist for semi-annual certification of sampler & divider (at barge loading transfer facility), official

referee laboratories (meal), official NOPA soybean meal sample bag.

Soybean meal export trading rules: Minimum blending procedures for export meal blended at ports, sampling of soybean meal (at vessel loading facilities), weighing of soybean meal (at vessel loading facilities), certification of installation of automatic sampler & mechanical divider (at vessel loading facility), semi-annual certification of automatic sampler & mechanical divider (at vessel loading facility), voluntary checklist for semi-annual certification of sampler & divider (at vessel loading facility), semi-annual certification of scales at vessel loading facilities. Trading rules on soybean oil. Sales contract. Definitions of grade and quality of export oils. Soybean lecithin specifications. Appendix to trading rules on soybean oil: Inspection, methods of analysis: (AOCS official methods): Soybean oil, crude; soybean oil, refined; soybean oil, refined and bleached; soybean oil for technical uses, refining byproduct lipid, acidulated refining byproduct lipid and tank bottoms. Official weighmaster application, semi-annual scale and flowmeter report, official referee chemists (oil). Soybean oil export trading rules. Uniform soybean oil export contract. Foreign trade definitions (for information purposes only) Appendix 1.

The section on officers, executive staff, board of directors, and executive office (Washington, DC), (p. 8-9) gives the name, company affiliation, and phone number of each person. Members (p. 10-19) (listed alphabetically by company; within each company, first the name of the official Association representative {who is on the Board and votes}, followed by the other personal members listed alphabetically by surname). Standing committees: For each committee, the function of the committee, the names of all members (with the chairman designated), with the company and company address of each are given. Address: 1255 Twenty-Third St., N.W., Washington, DC 20037. Phone: (202) 452-8040. Fax (202) 835-04000. E-mail nopa@nopa.org. Website: www.nopa.org.

1437. Cui, Zhanglin; Carter, Thomas E., Jr.; Gai, Junyi; Qiu, Jiaxun; Nelson, Randall L. 1999. Origin, description, and pedigree of Chinese soybean cultivars released during 1923-1995. *USDA Technical Bulletin* No. 1871. 267 p. Sept. [6 ref]*
Address: 1. Research Associate, Crop Science Dep., North Carolina State Univ., Raleigh, North Carolina.

1438. Great Eastern Sun. 1999. Pricelist. Effective November 15, 1999 [Mail order]. Asheville, North Carolina. 24 + 6 p. 28 cm.
• ***Summary:*** Contents: Catalog information: I Ching reading (hexagram #43), ordering, billing, shipping. Miso Master organic misos (traditional, mellow, sweet, miso tamari). Sweet cloud organic sweeteners. Haiku organic Japanese teas. One world organic classic teas. Mandala organic herbal teas. Organic planet pasta. Emerald Cove sea vegetables. Emperor's Kitchen condiments (Organic Oriental sauces, condiments in bottles, condiments in jars, condiments in bags, Japanese kitchenware). GES variety packs. Also sells coarse nigari in 44 lb or 440 lb lots. Address: 92 McIntosh Road, Asheville, North Carolina 28806. Phone: 704-252-3090.

1439. Pukel, Sandy. 1999. History of interest in macrobiotics, miso, and the Oak Feed Miso Co. Part II. 1975 to Aug. 1979 (Interview). *SoyaScan Notes.* Nov. 20. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Continued: Over the years Michio Kushi had talked about having a factory that made shoyu (natural Japanese-style soy sauce) in the United States. In about 1975, Sandy decided to do something about Michio's dream. He was increasingly an entrepreneur, but only in the sense that he liked to help make things happen. He still did not see himself as a businessman, in that he had little interest in money except insofar as it was important for making things happen. Oak Feed Co. was now a thriving enterprise. But why? "Because we didn't do it to make money, and because nobody took any money out of the company. So all the earnings were put back into the business. My job was to keep the philosophy going." Sandy's living expenses came from other investments. In the early 1970s, most young people Sandy knew who were interested in macrobiotics were dropouts with no money. He lived in a very nice house in Pinecrest (near Miami) and had the money he needed. In 1976 he began looking at the idea of a shoyu factory more seriously, but he soon realized that the complex equipment and buildings would make it too expensive.

Then John Belleme started coming to the macrobiotic cooking classes and other events at Sandy's house on 63rd Avenue. Though he came on his motorcycle, John had a "straight" job in electron microscopy at the Veterans Administration Hospital in Miami. Soon he was deeply interested in macrobiotics and wanted to learn more and more. So Sandy suggested that John go to Boston to study macrobiotics with Michio. John did that, moving into a Ken Burns' study house. He stayed for about a year, then went to Mexico with Frank Head, and finally returned to Miami.

He asked Sandy for a job at the Oak Feed Store, and Sandy said "Fine." He was a responsible and knowledgeable person. John soon became the store manager, while also taking macrobiotic cooking classes at Sandy's house, but he did not see his future in a retail food store, thus he wasn't very happy with the job–though he was a very good worker. John was more a creator than a manager, and he and Jan had become sweethearts–great people and good workers. Jan used to make delicious seitan there. One day in about late 1977 John went to Sandy and suggested they do some kind of a project together. One of the ideas that came out of

their brainstorming session was starting a miso factory in America.

A new idea was born, and Sandy responded by making John a deal. If John would work in the Oak Feed Store, in retail, for a total of three years (1976-79), Sandy would take care of the money necessary for making a miso factory happen and he would pay John's expenses related to starting the factory, pay for John's trip to Japan to study traditional miso making, and pay for John's share of ownership in the new miso company–$25,000 in shares. John would be responsible for doing the research, learning how to make miso in Japan, etc. John accepted and began to manage the store.

In the fall of 1978 Sandy and John visited Michio in Boston to discuss the idea; Michio was very supportive, but he wanted the miso company to be in Massachusetts–perhaps on land at Becket or Ashburnham. Sandy didn't like the idea of Massachusetts–too much macrobiotic politics and the weather was too cold. Sandy put money from the Oak Feed Store into a separate account that John used to pay his miso-related expenses. Soon he began taking Japanese language lessons.

In 1977 Sandy started the Oak Feed Restaurant, and at about the same time Leon got married. These two events led to the three partners dividing up the properties of the communal LJZ Enterprises. Sandy ended up as the sole owner of the Oak Feed Store and his friends ended up with other businesses. Sandy took in partners in the restaurant; Michael Henry (a friend), and Wayne Neal and his wife. They invested and owned shares in the restaurant. Sandy got Yozo Masuda to be the chef at the restaurant. For many years Yozo had been the right-hand man of Hiroshi Hayashi at Sanae, an early macrobiotic restaurant in Boston. Sandy brought him and his whole family from Japan, and got him a green card so he could cook at the Oak Feed Restaurant.

1979 (early)–At some point, Sandy began looking for land for the miso company–using specifications related to the climate and temperature that John Belleme had given him. But he was also looking for land for another reason–the Oak Feed Land Project. This was Sandy's dream of a macrobiotic educational center where various people would build homes and apprentice with John at the miso plant, and where various macrobiotic retreats and workshops and a summer camp with classes could be held on the land. Sandy spent about two months looking at catalogs, talking to realtors, etc.

1979 Feb.–Oak Feed Miso, Inc. is incorporated. By this time two groups have formed and begun to discuss their potential ownership of shares in the miso company: The Oak Feed group and the Erewhon group. It was agreed that the company would be named the Erewhon Miso Company. In the Erewhon group were Michio and Aveline Kushi, Sendai Miso-Shoyu, and maybe Mr. Kazama of Mitoku. In the Oak feed group were Sandy and John Belleme. It was expected that the Japanese would play a very important role in this company; they would assist the Americans in making miso in the United States. Sandy recalls meeting only once with some representative of Sendai Miso-Shoyu, probably at some natural foods trade show. Michio had most of the contact with them. At about this time the first of many of drafts concerning ownership of shares was placed on the table. None of the drafts was ever signed.

1979 April–Barry Evans becomes a major investor in the miso company.

1979 summer–After extensive research, Sandy flies up to North Carolina (Asheville) alone, looks at several pieces of property that a real estate agent has suggested, finds exactly the piece of land and house he had been looking for, makes a deposit or down payment of $10,000 to $15,000, agrees to assume the mortgage of the previous owners at the Tryon National Bank, North Carolina, and flies home alone the same evening. The roughly 90-95 acres of land in Rutherfordton cost about $100,000 to $120,000. The mortgage payments were $500/month for 30 years. It was a lovely but very rural piece of property with rolling green hills. The Sears-style prefab 5-bedroom house on the property was basically thrown in free of charge. The land had become available because someone had died recently. With the new land and house, Sandy's Macrobiotic Foundation could do things that were impossible in metropolitan Florida.

1979 Aug. 7–Sandy closes / finalizes the purchase of the land for Oak Feed Miso in Rutherfordton, North Carolina. He and John Belleme both sign the closing documents. Now the new miso company would have to find the money to make the monthly mortgage payments, plus additional monthly payments to two officers of the bank totalling $23,000. Barry Evans' money was important in making these payments but it was not essential. The miso company definitely would have been able to pay for the land in Rutherfordton and send John and Jan to Japan without the money Barry invested at this time. The investments Barry made after construction of the factory began in mid-1980 and after Erewhon filed for bankruptcy were more important to the company's survival. Sandy put in the first money; Barry's came later. Sandy told John that if John took care of all the technical matters, Sandy would take care of all the financial matters to make the new company happen. Continued. Address: Owner, Oak Feed Store and Restaurant, 4500 S.W. 63 Ave., Miami, Florida 33133. Phone: 305-446-9036.

1440. Pukel, Sandy. 1999. History of interest in macrobiotics, miso, and the Oak Feed Miso Co. Part III. Aug. 1979 to 1982 (Interview). *SoyaScan Notes.* Nov. 20. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Continued: 1979 Aug. 16–A "subscribers consent" agreement is signed at a meeting in Miami. The following people, all or most of whom were present, subscribe to buy shares in Oak Feed Miso, Inc. Sandy Pukel, John Belleme (he invested sweat equity, not money; Sandy

put up John's share of the money), Barry Evans, Yozo Masuda (chef in the Oak Feed Restaurant), Edmund Benson (a friend of Sandy's involved in macrobiotics), and Jim Kenney (manager of the Oak Feed Store). All these people knew each other, and all but Barry lived near Coconut Grove. John signed as the secretary. Sandy also has the original by-laws of Oak Feed Miso–more than 10 pages of typewritten boilerplate-type language. They are not dated or signed, but they were almost certainly drafted in 1979. No names or shares are given. Frank Head was never a shareholder as long as Sandy was involved.

1979 Aug. (late)–After the land deal was closed, Joseph and Patricia Carpenter (married, with children, macrobiotic friends of Sandy's from his neighborhood) moved into the main house on the miso company land at Rutherfordton, North Carolina, and lived there, rent free and getting money, throughout the time the Belleme's were in Japan. Joseph was a carpenter and fix-it guy, and he was expected to make improvements to the house and land before the Belleme's returned. Joseph was also hired to be John's assistant and head worker in running the miso company. Joseph "seemed like a hard-working guy" and Patricia was "a sweetheart lady." Joseph now lives in California and Patricia (who now uses her maiden name, Roberts) lives in Boca Raton, Florida, where she owns an antique store. Her parents live in Lighthouse Point, Florida, and her brother, Brendon Roberts, lives in Boulder, Colorado. Things did not end up on nice terms between them and John. Because they didn't do the work that John had expected of them, he either fired them or kicked them off the land. Sandy doesn't know what they were supposed to do; John would know. The Carpenters then bought land nearby.

1979 Oct.–John Belleme (and his new wife, Jan) leave for Japan. All their expenses are paid from the Oak Feed account Sandy had established–not from the new corporation.

Michio was supposed to arrange for John's welcome in Japan and find a place for him to learn how to be a miso maker. But the people at Sendai Miso-Shoyu didn't want to share their secrets with John, so John ended up studying with the Onozaki family–kind of by accident. It turned out to be a blessing, because Sendai was too automated for John to learn traditional miso-making there. Moreover, Sendai Miso-Shoyu wanted to send one of their people to the USA to run the new Erewhon miso factory; John would have been his assistant.

1980 June–John and Jan Belleme return from Japan. Not long afterwards, there was an important meeting at Sandy's house in Miami. Now that it was becoming clear that a miso company was actually going to happen, people began to get serious about issues of ownership and money. At the meeting were Michio and Aveline Kushi, Sandy, John Belleme, and Joseph and Patricia Carpenter. Joe Carpenter had no money; he was a handyman who was going to be a worker. Sandy recalls it as a "pretty testy" meeting. Michio looked upon the miso company as "his baby." His contributions would be "in kind" rather than in money. He would supply the company name: Erewhon Miso Company. Moreover, since he owned Erewhon Trading Co., he stated that the Trading Company would buy all the miso, package it, and distribute it under the Erewhon brand. Barry Evans was not there. In short, Erewhon planned to play an essential role in the new miso company.

After John and Jan returned from Japan, they went right to work building the factory and purchasing equipment. John is a very talented photographer. He took many superb photographs of miso making in Japan then documented the rise of the new miso company on the land in North Carolina.

1981 Sept. 27–Sandy has the "Minutes of an Annual Stockholders Meeting of Oak Feed Miso" (3 pages). It is signed by directors John Belleme, Sanford Pukel, and Barry Evans, all of whom, of course, were in attendance. It refers to the Subscribers Consent Agreement of 16 Aug. 1979 and tells exactly who owns how many shares in the company. With the help of an attorney, Barry got his stock converted to Class A, which enabled him to vote for the first time; he also got on the board of directors. Barry and John together now own the majority of shares. Sandy was, alas, no longer in control. The company needed Barry's money, and his demands were reasonable. The changes seemed inevitable–but it hurt.

In 1981, when it became clear to Michio and Aveline that Erewhon Trading Company was in a financial crisis and needed cash quickly, they appealed to many of their close friends for help. Sandy responded by sending them \$100,000. Nevertheless, on 19 Nov. 1981 Erewhon filed for bankruptcy protection under Chapter 11 of the Federal Bankruptcy Act. That left Sandy in need of money. Barry Evans invested a considerable sum in Oak Feed Store as part of a complex agreement. For Sandy, the Erewhon bankruptcy couldn't have come at a worse time.

1982 Feb. 26–Sandy Pukel and Barry Evans sign an agreement whereby Sandy gets out of Oak Feed Miso and Barry gets out of Oak Feed Store and Oak Feed Restaurant by an exchange of stock. Barry's financial strength won over, but this left Sandy upset and bitter at Barry. Sandy believes that there was no connection between this event and his lending \$100,000 to Michio. John was torn–caught in the middle. On the one hand, he felt great loyalty and affection for Sandy, and hated to see him out of the new company. On the other hand, he had invested years in the miso company and wanted to see it through to the end. So John continued to work with Barry, and Barry made him an offer he couldn't resist. This conflict strained Sandy and John's relationship for years afterward. About 8-10 years later, Sandy received a beautiful present in the mail of a wooden keg of special miso. It was from John (who had made the miso), accompanied by a nice note as a peace offering, with

the hope that the two could renew their friendship.

The idea of the Oak Feed Land Project disappeared when Barry Evans bought out Sandy's interest in the miso company. Sandy basically held a proxy for most of the other investors; when he left, they also left, selling their shares to Barry Evans.

One sidelight: In about 1993-94 Sandy formed a non-profit organization, an offshoot of the Macrobiotic Foundation of Florida, named The Ignoramus Club. Most of the members are people who have been involved with macrobiotics for many years. It had several hundred members who paid $100 each, including Michio, Herman Aihara, etc. No one had any authority over anyone else. At the meetings, some of which drew 50-100 people to Miami, everyone talked freely about macrobiotics. Resentment and criticisms, as well as gratitude came out. "A lot of people owe a lot to macrobiotics." The Club is no longer active. Address: Owner, Oak Feed Store and Restaurant, 4500 S.W. 63 Ave., Miami, Florida 33133. Phone: 305-446-9036.

1441. Belleme, John. 1999. Update on American Miso Co. (Interview). *SoyaScan Notes.* Nov. 22. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** John has worked for years as a consultant for and vice-president of American Miso Co. John is also on the board of directors. Two days a week, he works closely with Greg Gonzales, who has become an excellent maker of koji and miso. Previously Greg had been a dancer from Southern California.

Today their first batch of good corn koji came out. They have been working out the process for six months. He and Greg used it to make a corn miso. Other people who have used corn in miso have used it in place of the soybeans together with a rice koji. As far as John knows, this is first miso made with corn koji. John also goes to Great Eastern Sun where he is developing new miso products, such as a freeze-dried miso soup–in three flavors.

John thinks the American Miso Company might now be the largest manufacturer of hand-made koji in the world; they produce about 600,000 pounds a year of 5-6 different types of koji which end up in 11 different types of miso. The koji types are: Short-term barley koji, long-term barley koji, mellow barley koji, brown rice koji, white rice koji, corn koji, and soybean koji.

Last year they made soybean miso experimentally for the first time–which was extremely difficult because the carbohydrate content of the soybeans is very low. The trick is to keep the soybean koji from being overrun by bacteria and turning into natto. The soybean miso is now aging.

About a year ago American Miso Co. started selling "miso tamari" in 5 oz and 10 oz bottles. Address: Honto Press, P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1442. Elwell, Christian. 1999. Chronology of South River Miso Co. Part III. 1983-1999 (Interview). *SoyaScan Notes.* Dec. 16. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Continued: 1983 spring–The miso company sends out a very interesting and poetic hand-lettered, dated leaflet and price list. The front panel, with a logo of three waves in a circle, announces the availability of three kinds of miso: Mellow Barley (6 weeks), Mellow Brown Rice (6 weeks), and Mellow Flint Corn (8 weeks). "South River Farm is the coming together of three families seeking common livelihood." A pie chart shows the company's costs.

1983 summer–The first in-depth story about the miso company, with five good photos, appears in *Soyfoods* magazine. The article states that the company (whose name is incorrectly given as "South River Farm Miso Company") is owned by three families, and the names of the six owners are given. Actually, however, Christian and Gaella were (and have always been) the company's only legal owners.

1983 fall–The community idea fails after one miso season (1982-83). The Wheelers leave first. Anpetu and Hannah leave in the fall of 1983; Anpetu writes a sad poem about falling leaves as they part. It takes the Elwells 10 years to repay the money the other two families had invested.

1983 Sept.–Christian goes to Charlie Kendall, who lives nearby, and asks if he can supply Charlie with rice koji for the amazake he makes. Charlie had been buying all his rice koji, dried and in bulk, from Miyako Oriental Foods in California. Christian offered to match Miyako's price and make the koji from organic rice. Christian was already making rice koji for his red miso and he needed more customers. After making many trial batches and building a koji dryer, Christian begins supplying Charlie with 900 pounds (three 300-lb batches) of koji at a time. Also that second miso season (1983-84) the first apprentice, Sonia Schloeman, works at the miso shop; Christian needs help and Sonia needs a place to stay. He pays her a salary and she stays in the loft above the shop. After Sonia leaves, the Elwells move into the loft above the shop. The second intern was Dan Hornack, who came all the way from Aspen, Colorado. From then on the arrangement was room (in the cabins across the river) and board plus a small stipend in exchange for the apprenticeship. Other apprentices who worked in the shop over the years have included (in chronological order) Rich Sweitzer and Susan Gribbon (later to marry), Michelle Gemme (Montreal, Canada), Don Phillips, Michael Dessen, Tim Langdon, John and Mary Granger, Caroline Wurts, Maggie Smith, Andrew Goodman, Tolly Gibbons (New Zealand), Anne Walsh Sullivan, Bobby (age 18 and white, from South Africa), Sean LePoutre, Maria Low, Kamil Bersky (a medical doctor from the Czech Republic), and Stephen Jannetta. Stephen worked at the shop for two seasons (Oct. 1990 to May 1991, and Sept. 1993 to May 1994), then helped others (Soyalab, and La Fonte

della Vita) to start commercial miso production in Italy. His brother, Phil Jannetta, worked for Mitoku in Tokyo. Most apprentices stayed for one full miso season. Gaella cooked for everyone.

1983 Oct. 17–Isaiah, the Elwell's second child is born.

1983 Nov.–The company runs its first ad (1/3 page vertical) in *East West Journal.* The theme: "Wisely given miso gives its own wisdom." An illustration at the bottom shows the miso shop buildings. A logo at the top shows three waves in a circle.

1985–Starting this year, a group of students from the Kushi Institute at Becket, Massachusetts (which is about 1½ hours drive away) comes to visit to miso shop–even though Christian has had no personal connection with the macrobiotic movement for many years. Over the years, the number of groups has increased to 3-4 a year. In the early years, Christian would give a slide show and talk on miso-making. Now they usually come on a weekend and take a tour of the shop when it is not in production, and Christian will share with them what he has learned about miso.

1989-90–The Elwells, with the help of Fred Hubbard, design and begin building a timber-frame home located behind the miso shop–about 12 feet away from it. For the previous 5 years they had lived in the loft above the miso shop. Fred eventually built his own home in Conway, where he now resides as a carpenter and builder.

1991-92–The Elwells stop taking apprentices and start with paid workers. There was a difficult period of transition as Christian began to tire of working in the shop. Workers include Larry Glanz, a former student who worked with Muramoto-sensei and Stephen Jannetta.

1995 Aug.–Christian seriously considers selling his miso company to Barry Evans, owner of American Miso Co. and Great Eastern Sun in North Carolina. He had taken training to become a Waldorf School teacher. But this would require the Elwells to give up their land, and although it was quite isolated, they did not want to leave it.

1995 fall–Yukio Doyama begins to work at the miso company, a happy, hard-working man who enjoys making miso. At the same time, Steve Freiman comes to live above the miso shop and work with Yukio. Christian was now freed up for an extended time from day to day production and packing work; he began taking a more supervisory role and handled most of the office work and shipping. Andy Mathey followed in Steve Freiman's position, working with Yukio.

1996-97–This fiscal year the miso business is computerized. In late 1997 Christian decides not to sell the miso company, and to invest much more energy, time and resources in it–"to make it come alive again" after a period of hibernation. "When we clear up things inwardly, this is reflected by outward things." Quickly, all sorts of good new things begin to happen.

1998 Feb.–The first issue of *River Currents: News from South River Miso Company* is published. This attractive newsletter contains a catalog and order form, plus news about miso and the company.

1997-98 fall and winter–Three young people come to live at South River Farm to cultivate the land–and to work on forming a community. Arthur Lerner comes first, then his partner, Emily Kellert, and soon after, David Fisher. That winter these three also work part time in the miso shop. Robin Cole, a friend of many years, arrives in early spring of 1998 and creates the position of office manager/ administrative assistant.

June 1998–The Elwells and coworkers finalize a mission statement for the miso company after three months of weekly meetings. It is published in the winter (Dec.) 1998 issue of *River Currents.*

1999 Sept.–The apprenticeship program is reinstated; Maria Rossi is the first to fill the position.

1999 Dec. 16–Christian says that the miso company, about to enter its 21st year or adulthood, is taking on a life of its own. Gaella was never a regular miso maker in the shop. In the early years she was a full-time mother and cooked hundreds of meals for builders and then miso apprentices. Her role has always been one of moral support. This year she does work in the shop two afternoons a week on the packing crew. The many new people are contributing to the growth of the miso company as a "learning organization" (see *Fifth Discipline,* by Peter Senge).

South River Farm is now moving in the direction of being home to self-sustaining farmstead–"as the place in which South River Miso is planted." David Fisher has built a pole barn, gotten draft horses, pays a modest lease, and sells his organic produce. Address: Founder and Owner, South River Miso Co., South River Farm, Conway, Massachusetts 01341. Phone: (413) 369-4057.

1443. Wendel, Armin. 1999. Die Sojabohne: von der Sojabohne zum Sojalecithin [The soybean: from the soybean to soy lecithin]. Hamburg, Germany. 15 p. Unpublished typescript. [28 ref. Ger]

• ***Summary:*** This is a history of the soybean, with increasing emphasis on lecithin as that history moved into the 20th century.

Paragraph 1: The mythological early history of the soybean in China. Emperor Shen Nung and China's earliest crop plants (1) (2).

Paragraph 2. Englebert Kaempfer (1651-1716) (3) and introduction of the first information about the soybean to Europe. Linné (Linnaeus; 1707-1778) (4) first mentioned the soybean in 1737. In 1753 he classified it as *Glycine soja* in his classic, Species Plantarum.

Paragraph 3. Introduction of the soybean to North America by Samuel Bowen in 1765 (5-6).

Paragraph 4. In 1770 Benjamin Franklin sent soybeans from London to the botanist John Bartram in Philadelphia–independent of Samuel Bowen. The cultivation of the

soybean plant began in Europe between 1840 and 1875. In the USA Matthew Calbraith Perry (1794-1858) (7) introduced a soybean variety in 1854.

In Germany, Captain Wehrhan carried out cultivation experiments in 1870 which remained in vain [Haberlandt 1878].

At the Vienna World Exposition of 1873, the botanist Professor Friedrich Haberlandt displayed soybean seeds from China. He stressed the importance of the soybean for nutrition. He also carried out agronomic trials which, however, were not very successful and consequently vanished into oblivion.

The agronomic trials in Central Europe failed as a result of the climatic conditions. The vegetation period amounts to more than 150 days. That is how long the soybean seed needs for maturity. If planting is begun in April, then the harvest can be counted on in September. But the harsh spring in Central Europe with its late frosts at night thwarted all efforts.

While in Europe and the USA, the soybean remained insignificant until the twentieth century, cultivation in China grew continuously. The settling of Manchuria and the growing demand for soybeans led to the construction of two railway lines (the North and South Manchuria Railways) in 1902. From 1895 to 1926, the population of Manchuria had increased from 2.5 million to 22 million. One incentive for the increase in production resulted at the end of the nineteenth century from the Russo-Japanese War. Soy was suddenly a canned food for the military and was consumed in large quantities. The entire harvest was needed in Asia (8). The turning point occurred in 1908 when, as a result of cotton crop failures, the Japanese firm Mitsui & Co. brought one lot of soybeans to the European market [to Hull, England] for the first time for the purpose of oil extraction. The results of the oil extraction and the use of the oil for food and industry as well as the use of the pressing residues in agriculture were so outstanding that right away, a demand occurred that rose constantly. Thus in the port cities of Europe, soybeans were soon processed as a source of protein and oil. This occurred in particular in Hamburg and Stettin [today's Szczecin, Poland], Aarhus [Denmark], Hull, and Marseilles [France]. In Germany, the oil mill industry was concentrated in Harburg in Hamburg (9). In particular in Harburg in Hamburg, the oil mills began to process soybeans, [including] Hansa Muehle (the Hanseatic Mill) in 1910 [no citation] and the Stettin Oil Works (*Stettiner Ölwerke*), in the founding of which the "East Asiatic Company" was involved, (10) in approximately 1910. The East Asiatic Company (*Ostasiatiske Kompagni*) in Copenhagen was one of the largest importers of soybeans from China to Harburg and Aarhus. In 1910, Brinckmann [Brinkmann] & Mergell (11) also began with the processing of soybeans, as did Noblee & Thörl (12) in 1912 and Friedrich Thörl (13) in 1913.

In 1913, 126,000 metric tons of soybeans had already been processed in Germany (14). Up to the turn of that century, the processing and the obtaining of soybean oil still occurred primarily through pressing (15). With the beginning of soybean processing, modern extraction processes were also introduced (16) (extraction from the oil seed by means of solvents). The extraction process has the great advantage that the oil is basically obtained there without residue, while with pressing, at least 6 to 7% fat remains in the cake. That was in particular important with the soybean, since it has only a low oil content in comparison to other oil seeds (soybean: approximately 17-18% fat, copra: 66% fat). The credit for having introduced the extraction process to the fat industry is due to the Frenchman Deiss (1856) (17). In spite of the danger of fire and explosion (18), gasoline [or naphtha?] (*Benzin*) (hexane and heptane fractions) was the most important extractant (even today, hexane is still used).

But only the "Bollmann process" (19) made it possible to work continuously and produce soy lecithin for the first time in sufficient quantities at a satisfactory quality. At the heart of the process was a new, continuously-working extraction apparatus and a solvent mixture of benzene (Benzol) and ethanol. The new Bollmann system was also known as the "Ford system of oil production" (*Fordsystem der Ölfabrikation*). In Germany, the cornerstone for soy lecithin was laid with it. Germany was the country with the largest soybean processing in the world. The First World War brought a brief interruption. But starting from 1920, the processing grew continuously. Starting from 1933, though, as a result of the Nazi regime and the Second World War, production was once again interrupted (20).

A table shows world soybean production in 1933 in metric tons:

China 6,000,000
USA 356,000
Argentina 500.

The largest exporter in 1933 was China, with approximately 2,244,000 metric tons that went to the following countries: 1933 Import and Processing of Soybeans in metric tons:

Germany 1,171,000
Japan 392,000
Denmark 325,000
United Kingdom 157,000
Sweden 58,000
Netherlands 39,000
France 15,000
Other countries 177,000
Total 2,244,000 [no source given].

If the European processing of the soybean was already going at full speed at the start of the twentieth century, then in the USA the development was still at its beginning. The first oil mill in the USA that processed soybeans was Herman Meyer's mill in Seattle, Washington which imported

soybeans from Manchuria in 1911 and processed them into oil and meal with the help of a hydraulic press. Later on, the mill was called "Pacific Oil Mills". In 1915, the Elizabeth City Oil and Fertilizer Co. in Elizabeth City, North Carolina became the second soybean-processing oil mill. For the first time, this oil mill also processed soybeans that were grown in the USA in North Carolina. In 1917, approximately 50,000 acres (1 acre = 0.405 hectares) of soybeans were planted in the USA. In 1918, the Staley company began with experiments. In 1919, the Chicago Heights Oil Manufacturing Co. in Chicago Heights, Illinois, began with the processing of soybeans that were grown in Illinois. In 1920, Eugene Staley (23) gave the signal to start soybean processing. He ordered the necessary machinery from the V.D. Anderson Company in Cleveland, Ohio (hydraulic presses).

[in English:] "The day will come when our plant will process more soybeans than corn."

On September 30, 1920, the plant in Decatur, Illinois was able to [open] with a processing capacity of 500 bushels per day (1 bushel of soybeans corresponds to approximately 27 kg., so 500 bushels is around 14 metric tons). The start of the most important organizations in the USA also took place in 1920: the American Soybean Association (ASA) and the National Soybean Growers' Association, which held its first conference, the "Cornbelt Soybean Conference" in Camden, Indiana. In 1923, the Piatt County Cooperative Soy Bean Company in Monticello, Illinois began with the first solvent extraction plant. By 1927, there were already eighteen oil mills in the USA that processed soybeans. But with its 39% market share, Staley was the largest processor. And it remained so until 1957. Continued. Address: Managing Director, Nattermann Phospholipid GmbH, Cologne, Germany; and Chairman of the Board, American Lecithin Company (Oxford, Connecticut, USA).

1444. Lewycky, Jerry. 2000. Starting a new miso company in Canada (Interview). *SoyaScan Notes.* Feb. 2. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Jerry (whose last name is pronounced luh-WIK-ee) learned how to make miso from Yasuo Yoshihara. He started making miso in April 1999 and now has about 20,000 lb "brewing" in vats, each of which contains about 7,000 lb of raw miso. He has two vats full of 2-year barley miso and one vat full of 2-year brown rice miso. These will be ready for sale in the fall of 2000. He would also like to make a short-term white miso. He has not yet decided the name of his company, but he is considering "Miso Tradition." Jerry also has another miso teacher–Don DeBona. He visited Don several times in North Carolina–after he was no longer employed by American Miso Co.–and Don visited Jerry once in Claremont, Canada; he has been very helpful. Don still lives in his house right beside the miso factory in Rutherfordton, and is now working as a forest ranger for the Forest Service in North Carolina, but he has expressed an interest in making miso again, perhaps with Jerry. Jerry has traveled to Japan several times when he was co-owner of Timbuktu Natural Foods. He sold the company for a good price to a guy who bought it hoping to make a lot of money; he ruined the company. Jerry plans to sell his miso in glass jars. He believes he can take over much of the Canadian miso market now owned by South River Miso Co., because their miso is very expensive in Canada. Address: R.R. #4-2090, Claremont, ON L1Y 1A1, Canada. Phone: 905-649-1988.

1445. Wolff, David. 2000. Bean there: Toward a soy-based history of Northeast Asia. *South Atlantic Quarterly* (*Durham, North Carolina*) 99(1):241+. Winter. [26 footnotes]

• ***Summary:*** The rise of the soybean as an international commodity transformed Manchuria from China's least-developed province into an area of armed conflict between China, Japan, and Russia, and a province of great wealth and industrial innovation. Address: Visiting Asst. Prof. of East Asian History, Univ. of Chicago.

1446. Parsons, Leland. 2000. Adrian Alkanh Parsons, soybean pioneer in Hendricks County, Indiana (Interview). *SoyaScan Notes.* March 2. Followed by a letter of April 2. [1 ref]

• ***Summary:*** Lee is preparing to give a talk about his great-grandfather, Adrian A. Parsons, to the Hendricks County Historical Society, in Danville, Indiana, on Nov. 5. He writes to ask if Soyfoods Center has any record of soybeans being grown in Indiana before 1888 (as cited by W.C. Latta in 1938). Soyfoods Center has the same earliest date, none earlier.

Adrian Parsons was born on 7 Nov. 1846 in Guilford County, North Carolina. His family moved to Hendricks County, Indiana, in 1852. After being badly wounded in the Civil War, he came home to do a number of jobs, including farming. Since his health was not the best, he studied a great deal and experimented with different crops; among those were soybeans. He was probably the earliest farmer to grow soybeans in Indiana, or in Hendricks County, Indiana.

Lee has no evidence that Adrian Parsons heard of soy coffee during the Civil War. Lee's dad emphasized that the use of the soybean as a coffee substitute was one of the things first drawing Adrian's attention to the new crop. Lee has found many references in the early literature to the use of soybeans in coffee "(although more often as a coffee *extender* rather than as a pure soy brew)." He "even found an old farmer's concoction mentioned in an early farm paper. I wonder if Adrian's initial coffee substitute notion did not derive from his Civil War experience. He saw service in the Franklin, Tennessee, area in 1864, and in the Vicksburg, Mississippi, area later in 1865 after returning to his unit when his severe wound was healed.

"Incidentally, Adrian's commanding officer in the 9th Indiana Cavalry was Colonel Eli Lilly, who later started the pharmaceutical empire here in Indianapolis. It is a prominent part of our family oral tradition that Lilly stayed in close touch with Adrian for many years, particularly in regard to Adrian's experiments with plants, and that Lilly wanted my grandfather Norman and other of Adrian's sons to work for him in his fledgling business, but the boys opted to stay in farming and help out their father."

How was Adrian first introduced to the soybean, and how did he actually obtain his first beans? Lee is sure that Adrian did not write to the Agricultural division of the Patent Office. "I am still wondering if there wasn't some seed supplier in the 1880s who advertised imported soys, and that is how Adrian obtained them. I have been looking in those early farm papers for such a hint. I still believe, however, that Adrian already knew something of the plant before deciding to obtain seed, and this could have been from his North Carolina Quaker roots, his Civil War experience, or possibly even his general study of the East (he was an avid student of Oriental religions). The fact remains that we just don't know exactly how he became aware of soybeans." Note: Guilford County is in north central North Carolina. Most of the soybeans in North Carolina were grown in the coastal states after about 1915. As of April 2000 the SoyaScan database contains no records of soybeans in connection with Guilford County, North Carolina.

Adrian developed the soybean variety Mikado. Lee writes: "My dad [Edgar, born 1905] gave me a detailed verbal account of the circumstances of this selection by Adrian in 1905... The story goes that after he sold the right of distribution to the Wing Seed Company of Mechanicsburg, Ohio, they started marketing it as 'Wing's Mikado,' whereupon the USDA leaned heavily upon Wing to desist the implied self-credit in deference to Adrian's discovery and development."

Note: This is the earliest document seen (April 2000) mentioning that Wing's Mikado was the Wing Seed Co. catalog of 1910. The earliest document seen that mentions a regular Mikado was published in March 1914. However in 1923 Piper and Morse, in their classic book *The Soybean* state (p. 168): "Mikado.–Selection from Mongol by A.A. [Adrian Alkanah] Parsons, Plainfield, Indiana, in 1905." This is the earliest document seen (April 2000) stating that Parsons developed or originated the Mikado variety. This Mikado variety is no longer in the USDA germplasm collection at Urbana, Illinois, however another variety named "Mikado" obtained from Japan in 1989 is there.

Rex Parsons, like Lee, is a great-grandson of Adrian Parsons. Rex still farms near Danville, Indiana, and represents at least 109 consecutive years of the Parsons clan growing soybeans in Hendricks County–surely a record at least in Indiana.

Lee's grandfather, Norman Parsons (1873-1939), estimated that Adrian introduced the soybean to Indiana in 1886 or 1887. "Norman was a teen in the 1880s and likely would have had a clear recollection of the occurrence, if not the precise year, and I have no reason to believe his estimate to be far off. The fact that William C. Latta places the date of introduction of soybeans in Hendricks County at 1888 (no doubt Adrian's, and a good 5 years earlier than any other county in Indiana) must mean something. I wonder if Adrian started by experimenting with just a few plants in his garden in the 1880s, but only commenced sustained cultivation in 1891... At any rate, to be academically honest, it appears at this time that I should be saying that Adrian introduced the soybean sometime between 1886 and 1891. To the best of my knowledge, the credit for being the first on record for Indiana is still sound."

Note: Phyllis West Parsons, the wife of Lee's third cousin, John Parsons (of Clayton, Indiana), e-mailed Prof. Ted Hymowitz to ask about Adrian Parsons and the early history of the soybean in Indiana. Hymowitz referred Phyllis to Soyfoods Center. When Shurtleff received her letter he called Phyllis, and Lee happened to be at her house. Lee and Shurtleff had a long talk. Address: 5814 Big Oak Dr., Apt. C, Indianapolis, Indiana 46254. Phone: 317-290-9446.

1447. McMahon, Mae. 2000. History of the American Miso Company property (Interview). *SoyaScan Notes.* March 27. Conducted by William Shurtleff of Soyfoods Center. [3 ref]
• ***Summary:*** In Sept. 1975 Robert Warren Deakin and his wife, Karen Ann, purchased two tracts [pieces] of land (48.3 acres and 44.08 acres = 92.38 acres total) in Green Hill township, Rutherford County, from Grover K. Carver and his wife Lyla H. To do so, they borrowed $89,325.50 from the Tryon Federal Savings and Loan Assoc. on 19 Sept. 1975. This is recorded as a deed of trust (a loan made with land as collateral) of that date found in book 223, page 411.

Then on 26 Jan. 1979, Robert W. Deakin and his wife deeded [sold] the same two tracts of land to Lawrence L. Bridges and E. Milton Singletary. The deed is recorded in Deed Book 401 on page 146, Rutherford County Register. Recorded Jan. 31.

On 5 Feb. 1979 Bridges and Singletary got a deed of trust (borrowed money against the land), recorded in deed of trust book 262 on p. 695. Apparently Bridges and Singletary assumed a deed of trust (agreed to take over the land payments and pay the balance due) that Robert Deakin had taken out from Tryon Federal Savings, plus they gave him $8,000. That loan of $8,000 was paid off on 13 Aug. 1979.

Then on 7 Aug. 1979 the names of Oak Feed Miso, Sandy Pukel, or any Belleme are first mentioned on any document we can find. On that date Lawrence L. Bridges and E. Milton Singletary deed the two parcels of land totaling 92.38 acres to Oak Feed Miso. This deed is recorded in book 405 on page 727. At this time Oak Feed Miso assumed the deed of trust to Tryon Federal Savings (see book 223, p.

411) and also paid $10,000 (as shown by a real estate excise stamp at the bottom of the deed). Note: In North Carolina, houses located on land are not usually mentioned on the land deeds.

On 19 May 1986 some 7.05 acres of the property were sold.

On 4 Dec. 1992 the deed of trust was paid off, i.e., the land was completely paid for.

On 1 Sept. 1995 some 19.11 acres were sold.

As of today (27 May 2000) American Miso Co. owns 66.97 acres. Address: Rutherford County records room, Rutherfordton, North Carolina. Phone: 828-287-6195.

1448. Parsons, Leland. 2000. More about Adrian A. Parsons, soybean pioneer in Hendricks County, Indiana (Interview). *SoyaScan Notes.* April 8. [1 ref]

• ***Summary:*** Lee found a series of letters about soybeans in the 1 Feb. 1902 issue of the *Indiana Farmer.* The first letter (which was very long, detailed, and interesting) came from Hendricks County, and the initials of the author were E.B.D. which almost certainly stood for Evan B. Davis, Adrian's son-in-law who married one of his girls. In 1902 he was a prominent farmer in Hendricks County; in 1912 he moved to Alabama. The style makes it clear that the letter was not ghost-written by Adrian Parsons. Adrian's style was pretty "wooly," i.e. not rigorously clear.

During the 1920s, Adrian was in business with Guy McKinnis in the Parsons-McKinnis Cooperative. McKinnis, himself, had a farm near Bridgeport, Indiana. Lee has not yet been able to find the nature of their business partnership. McKinnis (from "near Indianapolis") spoke on growing and harvesting problems at the Sept. 1920 meeting at the Fouts Farm in Indiana; Lee can find no indication that Adrian was at that meeting. He may have had to stay at home to care for his wife, who had epilepsy and died in 1922.

Adrian was on the program to speak about his pioneering work with soybeans in 1928 at the Ninth Annual Meeting of the American Soybean Association in Indiana. The day after the meeting, the *Plainfield Messenger,* which was the closest local newspaper, published an article titled "Pioneering in Soybeans" which included a program for the meeting at the Edmondson Farm in Hendricks County, Indiana. Lee has never been able to find a copy, or even a summary of that speech. He knows that Adrian attended the meeting, but he has no proof that Adrian actually spoke. We do know from the photo and interview in *Prairie Farmer* that Adrian was at the meeting–but that article, too, does not say that Adrian actually spoke at the meeting.

J.B. "Ben" Edmondson of Clayton, Hendricks County, was the man behind the Mid-West Soybean Cooperative and Dunfield soybean. Many of the members of that cooperative were Edmondsons. J.B. Edmondson first grew soybeans in 1914. There is still a fair amount of bad feelings between the Parsons and the Edmondsons in Hendricks County, and Lee is in a delicate position now, having been asked to give this public speech in Hendricks County next November–where there are still lots of Edmondsons who farm. Once when Adrian was still a young man doing research on soybeans a man came onto his farm and told him that he would regret bringing that "weed" into the county. That was Robert Edmondson, the father of J.B. Edmondson. Most branches of Lee's family tell this story in about the same way. But one branch (which is not Lee's) says: Adrian Parson's main farm was near Plainfield. But in about 1903-04 he bought a second farm near Belville, Indiana, which is in Liberty Township, the same township in which the Edmondsons farmed. Now he owned two farms, and was a neighbor of the Edmondsons on the second; he started growing soybean immediately. One year, in about 1903-04, Robert Edmondson was township trustee. He came onto Adrian's farm to do a tax assessment, and saw what Adrian was doing with soybeans. He ridiculed Adrian and said "You will regret bringing that weed into the county." This rebuke of his serious research made Adrian so mad that it was the source of a lifelong animosity between Edmondsons and Parsons, and is still a source of tension. Another branch of the Parsons family, descended from Adrian's son Bert, got the story that Robert Edmondson was accompanied by his young son, J.B. Edmondson, at the time. Adrian got so mad that he ordered the Edmondsons off his farm and told them never to set foot on his property again. Still another version says he threatened them with a gun; Lee tends not to believe the latter because Adrian was a Quaker, but apparently it was quite a sharp exchange. Politics may have also been a part of the conflict because Edmondson was a Democrat and Adrian was "a dyed-in-the-wool, bloody shirt, Civil War Republican." The irony is that, years later, the Edmondsons became the biggest soybean growing family Hendricks County.

Concerning Adrian's Quakerism: He put it aside when he entered the Civil War. One of Adrian's grandchildren, Lee's cousin also named Lee, lives in LaPorte County near Chicago, Illinois; he still farms and is one of the last people left who has clear memories of Adrian. Lee interviewed him on tape about a month ago. Adrian's mother was a Quaker and his father was a Methodist, but the children were raised as Quakers. Adrian's mother was Quaker blue-blood, connecting the Parsons to many of the important Quakers in history. When Adrian's mother married Nelson Parsons, she was kicked out of the Quaker church for "marrying out of unity." Adrian's father, Mr. Parsons, like almost all his ancestors, were Methodists–but they very frequently married Quaker women. They were married in Guilford County, North Carolina, then they moved to Indiana in 1852 when Adrian was a young boy. Essentially Guilford County, North Carolina, moved en masse, to Guilford Township, Hendricks County, Indiana. Plainfield, where they settled and named the town, was a Quaker community, and there (Lee thinks) they went to the local Quaker church–but he has no records

that they actually belonged to that church. There were many Quakers and Quaker meeting houses in Hendricks County. Virginia, a granddaughter, lives on Adrian's original Farm; Lee has known her for years but has never done a formal interview.

In 1976, when Lee was writing the story of the Adrian Parsons family, he had temporary custody (for 18 months) of Adrian's notebook, which contained some of the manuscripts discussed in the 11 Jan. 1930 issue of *Prairie Farmer*. These "manuscripts" were written, mostly in pencil, on the pages of the notebook. Unfortunately, neither the notebook itself nor any of the entries are dated. Fortunately, about 10 years before that, one of Lee's aunts transcribed the entire notebook as a wedding anniversary gift for her husband. Lee still has that 16-17-page, single-spaced typewritten transcript, but the original notebook was lost by the relative to whom Lee returned it. Soybeans are mentioned on only about 4 pages of the typewritten manuscript. Lee's impression, based on the handwriting, which is an old man's somewhat shaky scrawl, is that the notebook was written late in Adrian's life. Lee has other samples of his handwriting from the early 1920s, such as letters he wrote to William Morse at USDA.

Lee's dad was sure that some of Adrian's articles were published; he read Lee a list of magazines in which he said Adrian's writings appeared, including *Wallace's Farmer, Hoard's Dairyman, Farmer's Guide, Farm Journal,* etc.

Lee now thinks it is more likely that Adrian got his first soybeans from Kansas than from Japan. Address: 5814 Big Oak Dr., Apt. C, Indianapolis, Indiana 46254. Phone: 317-290-9446.

1449. Pukel, Sandy. 2000. Why were Patricia and Joseph Carpenter kicked off the miso company land in Rutherfordton, North Carolina, and denied their share of ownership in the company? (Interview). *SoyaScan Notes.* May 20. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Sandy has just finished talking with John Belleme on the phone to compare their memories of this unpleasant incident. Their memories were exactly the same. "John remembered even more things that the Carpenters didn't do than I remembered." "If they were upset or felt they were owned money, why did they wait 20 years to tell me about it? That's pretty bizarre."

It was very clear to everyone else why they were kicked off the land. The miso company bought the land. Joseph was hired as a carpenter-handy man and paid a salary to build the factory there and to oversee things. They had their kid in private school, and they lived rent-free. "We paid for everything. John got back and nothing was done. They lived the life of Riley [a carefree, comfortable way of living] for a year."

Sandy says that his job was not at all to tell them what to do. Before he left for Japan, John gave them specific instructions for specific projects. It was very clear, and John is very meticulous. Anything he didn't tell them before he left, he certainly would have communicated to them from Japan. "When John got home, he totally freaked out. He absolutely had a heart attack. He couldn't believe it. They had done nothing. They knew very clearly what they were supposed to do and they didn't do it. No ifs, and, or buts about it." This put the miso company 6-12 months behind schedule. Moreover, "they got paid a serious salary to do it–and they lived rent-free, in a beautiful set-up there."

Question: "Why do you think Joseph didn't do the required work?" Sandy's answer: "I guess he wasn't motivated or he wasn't capable. I don't really know why. I haven't seen him in many, many years. He's a nice guy but I think he needed more direction." Patricia wanted to be part of the miso company more than Joseph did. "She's very outgoing and aggressive, and maybe she oversold him. He was more of a laid back hippie carpenter." Sandy made John Belleme a deal that if he went to Japan, learned how to make miso in the traditional way, then came back and made miso for the new company, Sandy would give him $25,000 in stock. He did what was expected, and got what he was promised. Actually John got his $25,000 in stock even before he left for Japan, because there was no question that he was going to do what he said he would do. Address: Owner, Oak Feed Store and Restaurant, 4500 S.W. 63 Ave., Miami, Florida 33133. Phone: 305-446-9036.

1450. Roberts, Patricia. 2000. History of interest in macrobiotics. Living on the Oak Feed Miso Co. land in Rutherfordton, North Carolina from 1979 to 1980. Part I (Interview). *SoyaScan Notes.* May 20. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** 1972–Patricia meets Joseph Carpenter (a native of California) in Oregon on a farm where she went to do yoga; she was very involved with yoga and meditation. Joseph is a very friendly and personable fellow, and he has an "incredible memory. Most people are in awe of his brain." They went together to Tucson, Arizona, to pick oranges. She was living on oranges and bananas, had lost much of her memory, and was very spaced out and emotional. They went into a place named The Granary, where they met Jack Garvey, who brought them into the macrobiotic community. She first met Michio Kushi in Tucson, when he came there to lecture.

1973 Sept. 15–Patricia and Joseph Carpenter are married in Arkansas. They were invited to Arkansas to do a little farming by some friends who had some property there. Their friends were deeply involved with Stephen Gaskin and The Farm in Summertown, Tennessee. They arrived with all of their macrobiotic "judgments" and that led to conflicts. They built a little house on the land in Arkansas, and Thom Leonard came to visit them there in 1973. He took care of

their house for the winter when the Carpenters went to visit Patricia's parents in Florida.

1973 Nov. 11–Their first child, Yana, a girl, is born in Arkansas. They leave to go to "Snowflake," the first macrobiotic conference in Arizona. It was held on property near a Hopi reservation that a group of people in the macrobiotic community, including Michio, purchased.

1974–Patricia goes to a macrobiotic conference in Miami and meets Sandy Pukel for the first time. She becomes friends with Sandy and his wife, and saw Michio for the second time.

1975 fall–Patricia arrives (with her daughter, Yana) in Brookline, Massachusetts, and lives in the macrobiotic study house run by Ken and Ann Burns. After about 3 months she moves to another study house. Joseph arrives later, in about 1976, and lives in the study house run by Jack and Barbara Garvey, on the same street as the Burns' house. Joseph Carpenter was very close to Jack Garvey. They both have a close relationship with Michio and Aveline Kushi. For Patricia, who had a Catholic upbringing, Michio was a spiritual teacher. John Belleme arrived in Brookline about mid-1976 and lived in the Burns' study house; it was at about this time that Patricia first met John–though they never lived in the same study house. Joseph designed and built an addition to the Kushi's home at 62 Buckminster Road; it was for Aveline–the bathroom of her dreams on the second floor. One day Aveline came to see Patricia in her apartment. She liked a chopping block table that Joseph had built for Patricia. Joseph is an excellent carpenter. He did much of the finish carpentry on the original Erewhon retail store on Newbury St. in Brookline, including the wooden bins for grains and beans.

1977 Christmas–Patricia and Joseph go to Florida for Christmas, one of many trips they took there. Patricia's parents and many of her friends live in Florida; she loves to visit. In early 1978 Joseph worked as a carpenter for several months in Sandy Pukel's Oak Feed Restaurant in Coconut Grove, Florida. He had gotten to known Sandy because Patricia and Sandy were close friends. During this time Sandy came to realize that Joseph was a skilled carpenter.

1979 Feb. 12–Patricia's second child, Benjamin, is born in Brookline. At about this time Patricia's sister, Christine, moved up to Boston to be near Patricia. In the spring of 1979 Patricia went to Florida to visit her parents and show them her new baby. Sandy flew Joseph down to talk business. Sandy had now decided that he wanted the Carpenters to become part owners of the company–so he offered them a deal, which, as near as Patricia can remember, was as follows. He asked them to live on the land the miso company planned to purchase while the Bellemes were in Japan learning how to make miso. If they would live and work the land, become a presence in the community, and then become owners of and workers for the company, Sandy offered to pay their expenses and give them $25,000 worth of company shares for each year they stayed and worked on the land–including the first year, of course. But this agreement was verbal; nothing was put in writing. Back in those days, Patricia, recalls, people were less businesslike than they are today.

Looking back, Patricia believes that she and Joseph failed in their negotiation of this deal. Joseph is an artist, and he is much better at self expression than at negotiating agreements. Sandy is very good at negotiating.

1979 May–On Memorial Day weekend, at the end of May, after four years in Brookline (near Boston), the Carpenters leave and move to Florida for the summer, to be near Sandy, to work out the details of beginning the miso company. In leaving Boston, they were giving up a lot, including many friends ("We were very plugged in. My sister, Christine, was quite upset that we were leaving") and Joseph's good carpentry job. But they believed that Sandy's deal made the move worthwhile.

Patricia flew to Florida with her two young children. At Sandy's request, Joseph drove their van so that he could go to Hendersonville to meet with several real estate agents. The miso company property had not yet been decided on or purchased. The realtors took Joseph to visit several areas on the isothermal belt, but they didn't find the property at that time. The isothermal belt means "never too hot, never too cold." But it freezes and snows a little during the winter.

Patricia recalls that they bought the property from Bob Deakin. Joseph knew Bob Deakin. Bob was driving with his wife and daughter at about that time, on a holiday, to chimney rock. A truck was coming toward Bob's car and suddenly a bee flew into the cab of the truck. When the truck driver started to swat the bee, his truck swerved across the road and killed Bob Deakin's daughter. Bob kindly refrained from suing the truck driver or truck company, and somehow, because of the accident (or perhaps because of big hospital bills) he lost his property–which the miso company later purchased.

In Florida, Patricia and Joseph rented a place for the summer on Highland Beach near Boca Raton. They had visits with Sandy and learned more about his plans for the miso company. That summer, Michio came down and did a seminar, which they attended. Michio wanted the land to be used as a summer camp and a place to garden; he also wanted to build a dam and lake. John and Jan Belleme were preparing to go to Japan. Continued. Address: Grass Valley, California.

1451. Roberts, Patricia. 2000. History of interest in macrobiotics. Living on the Oak Feed Miso Co. land in Rutherfordton, North Carolina from 1979 to 1980. Part II (Interview). *SoyaScan Notes.* May 20. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Continued: 1979 Aug. 1–A special election is held on alcoholic beverage control in the town of

Rutherfordton, North Carolina. Called the ABC Referendum, it would decide whether alcoholic beverages in containers could be sold in special "ABC Stores" and whether off-premises sales of malt liquor (mostly beer) would be permitted. Note: Before that election, a person had to go to South Carolina to buy such beverages. To this day, all cities in Rutherford County except Rutherfordton and Lake Lure are "dry"–one cannot buy alcoholic beverages there. Throughout the county one cannot buy any alcoholic beverages (except wine) by the drink or glass. No sales of any alcoholic beverages are allowed on Sundays.

1979 Aug. (late)–The Carpenters and their two children arrive (in separate vehicles) in Rutherfordton from Florida and move onto the miso company land. Patricia remembers the date clearly because people in town were buying beer to celebrate the implementation of the ABC Referendum. The Carpenters were the first people to live on the land after it had been purchased by Oak Feed Miso.

Two months later, in Oct. 1979 John and Jan Belleme leave for Japan. Patricia recalls that the Bellemes stopped by the land briefly on their way to Japan and left some things in the house. Patricia recalls that there was no discussion at this time about the work that Joseph was supposed to do during the coming year. There was no list of things Joseph was supposed to do. John never asked: "Is everything clear? Do you have any questions?" "We were all in our twenties and we all had a dream. Nobody knew exactly how it was going to happen, but we had a very nice relationship with John at the time. We were close friends." It is also important to remember that Sandy was in charge of the miso company, not John.

During the time Patricia and Joseph lived on the land, they were very happy. Patricia recalls: "It was a wonderful time for us." Joseph worked hard every day, out on the land, while they were there. He cut down trees and cleared lots of land, for the miso factory and warehouse, for planting the soybeans, and for their own home. Then he spent days rototilling and planted many acres of soybeans on the land he had prepared. He worked with local soil and agricultural departments in preparation for a dam that was to be built on the property. He also worked with the Farm Bureau and the water department–to get the basic groundwork done for the miso company. But he didn't do any carpentry at all when he was on the land, because he was waiting for John Belleme to send the plans, measurements, kinds of wood, where to build, the orientation of the buildings (*Feng-shui*), etc. Patricia recalls no communication with the Bellemes after they were in Japan. Joseph was in regular communication with Sandy Pukel in Florida. Sandy would say "Hang on" but never sent the needed information.

In exchange for their work, the Carpenters got use of the house free of charge plus the electricity and food expenses. Patricia taught cooking weekly classes to local people, and about 40 typical Americans came to class after class. Michio and Aveline Kushi came once to visit while the Carpenters were there; Patricia remembers his black suits, his cigarettes, and the fact that he liked her rice.

"Joseph is a very laid-back guy. He's an incredible artist. He's not threatening. He always follows through with things. He has a very unique constitution and spirit. He doesn't talk about other people; he's not a schmoozer."

1980 June–John and Jan Belleme return from Japan. Patricia recalls that "When John and Jan came back from Japan, they were very, very different people." John had been rigid in Boston, but now he was much more rigid. After several weeks of sharing their house with the Bellemes, the Carpenters are told to leave the land. Patricia thinks it was John Belleme who actually told them this, but she is quite sure that it was Sandy who made the decision. She recalls that Sandy phoned Joseph several times after the Bellemes returned to discuss problems. For example, the Carpenters had a new truck that was owned by the miso company but that was registered in Joseph's name. Patricia recalls that a settlement deal was made: "When you turn over all the legal papers, then we'll give you the money we promised you. They gave us $1,000, then they promised us an immediate $8,000 more upon receipt of the truck title." Patricia is sure that the amount promised was $8,000 but she does not know how that number was arrived at.

To this day, neither Patricia nor Joseph know why they were told to leave. She and Joseph were left in Rutherfordton without anything to do, and with two young children. Patricia was pregnant with their third child. They borrowed money from Patricia's father and bought a beautiful 50-acre farm in Rutherfordton. They had lived (uncomfortably) in the same house with the Bellemes for more than a month. Patricia recalls: "Losing the miso company was a disaster for Joseph. He never wanted to talk about it again. I think he never really got over it."

Not long thereafter, Jan Belleme come to visit Patricia and Joseph. She brought a basket of vegetables that the Carpenters had planted in the garden on the miso company land. As she arrived, Patricia clearly remembers thinking that she was bringing the money they were owed. "It was always expected."

1980 Nov. 23–The Carpenters' third child, Patrick, was born at that farm. After the birth, Patricia was thin and weak. Jack Garvey came to visit and directed her to eat differently. "It saved my life."

Patricia has nothing but good memories of the time she and Joseph lived on the miso company land. "Joseph was a very happy, healthy, and active man, with a lot of good energy, while we were living on that land." But she has bad memories from the time they were kicked off the land and not paid the money they were owed. Joseph also has very bad feelings and memories about the latter events. Joseph has an incredible memory for facts and details. Patricia notes that she doesn't hold onto things, but there was something about

the way their agreement with the miso company ended that has been the only thing in her life that she has sadness about. She has tried to work it out, but she still feels badly about it. She still does not understand why John Belleme asked Joseph to leave the land. Continued. Address: Grass Valley, California.

1452. Roberts, Patricia. 2000. History of interest in macrobiotics. Living on the Oak Feed Miso Co. land in Rutherfordton, North Carolina from 1979 to 1980. Part III (Interview). *SoyaScan Notes.* May 20. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** 1983 Feb.–Patricia leaves Joseph and moves away from North Carolina, to California.

1983–In California, she lived for eight years in Marin County, where she was a disciple of Bubba / Da Free John, an American-born spiritual teacher who had a community at Clear Lake. These were the best years of her life. Da Free John lived for a while on an island in Fiji and now he lives on one of the San Juan islands off the coast of Seattle, Washington. 1993–Patricia moved back to Boca Raton, Florida, to be near her family; there she ran an antique shop for 7 years. After returning to Florida, Patricia really wanted to call Sandy–but she couldn't; it was just too difficult.

1997 Nov. (late)–Patricia accidentally bumps into Sandy at a Heat basketball game in Florida. Sandy phoned her later that night, because he was so excited to see her again. asked why she had not called him–he had always really loved her. She said, "Because I have been so angry with you all these years." He said, "What about?" He did not know, so she told him a little bit about why she was still upset–but she did not hold anything over his head. He got it. On many nights thereafter they talked on the phone for hours. But they did not get together until early 1998, when they started dating. At her birthday dinner, on 28 March 1998, Sandy told her (she remembers this very clearly, as he sat across the table) that he had called John Belleme and that John had said Patricia was right–that Patricia and Joseph had been asked to leave, that they had been "screwed" (i.e. treated very unfairly), and still had not been paid the money they were owed. It wasn't clean. Patricia was happy to hear that John's recollection was the same as hers. Patricia and Sandy got involved with one another again, and Patricia recalls clearly that Sandy said something like "Stick with me, baby, and I'll be sure you get the money back." Again she believed he would rectify the unfair situation. Sandy said he was shocked at how much John remembered about how Patricia and Joseph had been treated unfairly.

Patricia again ended her relationship with Sandy on a bad note." He is the only person with whom she still has a bad relationship.

For the last eight years Patricia has lived in Boca Raton, where she ran an antique shop. Recently she moved to Grass Valley, California, to be near her children.

Sometimes Patricia sits down with her journal and reviews her whole life; she feels as if events fall into decades, and how quickly time passes. She continues to have a strong interest in meditation, yoga, and vegetarianism. She no longer practices macrobiotics, but she has been strongly influenced by it and she loves brown rice and some other macrobiotic foods. She is now feeling an urge to start teaching cooking classes again; she enjoys it very much and is very good at it. Address: Grass Valley, California.

1453. *Nutrition Business Journal* (*San Diego, California*). 2000. Corporations proceed cautiously with soy. 5(5):16. May.

• ***Summary:*** The supermarket chain Kroger promoted soyfoods at all of its 2,000 stores as part of Soyfoods Month in April. Nature's Path has launched Soy Plus Organic Granola, with a claim about reduction of menopausal symptoms. Natural Vitality has introduced Menopausitive, a drink fortified with 110 mg of isoflavones.

In the 17 Sept. 1999 issue of the prestigious scientific journal *Science,* Steven H. Zeisel, chair of the Department of Nutrition at the University of North Carolina (Chapel Hill) wrote a Policy Forum article advocating safety studies for substances like soy isoflavones, which are administered in large doses to obtain medicine-like effects, before they are put on the market. This would apply to products [such as ADM's Novasoy], for example, were one dose is five times the average human consumption. Central Soya has a new product, Prevastein Soy Isoflavone Concentrate.

1454. Carpenter, Joseph. 2000. Living in Boston and on the Oak Feed Miso Co. land in Rutherfordton, North Carolina from 1979 to 1980. Part I (Interview). *SoyaScan Notes.* June 2. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Joseph was born on 5 Aug. 1948 in Oakland, California, at Providence Hospital. He lived with his family in Berkeley until he was age 10; his father, who was a carpenter by trade, died in 1954, when he was still a boy. He and his mother then moved to nearby El Sobrante (by the back gate of De Anza High School–where he graduated from high school). He attended Contra Costa Junior College for two years, moved up to Sonoma State for a year, then dropped out. At age 19-20 (1967-68), he took off to see the world. As a young man, he became a skilled carpenter, learning by doing. Several of the men he worked with were good teachers.

A hippie during the 1960s, he met Patricia Roberts who was born in March 1947 in Queens, New York, and grew up in Rockaway Beach in Queens. Her father was a New York City police officer and detective for 20-25 years. Her parents retired to Florida in the late 1960s or early 1970s. When the kids were at home, they lived in a nice big home at Whitehouse Point; after the kids were gone, they moved to Deerfield Beach. Soon after meeting Patricia, Joseph stopped

using psychedelics drugs and alcohol. They picked apples together in Hood River, Oregon, and lived in an old picker's camp. Having been overweight, he lost about 80 pounds in less than 6 months–and felt great. He and Patricia and a girl friend of hers migrated to Tucson, Arizona, where they were planning to pick oranges for the winter. While looking for a place to stay, they came across a macrobiotic bakery, The Granary, run by Jack Garvey. That was their first introduction to macrobiotics. Because of their largely raw food diet, they were somewhat resistant at first, but soon became friends and students of Jack's. In 1973 Joseph and Patricia were married in Arkansas.

1977 Feb.–Joseph arrives in Boston from Northern California; he is very sure of this date. He met Charlie Kendall (a maker of traditional natto, amazake, and mochi), who had just bought a house in Brookline by the railroad tracks; Joseph helped him extensively remodel that building. Charlie's wife, Yoko, was Aveline's sister. Joseph soon became friends with Bill Painter, who was a house painter by trade and also had a small shop in the basement of the Kushi's house. Before long Joseph was working as a carpenter with Bill Eggloff, building a handsome grain bin for Erewhon's retail store on Newbury Street. Using red oak and Plexiglas, they worked on it in the basement, which had a garage door that opened onto the alley behind the store. Bill, who lived on Cape Cod, stopped working for Erewhon when the bin was finished. But the store needed more fixtures, so Joseph made a bid, signed a contract, then installed new check-out stands, new shelves, and units to hold the crocks of bulk tamari, barley malt, etc. Joseph had a family to support, and carpentry was his livelihood, so he was paid for all work he did in the Boston area. Later, over 4-day weekend, he worked to tear out old bathrooms and office spaces to open up the cramped front of the Erewhon store. He also did some work on a new Erewhon store in Brookline. After Erewhon moved out of their old 4-story brick warehouse, he worked on the huge modern warehouse that Erewhon moved into. The Kushi's house on 62 Buckminster Road had been the headmaster's house for a private school. Upstairs there was an institutional bathroom. Aveline asked Joseph to remodel it to make a private bathroom–with lots of tile. After about a year of working for the macrobiotic community (always for pay), Joseph got "burned out" and went to work for a regular contractor unconnected to macrobiotics.

1977 Christmas–Joseph and Patricia go to Florida for Christmas, one of many trips they took there. In early 1978 Joseph worked as a carpenter for several months in Sandy Pukel's Oak Feed Restaurant in Coconut Grove, Florida. He had gotten to known Sandy because his wife, Patricia, and Sandy were close friends; they had first met when they both went to a seminar Michio Kushi gave in Coconut Grove. After the restaurant opened, in about May 1978, Joseph and Patricia took a vacation to Jamaica. During the summer and fall of 1978 Sandy came to Boston several times. Each time he and Patricia and Joseph went out to dinner together. Sandy mentioned that he was thinking of starting a miso company and asked if they might be interested in getting involved. They expressed interest, but no definite plans or offers were made.

1979 Feb.–Joseph's second child, Benjamin, is born in Boston to his wife Patricia. The Carpenters took many trips to Florida, especially during the winter, to visit Patricia's parents. In about March 1979, over a long weekend, when Patricia and their two children were vacationing in Florida (visiting her parents), Sandy Pukel paid for Joseph to fly from Boston to South Florida for a meeting to discuss the part that the Carpenters might have in the development of the new miso company. Sandy knew Joseph's skills as a carpenter. Joseph recalls that the meeting was at Edmund Benson's house. Sandy said that he wanted Patricia and Joseph to become part of the miso company. In exchange for their labor, they would be given a share of the business ownership worth $25,000. Joseph does not recall whether they would receive the $25,000 once or each year that they worked–but he definitely recalls the $25,000 offer. Joseph recalls that the talk at this first meeting was very general in terms of what kind of carpentry or construction work he would do for the company.

1979 May (late)–Joseph leaves Boston in his van, headed for North Carolina–after handing over their house to the next renters. On the way, following Sandy's instructions, he stops in Hendersonville, North Carolina, for about a week to check out some real estate. With real estate agents that Sandy Pukel and/or Edmund Benson had found, Joseph looks at property the agents thought might be appropriate for the miso company in the Asheville area and in Rutherford County. As far as he knows, Joseph was the first person to actively look for land for the miso company. They found several properties that Joseph considered borderline, so Sandy (and probably John Belleme and Edmund) flew up from Florida and they all visited these sites together. Finding nothing that was suitable, they left. Joseph continued on to Florida in his van to be with Patricia and their children. Sandy continued to work with local realtors until he found a suitable piece of property. Joseph is quite sure that just before they finally purchased the land in Rutherfordton, Sandy, Michio and he (and perhaps a few other people) all went to see the property at the same time. They walked over the roughly 100 acres of land and through the beautiful house.

During the summer of 1979 Joseph and Patricia met with Sandy and Edmund several times to discuss their living on the miso company land while John and Jan Belleme were away studying miso-making in Japan. Though nothing was put into writing, Joseph and Patricia both recall clearly that their daily expenses would be taken care of, they would work on the land, and, at the end, they would own a part of

this new business. They were not given any specific list of tasks or duties they were expected to accomplish. Continued. Address: 10655 Lakeshore Dr., Clear Lake, California 95422. Phone: 707-994-3218.

1455. Carpenter, Joseph. 2000. Living in Boston and on the Oak Feed Miso Co. land in Rutherfordton, North Carolina from 1979 to 1980. Part II (Interview). *SoyaScan Notes.* June 2. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: 1979 Aug. (late)–Joseph leaves from the Boca Raton area of Florida in his van, pulling a U-Haul trailer filled with mattresses and furniture, and drives to the miso company land in Rutherfordton, North Carolina. Patricia's parents drove her up a day or two later. The first day that Joseph got to Rutherfordton was the first day that anyone could legally buy alcohol. It was the day the provision from the vote on Aug. 1 took effect. He distinctly remembers stopping at a service station in Rutherfordton; they were selling beer and everybody was talking about it. Before this, although liquor could not be sold legally in the area, there was plenty of bootlegging. One local bootlegger earned enough money to send his three sons through college. Or one could drive 45 minutes to Chesney, South Carolina, to buy alcohol legally. When someone was drunk and staggering a bit, they were said to have a "Chesney lean."

Joseph began his work of settling in by cleaning the house, mowing the lawn, and generally cleaning up. After a month or so John and Jan Belleme arrived on their way to Japan. John was driving his BMW motorcycle and Jan was driving their old beat-up Volkswagen. Joseph took the VW into Charlotte to trade it in for a truck to use on the land; it broke down in the used-car lot. John and Jan dropped off some of their personal possessions, and stayed for a week or more before they continued on across the USA on the motorcycle to California, then Japan. Joseph is very sure that while John Belleme was on the land, he never gave Joseph a specific or even a general list of work he wanted to have accomplished while he was gone. It wasn't even clear yet where the miso factory was to be located. "Everything was up in the air." Also, John was working for Sandy–just like Joseph was.

After the Bellemes left, Joseph began by painting the entire inside of the house. Most of the land was unimproved pasture with tall weeds. He arranged for a tractor and a brush-hog to keep the weeds down, both to reduce fire danger and to make the land look nicer. He started a big garden (on a nice flat area down by the paved road where the miso factory was eventually constructed), but found out later that a previous owner, Bob Deakin, had grown so much corn there that the soil had been exhausted. So his first garden failed. Later he built up the soil using a Troy-Bilt rototiller.

He cut firewood, cleaned up and burned the slash (the tangle of brush and tree tops from "Nigger Pines" that had been cut and sold for pulpwood), dealt with the kudzu, etc. He laid the groundwork for a pond and dam on the property by contacting local agencies, gathering information, and sending it to Sandy. He and Patricia were in touch with Sandy by phone and letter. The few requests for work from Sandy (mostly laying the groundwork), Joseph completed promptly. For example, he collected and sent samples of wood and wooden pipes to John in Japan. He did not do any carpentry or construction work because no such work had been authorized by Sandy. Joseph recalls: "The owners of the miso company knew what they wanted to do, but they didn't yet know *how* they were going to accomplish it, or what form it was going to take. "It was kind of vague, with few details. There was not a lot of direction, so it was a struggle to keep busy; there's nothing worse than just doing nothing."

A letter or two was exchanged with the Bellemes in Japan, but none of these contained any discussion of work for Joseph to do. Rather the Bellemes described their Spartan existence.

Joseph put in a good day's work every day–weather permitting. In exchange, he had the house to live in, all expenses paid–such as utilities, food, gasoline, home insurance, and even schooling for their eldest daughter, Yana. He thinks that he and Patricia probably also got a minimal salary so they would have some personal money–but not enough to open a personal bank account and make deposits. At one time the company bank account (at a bank in Rutherfordton, on Main Street, on a corner), replenished once a month by a check from Florida, got so low that Joseph had to go out and find a paying job.

While the Carpenters were living on the land, they practiced a healthy macrobiotic diet, with Patricia as the cook. They were not strict, so they consumed a little chicken now and then.

They purchased their home insurance from Bob Deakin, a very nice man who worked for the North Carolina Farm Bureau Insurance Co. They soon learned from Bob that he had formerly owned this same piece of land–it was his dream place–with several creeks and hills, and a beautiful home on top of the hill, big kitchen with custom cabinets, three bedrooms downstairs, huge master bedroom upstairs with a sauna, two car garage. Joseph heard the fateful story from other people local town. One day Bob and his family was driving into town. A truck driver in a big semi [semitrailer] was swatting at a bee that had gotten into the cab. He hit Bob's vehicle head-on, killing one of his daughters and seriously injuring Bob. For some reason, either there wasn't insurance or he wouldn't sue the truck driver (he refused to profit from his daughter's death), Bob (who couldn't work) eventually lost his treasured piece of land. He sold it in 1975 to Lawrence Bridges and E. Milton Singletary. Continued. Address: 10655 Lakeshore Dr., Clear Lake, California 95422. Phone: 707-994-3218.

1456. Carpenter, Joseph. 2000. Living in Boston and on the

Oak Feed Miso Co. land in Rutherfordton, North Carolina from 1979 to 1980. Part III (Interview). *SoyaScan Notes.* June 2. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** 1980 spring–The Bellemes return to North Carolina from Japan. Joseph recalls there was almost "immediate antagonism. They were so *yang,* tight, salty and wound up. Maybe we had gotten used to operating on the Southern vibe. It was a clash–bad vibes from the beginning." Patricia had come to consider the place as her home and now it had to be shared. Joseph does not recall any specific areas of conflict, and he is certain that John had no specific complaints and never said anything such as "Why haven't you done this or that?" Joseph had done everything that he had been asked to do, and he had no power to initiate any construction projects. It was understood that all those decisions would be made after John and Jan returned from Japan.

The Carpenters and Bellemes lived on the land for a month or two together. It was unpleasant, but Joseph does not recall any specific complaints by the Bellemes. Patricia is a good housekeeper, so the house was very neat and clean. Question: Did you decide to leave on your own or were you asked to leave? Joseph's answer: "We were definitely asked to leave. We didn't want to go." The Carpenters had expected to be actively involved in founding the business, and to soon have a separate home of their own on the land. John Belleme was the one who asked them to leave, but it may well have been a decision that Sandy made–maybe with some input from John. Joseph recalls hearing of some kind of "financial shenanigans involving Sandy." He never knew exactly what the problem was, but he felt he had lost his support from Sandy–for whom he was working. Maybe someone decided to just have a construction company come in, pour a slab, and erect a metal building–instead of taking the time to construct a hand-made building. Both Joseph and Patricia feel that they were treated unfairly in that they believed they had some compensation coming that they never received–either a portion of the business or monetary compensation. They had lived and worked there for almost a year–basically for room, board, and expenses (including about $1,000 for Yana, age 7, attending a local private Christian school)–with the clear understanding that a portion of the business would be theirs.

Soon Joseph began looking for a new place to live. They found a piece of land with two homes on it just outside the Rutherfordton city limits.

1980 Nov. 23–Their third child, Patrick, was born at that farm. After that, Joseph began to receive acupuncture treatments from Jack Garvey. Joseph renovated the second home and rented it out, but after Patricia left in early 1983 the tenant was murdered (by her ex-boyfriend) in the home, so he couldn't rent it out any more.

Joseph felt bad about what happened during the time he worked for the miso company, but after several years he let go of it. Life goes on, and he had new problems to deal with. Not much was to be gained by dwelling on the past.

In about 1991 or 1992, while listening to the Dean O'Dell show on KGO radio at work, he first heard the diagnosis of a sleep disorder that had started several years after he left the miso company land–sleep apnea. It means you frequently stop breathing when you are sleeping. The result is that you never get into deep REM sleep, so no matter how much you sleep, you're always tired. Joseph would often fall asleep during the day, and as soon as he got home from work. He feels that was a real problem in the later years of his marriage. He has been able to treat the problem by putting a small medical air compressor (a CNAP = Constant Nasal Air Pressure) as part of a mask over his face when he sleeps at night. This machine activates when he stops breathing at night. When he found out what the problem was, he was so glad. He had to pester the regular doctors before they would give him sleep tests, which led to a diagnosis and the machine.

Note: On 2 July 2000 William Shurtleff called John Belleme, told him that he had interviewed the Carpenters, and asked John if he would like to tell his side of the story. His response: "I'm not going to say a word about it." He did say that he felt it was "outrageous" for Shurtleff to discuss matters of personal feeling and conflicts in a company history–especially feelings that could hurt people who are still around; the history should be limited to facts about the company. Address: 10655 Lakeshore Dr., Clear Lake, California 95422. Phone: 707-994-3218.

1457. Deakin, Karen. 2000. How the American Miso Co. land in Rutherfordton, North Carolina, became available (Interview). *SoyaScan Notes.* June 20-21. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Karen Deakin was married for many years to Bob Deakin. Their family used to own the 92 acres of rural land in Rutherfordton, North Carolina, on which the American Miso Company now stands. Bob used to be a golf professional who toured. He and Karen were city people, born in Detroit (Michigan) and Chicago (Illinois), respectively. They and their four children had moved from Florida to North Carolina to be near Fairfield Mountain, an excellent golf course there. When the golf course started to go out of business, the Deakins elected to stay in North Carolina, because they loved the place. Bob got out of the golf business. On 19 Sept. 1975 they purchased 92 acres of rural land in Rutherfordton. The deed of trust was between (1) Robert Warren Deakin and his wife, Karen Ann, of Rutherford Co. and (2) William A. McFarland of Tryon Federal Savings and Loan Assoc. in Polk Co.

They got a published plan for a large, five-bedroom ranch house, then hired an independent contractor to build it for them. (Note: It was not a prefab house). Soon Bob got a job with North Carolina Farm Bureau Insurance. He was

a “people person” and was great at this job; he helped many people.

On 2 Aug. 1977 Bob was bringing two of their children back from a music lesson in Forest City. All three were in the front seat of their car, with their eldest daughter, Deanna (“Dee Dee”), age 12½, seated in the middle and their middle son, Jay, age 8, seated on the right. They were driving behind a truck, going north, on a curve in the tiny town of Ruth (between Spindale and Rutherfordton) when suddenly a huge Rider car carrier (which carries empty cars on the back) swerved across the road, smashed into the truck ahead of them (killing both men in it–brothers), then crashed into the Deakins’ car, bounced off the railroad tracks, and smashed into the Deakins’ car again–totally destroying it. “It was almost like an angel intervened to save my husband.” Deanna died on the spot in the arms of a rescue worker. Both Bob and his son were seriously hurt. Doctors said that Bob might never see or walk again. To explain what had happened to her other two small children, Karen said: “Daddy, and Jay and Dee Dee have been in an accident. Jesus wanted to Dee Dee to come and stay with him.”

They learned later that the driver of the Rider truck had lost control when he tried to swat a bee that had flown into his cab by accident. The Deakins refused to file a lawsuit because “we did not want to profit from the death of our dear daughter.”

Bob was hospitalized for quite a while, then was in a body cast and wheelchair for 8 months. He couldn’t work, and Karen was taking care of her injured husband and son, so the family had no income and fell far behind on the mortgage payments that were due on the property. “The Lord took care of us, helping to pay for utilities and food.” They tried to get a second mortgage, but were unable to.

Finally the bank either foreclosed on the mortgage or threatened to. Karen thinks that the names of two officers of the bank, Lawrence L. Bridges and E. Milton Singletary, appeared on the deed to the land. Tryon Federal Savings and Loan Association, of Tryon, North Carolina, immediately tried to sell the land so the new buyer would assume the mortgage. They finalized this sale to Oak Feed Miso, Inc. on 7 Aug. 1979.

The Deakin family moved out of their lovely house to an old house on a farm (about 13 acres) in the Gilkey area, just outside of Rutherfordton. The monthly payments were much smaller, Karen got a job as a teacher’s aide in a kindergarten, and Bob returned to his insurance job a little later. Bob died in 1994 of cancer. Karen has since remarried, and her son (who was in the accident) and his wife have recently given her a grandchild.

Karen met John Belleme one day when there was a fire in the attic of the bedroom and he came in looking for wood flooring; Karen was working for Robbins Paint and Carpet. Karen later met a women named Mary Flin who lived on the miso company land and had about 4 kids. She also heard that a second house had been built on the land and that someone were raising shiitake mushrooms by a low waterfall or rapids near the homestead cabin the center of the property. Karen used to keep turkeys in this cabin, and before the Deakins bought the property the Elliott family had this cabin as their homeplace. In the spring the land was covered with double and triple daffodils. Address: Rutherfordton, North Carolina. Phone: 828-287-7862.

1458. Gonzales, Greg. 2000. Making miso and koji for American Miso Co. Inc. Part I (Interview). *SoyaScan Notes.* June 20-21. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Greg was born in July 1959 in Torrance, near Los Angeles, California, in a middle-class Mexican-American Catholic family. Both his parents were born in the Los Angeles area and Greg grew up in that area. After graduating from high school at age 18-19 he became a professional dancer. In 1987 he went to Japan for 6 months to work as a dancer at a tourist hotel in a small, isolated Japanese town. He liked Japanese culture very much. During this time he wrote short stories, and decided it was time for a change of careers. After returning to the USA, he lived in Los Angeles, found several easy jobs, and went to L.A. Community College for a year to pursue his interest in writing. At that time, in 1989, he met Barry Evans who was living to Los Angeles. They met through a mutual friend, spent a lot of time together during the next year, and became good friends. Barry took a federal holiday and Greg moved to Sonoma County in northern California. There he met a woman named Manon Fancher who became his partner; she already had a child named Keith Fancher. Together they moved to a small lumber town in Plumas County, in the Sierra Nevada mountains, about 70 miles north of Lake Tahoe. Greg worked for the U.S. Forest Service on a timber salvage marketing crew and taught dance on the side. On 12 Aug. 1992 they had a baby boy named Devin.

One day, in 1995, after they had lived in mountains for about two years, Barry Evans called, said he lived and owned several businesses in and around Asheville, North Carolina, and offered Greg a job working at the miso factory; Don DeBona would be his boss. Greg said he would like to think about it, discuss it with Manon, and visit the company before making a final decision. He had enjoyed miso previously, but did not know how it was made. He liked Japanese food and culture, knew nothing about macrobiotics, and was not sure how he would like living in rural North Carolina. So Barry flew him out to North Carolina. Before his interview with Don DeBona, Greg read *The Book of Miso* to better prepare himself. He accepted the offer. He and Manon tied up loose ends in Plumas County, then drove with their kids across the country to North Carolina.

Arriving in Feb. 1995, Greg worked at Great Eastern Sun for about 8 weeks, then went to work with Don DeBona

at American Miso Co. (AMC). Don had had trouble keeping workers; they were attracted by the romance of miso and making macrobiotic foods, but couldn't take the hard work or the rural environment.

Greg worked for Don for about 2½ years. When Don left the company, Greg had plenty of experience making miso but he had never made koji by himself. Greg recalls: "I suddenly found himself with the reigns in my hands. There was a lot of responsibility, and I felt tense at first." He had steamed and inoculated the rice, dug it, put it in the trays, put the trays in the koji room, etc., but he had never stayed with the koji during the night or had to make decisions about adjusting its temperature. Making koji is an art, based on being sensitive to the properties of the koji; it cannot be learned from a book. It takes a long time to "learn how to make koji happy. Newcomers always want to go by what the thermometer says, but it doesn't work that way."

About a month after Greg took over, Barry hired John Belleme, one day a week, to look carefully at the koji Greg had made the day before, and to give him tips on how to improve. John is still active in this role, which is working out very nicely for both John and Greg. "John loves this place."

Greg makes koji at least once a week; Wednesday is koji night, so Greg will be with the koji until midnight. He will check its progress every 60 to 90 minutes, depending on the season and outdoor temperature. A little after midnight, he goes to his cabin on the miso company land and sleeps until a little before 4:00 the next morning. Then he returns to the miso plant, checks the koji again, and starts cooking the soybeans. Because of the fermentation process, koji generates its own heat, and it creates increasingly more heat as it matures, and its mycelium expands and binds the rice into a cake. Each time Greg makes koji it is different, and different types of adjustments must be made. There are no thermostats in the koji room. All temperature adjustments are made by either opening or closing the koji room door or the vents in the ceiling. If the ceiling vents are opened too much, the heat will rise out but so will the humidity. Thus, the balance of opening the door vs. the ceiling vents is important in adjusting the koji room humidity. To add humidity, Greg may wet the floor of the room and close the room. He never uses a heater to heat the koji room, in part because it dries out the air. When inoculating the rice, Greg will use less inoculant in the summer than in the winter.

This koji is really made in the traditional way–all natural, nothing artificial. Most companies automate their process as their volume expands, but AMC has decided not to do that. Yuko Okada of Muso and Mr. Kazama of Mitoku (both Japanese natural food companies) told Barry Evans that they thought AMC was the largest maker of traditional koji in the world. The company makes about 300,000 lb/year of miso. Don DeBona increased the number of miso vats from 10 to about 45. Continued. Address: 4225 Maple Creek Rd., Rutherfordton, North Carolina 28139. Phone: 828-287-2940.

1459. Gonzales, Greg. 2000. Making miso and koji for American Miso Co. Inc. Part II (Interview). *SoyaScan Notes.* June 20-21. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** To enter the original koji room, one had to step up a foot or so from floor level. The koji table was built into the room, and was thus immovable. The original koji room is now used for cold storage of miso tamari from the top of the vats (they bottle and sell it) and for tubs of bulk miso. The company now has two new and larger koji rooms. The floor of each is level with the floor of the building and the door is larger; thus, it is now possible to roll the koji table and racks of koji trays in and out of the room. Two koji tables can fit side by side in one new koji room. Don DeBona had the idea of putting the koji table and racks on wheels. He called it "Reinventing the wheel." Each koji room has about the same floor area as the old one, but the ceiling is 8 feet high rather than 6 feet. The floor of the new rooms is insulated wood (rather than cement) to prevent loss of heat and humidity.

After the rice is steamed, it is put into the hopper of a machine where three things happen: Metal fingers break up any clumps, a water-cooled jacket cools it, and a small blower blows spores of koji starter over it. It comes out onto a low table, whence it is shoveled (using a stainless steel shovel) into the koji crib atop the stainless steel table. The koji crib is about 18 inches deep and is lined with organic linen cloths before the cooked rice is put in. The inoculated rice, on the table, is then wheeled into the koji room.

"The hotter it is, the harder it is to make koji," notes Greg. So on very hot days, Greg will spread the grain by hand on the low table to cool it faster and more; then he will inoculate it by hand, and work the inoculant in evenly with his hands.

When the koji in the crib is ready, the crib (on its table) is wheeled out of the koji room. The koji is then scooped onto koji trays using a one *shô* measure. Greg does not stack the koji trays in different ways to conserve or release heat; rather he puts them on rolling racks. Once a koji tray is placed on a rack, it stays in that place on the rack until the koji is ready. When a rack is full, it is wheeled back into the koji room. This saves labor and enables Greg to make much more koji.

Greg makes miso in a three day cycle. He steams the rice on Monday, puts it in trays on Tuesday, and makes the miso on Wednesday. For most of the year, this cycle is repeated twice a week. Making miso twice a week is hard work. During the busiest times of year, the company employs about eleven people–including Greg; five in production and six in packing. Many of the packers are local women who like the miso company work better than that offered by the local mills, because there is less stress, and they can set their own hours as long as the work gets done. Greg is the general

manager, in charge of these workers. He really appreciates this challenging opportunity. So far this year, Greg and his coworkers have made 119,250 lb of finished koji.

Most consumers use miso to make soups. They use more miso in the winter than in the summer. So by the beginning of summer, the vats are usually full. By October or November enough vats have been emptied of their miso, that it is time to start making more miso to refill them.

Concerning this work, Greg reflects: "I love it. I don't mind hard work. It offers its own reward. I feel connected to everyone who went before me–part of a lineage. Also, you can't be phony with the koji, or pretend, or get arrogant with it. If you don't look at it carefully, and feel and smell it, then you'll make a mistake. It's dynamic, and it keeps you honest that way. This is an honorable thing to do, and I feel privileged to have found myself in the same wacky way that everything else happened here–to be the baby sitter for a while."

When not making miso, Greg continues to write short stories and poetry. When he learned that Erewhon was connected with this miso company during its formative years, he joked: "That makes perfect sense. 'Erewhon' spelled backwards is 'nowhere,' and this place is out in the middle of nowhere." Recently Louise Hagler of The Farm in Tennessee visited the American Miso Co. for three days. She is writing a miso cookbook, which will contain a brief description of koji and how it is made into miso.

Greg's son, Devin, is now age 8, and his stepson, Keith Fancher (who is into computers and math) is age 16. Manon cares for the kids at home. They are considering home schooling for next year. Both of Greg's parents are still alive. They have found that the corporate world is not a nurturing place. So they have come to respect his choice to follow his own path, and the fact that he is now general manager.

Talk with Barry Evans, owner of American Miso Co. 2000. June 29. Greg Gonzales' right hand man in making (and tending) koji and miso is his brother, Dave Gonzales. Two black guys and a Honduran immigrant also make koji and miso with them. The father of Greg's partner, Manon Fancher, is Hampton Fancher, who is a screen writer; he wrote the script for the well-known movie *Blade Runner.* Address: 4225 Maple Creek Rd., Rutherfordton, North Carolina 28139. Phone: 828-287-2940.

1460. *SoyaScan Notes.* 2000. One disaster after another leads to success: Brief history of American Miso Company (Overview). June 20. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** This story, with its many strange twists and turns, might be called "One disaster or failure after another leads to success" or "The perfection of imperfection."

1977 Aug. 2–It was a disaster for Bob and Karen Deakin of Rutherfordton, North Carolina, when a bee flew into the cabin of a big truck near their home. As the driver tried to swat it, his truck swerved across the road and smashed into a car driven by Bob Deakin, killing Bob's daughter (age 12½) and severely injuring Bob and his young son.

1979 Jan. 26–It was a second disaster for Bob and Karen Deakin when they were forced to give up the home they had built and the 92 acres of land they dearly loved in Rutherfordton because they could not make the mortgage payments. With Bob still injured from the car crash, the family had no steady income. The land was sold to Oak Feed Miso Co. on 7 Aug. 1979.

1979 Oct.–It was a disaster for John Belleme when he arrived in Japan to study miso and nobody knew who he was or why he was there. The arrangements that were supposed to have been made were never made.

1979 Oct.–It was a small disaster for Mr. Kazama of Mitoku when John Belleme handcuffed himself to Mr. Kazama's desk and said he would not leave until Mr. Kazama had located a miso master with whom John could learn the traditional art of making Japanese miso.

1979 Oct.–It was a disaster for miso master Takamichi Onozaki, of Yaita, Japan, when two foreigners arrived, without invitation, saying they wanted him to teach them how to make miso. He told them he was sorry, but they could not stay. They stayed in his house, under the same roof, for 6-8 months as they worked hard and learned how to make miso.

1979 Nov. 18–Barry Evans is in a disastrous bicycle accident, breaking 5 vertebrae and 9 ribs. After a 14-hour operation, he spends 6 months on his back in the hospital and 1 year in a full-body cast.

1980 June–It was a disaster for Joseph and Patricia Carpenter, who had lived on the miso company land for the past ten months and expected to be owners of the miso company, when they were told to leave and, in their opinion, not told why.

1981 Nov. 10–It was a disaster for Michio and Aveline Kushi when their company, Erewhon, is forced to file for Chapter 11 bankruptcy protection because of debts totaling $4.3 million. The Kushis also had to give up their dream of starting a miso company (named Erewhon Miso Co.) in America. It was also a disaster for the miso company which could no longer count on Erewhon to distribute its products.

1982 Jan. 31–It was a disaster for Sandy Pukel when he has to give up his stake in Oak Feed Miso, Inc. It was his "baby" and he, more than anyone else, was responsible for bringing it to this stage. Equally sad was the fact that his good relationship with John Belleme was strained for the rest of the 1980s; they didn't talk for years after this event.

1982 Jan.–It was a small disaster for Mr. Onozaki when John Belleme begged him to come to America from Japan to check John's koji-making. He didn't want to go. He spoke no English, had never been outside of Japan, and had a business to run at home. Yet he went to help a friend in need.

1983 Oct. 1–It was a disaster when John and Jan

Belleme feel they must sell all of their ownership in the American Miso Co. (900 shares) to Barry Evans. They had devoted most of the last 4-5 years working to create and build this company.

1992 Jan.–It was a disaster for Barry Evans when he is forced to take a "federal vacation" in Santa Barbara, California, for 2½ years.

2000 July 4–American Miso Co. is the largest and most successful Caucasian-run miso manufacturer in the Western world. Who is and was responsible for this success? Most of the people named above.

Note: Some of the most interesting (juiciest) stories about this company remain untold, for reasons that cannot be disclosed at this time.

1461. Troy, John. 2000. Update on Wizard's Cauldron and work with miso (Interview). *SoyaScan Notes.* June 26. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** John's original organization was the Lindenself Foundation, a nonprofit organization involved with Eastern spirituality. The linden tree symbolized the heart. Out of this grew Linden's Elfworks, then Elf Works, Ltd., whose first product was a candy bar named Wizard Baldour's Power Pac introduced in 1976, and containing ginseng. Elf Works, Ltd. was created outside of the nonprofit corporation, and it existed only briefly (1981-1984).

In about 1980, John was first introduced to miso by Joel Dee of Edward & Sons who was introducing his Miso Cup, a dehydrated miso soup. Troy's next product was Wizard Baldour's Hot Stuff (in Regular or Blazing intensities); it was the company's first big success. It contained miso from the day it was launched. Troy first bought this miso from Erewhon (a fairly dark salty rice/red miso), but when Erewhon filed for Chapter 11 bankruptcy in Nov. 1981, Troy started buying his miso from Barry Evans of American Miso Co. It was John Belleme and Barry Evans who really got Troy interested in and involved with miso–before American Miso Co. had any miso for sale, but after their miso plant had been constructed. Troy can't remember how, where, or when he met Barry Evans. Belleme told him about going to Japan and apprenticing with Mr. Onozaki. Later Barry Evans introduced Troy to John Fogg in Charlotte. Troy later worked closely with Fogg; "at first I thought he was arrogant and fussy, but he ended up being a tremendous influence in my life, and taught me so much about marketing... To this day I still draw on the wisdom of John Fogg."

Troy now makes almost 100 different products for the natural food trade. Most of these contain miso and/or soy sauce. All of his business is private labeling, so he develops and manufactures products, which other companies market. Across the street from his office is a modern, high speed blending, bottling, labeling plant, with plenty of cold storage. He manufactures and bottles every product he develops. His company, The Wizard's Cauldron, Ltd., run small by a small team of leaders, now does about $2 million a year in annual sales. His products are now almost totally organic–200 ingredients. John has just a handful of customers. The biggest is Whole Foods Markets; he makes all the salad dressings and sauces sold under the Whole Foods label. Second biggest is Joel Dee of Edward & Sons. Troy makes four brands for Joel Dee: Premier Japan, The Wizard's, Troy's, and Rain Forest Organic. Joel's company owns the "Wizard" brand, which Troy gave him in 1987 as part of his "recovery plan" after American Natural Foods went down the tubes. Joel said, "You make it, I'll sell it." At about the same time, they also both developed the Premier Japan brand and line, which is still doing extremely well. In about July 1989 John developed "The Wizard's Worcestershire Sauce," a vegetarian sauce, for Joel Dee. It is now selling better than Hot Stuff. Ponzu is the Japanese equivalent of Worcestershire sauce; they use bonito instead of anchovies. But ponzu originated first, so "Worcestershire sauce is a Western 'knock-off' of ponzu." The Ginger Tamari is still a wonderful product that is doing very well.

Troy's third largest customer is Albert's Organics, America's largest organic produce distributor, for whom he makes a line of fresh, refrigerated organic dressings. Albert's Organics recently merged with UNFI (United Natural Foods, Inc., the collection of distributors that was Stow Mills, Cornucopia, Rainbow, Mountain People's Warehouse, etc.). UNFI is now a big publicly-owned company. Troy's favorite product developed for Albert's is Mellie's Miso Mustard Dressing, launched in 1998 with a mild miso from American Miso Co. Albert's daughter is named Mellie.

John is now developing a line of dressings under the Moosewood Restaurant brand for the people who own that restaurant. John's favorite is the Miso Ginger Salad Dressing. A few days ago he closed a deal with Robert Tepper (formerly of The Farm, in Summertown, Tennessee) to market his Simply Delicious brand of dressings. Robert now has his own company named Sunrise Management, which is a brand management company; Simply Delicious will be the first brand he owns. Robert worked for Natural Nectar, then Blue Sky, then Annie's (which he left in early 2000 to start his own company).

John's main work is still developing new products and naming his creations–the work he enjoys most of all things. "It's really fun." Blessed are those who find a way to do what they love most in life. Address: The Wizard's Cauldron, 8411 Hwy. NC 86 N, Cedar Grove, North Carolina 27231. Phone: 919-732-5294.

1462. Troy, John. 2000. Update on the Macrobiotic Company of America and Bruce Macdonald (Interview). *SoyaScan Notes.* June 26. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Bruce was recently kicked out of the company (MCOA), Norio Kushi is now running it, but Muso owns

most of it. Bruce has filed a lawsuit against MCOA. Barry Evans and Norio are trying to work together, since Barry would like to slowly get out of the distribution business (he owns Great Eastern Sun) and move towards building branded products.

A few days ago John heard that Mr. Kazama had decided not to sell any more of his Mitoku products to MCOA. Rather, he will help Bruce start a new company in Asheville, and Mitoku will sell to Bruce.

John heard from Norio a few days ago that MCOA wants to come out with a line brandnamed "Kushi Organic" to take the place of Mitoku. They want John to develop a line of miso-based sauces, dressings, etc. for them. "Kushi" is now a registered trademark, owned by Michio Kushi, who is willing to assign it to his son, Norio. Address: The Wizard's Cauldron, 8411 Hwy. NC 86 N, Cedar Grove, North Carolina 27231. Phone: 919-732-5294.

1463. Evans, Barry. 2000. A visit with Mr. Onozaki in Japan: The story of the guests who decided to stay (Interview). *SoyaScan Notes.* June 29. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** In 1984 Barry and John Belleme both traveled to Japan where they visited Mr. Takamichi Onozaki, with whom John and Jan Belleme had spent seven strenuous months studying miso-making in late 1979 and early 1980. Barry visited Mr. Onozaki again last month in Japan. At about age 70, he was still his same energetic self, very active and healthy and full of vitality, and his daughter and son-in-law were still there living 10 feet away (in Japanese fashion) and working hard making miso. Barry recalls: "He is a wonderful person. When we pulled up, got out of the car, and I saw him there, I broke down and started weeping. I hadn't seen him in 15 years. I think of him as the father of our miso company and I feel the same great affection and respect toward him that I do to my own father. It was very special." Mr. Onozaki then told Barry a story he had never heard before.

When the Belleme's showed up at his house, unannounced, in 1979, it was a disaster for him. He didn't want them to stay at all. He went out for a while, but when he came back he found to his dismay that they had moved all their baggage into the room of his daughter who was away at college, and made themselves at home. They begged him to let them stay overnight, so he relented and said okay, but only for one night. The next day they persuaded him to let them stay for one more night. The whole time they were there, he tried to get rid of them, over and over again–but they bamboozled him at every turn. They talked him into letting them stay for one week, then for one month, then for one more month, then for three months, then for two months more. At every juncture, they had to fight their way to stay the extra time. They would cry and moan. Of course, by end of their stay, television crews were coming up to cover the amazing story of Americans who had come to Japan to learn how to make miso.

But as he told the story it was clear that he was now quite proud of the fact that his disciples had started what is today the largest Caucasian-run miso factory in the Western world.

He then told Barry about how John seemed to have lost some confidence in his koji-making ability during the first season. John asked Mr. Onozaki if he would come to the United States and check that he was making the koji correctly. Mr. Onozaki said that he refused to come the first 3-4 times that John asked him. He had never been outside Japan before, and he has never left it since. He didn't want to go–at all. He didn't speak any English. How would he find his way? He had an active business to run at home. But John just kept insisting that he had to come. Mr. Onozaki said that eventually he remembered an old Japanese saying: "When a friend says he really needs your help, you've got to try to help!" So he felt that he just had to go, though he did so "kicking and screaming." Several months later, he sent his daughter and son-in-law in his place.

On the 1984 trip to Japan, after visiting Mr. Onozaki in northern Japan, John and Barry visited the Muso Company (*Muso Shokuhin*) in Osaka (south-central Japan), then the Fujiwara Brewing Company in Hiroshima (a manufacturer of equipment for making beer, soy sauce, miso, etc.; Barry was considering making shoyu in North Carolina), then the company that makes sweet white miso for Muso in Fukuoka (on Kyushu, Japan's southernmost island).

On a 1983 trip with Robbie Swinnerton of Mitoku (John Belleme was not along) Barry visited Sendai Miso-Shoyu Co. in northern Japan. Address: Owner, American Miso Co., Inc. and Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1464. American Miso Co.; Tax Dep. of Rutherford County, North Carolina. 2000. Maps of American Miso Co. land and buildings. Rutherfordton, North Carolina. 7 p.

• ***Summary:*** These seven maps were sent by Greg Gonzales of American Miso Co. (AMC). The information on dates of sale and where those land deeds were recorded was provided by Mae McMahan of the Rutherford County records room (Phone: 828-287-6195).

Map 1 (which is part of the larger Map 571, Block 1 of the Rutherford County Tax Dept.) shows the land owned or formerly owned by AMC–consisting of three lots. Lot 33 (tract 1), 66.97 acres, was purchased on 7 Aug. 1979 by Oak Feed Miso Inc. from Lawrence L. Bridges and E. Milton Singletary (Deed Book 405, p. 727). Lot 33-A (tract 2), 7.5 acres, was purchased on 9 March 1981 by John Belleme from American Miso Co. (Deed Book 422, p. 228). John sold this lot on 19 May 1986 to Jack Benny Lovelace (Deed Book 486, p. 335), and Mr. Lovelace now lives on that land. And lot 33-B, 19.11 acres, was purchased on 1 Sept. 1995

by Donald J. DeBona from American Miso Co. (Deed Book 656, p. 368). The total area of the three parcels is 93.58 acres. The amount purchased by American Miso Co. on 7 Aug. 1979 was 92.38 acres.

The main lot, 33, the only one presently owned by American Miso Co., is basically a rectangle, about 2.75 times as wide as it is high, with its long sides running east-west. A boundary line running north-south down the middle shows that it once consisted of two separate lots. It is bounded on the southeast corner by Maple Creek Road, and on a long, diagonal northeast corner by a boundary line. Parallel to this line, and a little southwest of it runs a stream which flows from northwest to southeast into Maple Creek, located just east of and parallel to Maple Creek Road. Between the steam and the northeast boundary is a 5-acre pasture that belongs to the company. Lot 33-A, the smallest lot, is in the northwest corner of Lot 33; it was purchased from Barry Evans by John Belleme, who built the foundation of a house on it; he later sold it to a Mr. Lovelace, who finished building the house and now lives in it. Lot 33-B, located just east of center of Lot 33, contains the large house which, with the lot, is now owned by Don DeBona. He lives there and is the American representative for an Australian import-export; he works out of his home. This is the house where Joseph and Patricia Carpenter, then John and Jan Belleme once lived.

Map 2 (drawn by Greg) is an improved version of Map 1 showing, the correct location of the stream, of the dirt road leading to the cabin where Greg stays on koji nights, of the four miso-company buildings, the two paved asphalt areas by the entranceway (for parking and where large trucks can back in and unload onto loading docks) and the well house. All water used in making miso comes from this well, which has very pure water, but is still tested regularly for purity. A lot of kudzu grows on the property.

Map 3 shows the outlines (incl. correct size and spacing) of the four American Miso Company buildings.

Map 4 shows building A, located furthest south on the property and nearest the entranceway. It contains the rice milling machine, pallets of rice, break room, and office.

Map 5 shows building B, one of the two largest buildings, in which are located the new and old koji rooms, water tank, boiler, steamers, soybean cooker, soybean cooling table, 12 miso vats and two short-term storage areas.

Map 6 shows building C, which is attached to building B, and is the packing room; it contains the incubation room, tables, miso auger and cooler.

Map 7 shows building, the other large building, which is located furthest north on the property. In it are many miso vats and pallets of soybeans, plus a cooler for refrigerating short-term miso before it is shipped. A road runs next to the four buildings along their southwest side, then curves onto lot 33-B and ends at Don DeBona's house. The miso company consists of four buildings.

1465. *SoyaScan Notes.* 2000. Chronology of Erewhon Miso Co., Oak Feed Miso, Inc. and American Miso Company (Overview). July 6. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** These three companies are actually the same company whose name changed. This chronology is based largely on dated documents. Undocumented dates are usually followed by question mark. Notice the many unusual twists and turns in the story.

1977 Aug. 2–A bee flies into the cabin of a big truck near Rutherfordton, North Carolina. As the driver tries to swat it, his truck swerves across the road, smashing into a car driven by Bob Deakin, killing Bob's daughter (age 12½) and severely injuring Bob and his young son.

1978 Dec.–Sandy Pukel, Michio Kushi, and John Belleme get together in Boston to discuss the miso factory. They agree on quite a few points. All three are deeply interested in macrobiotics.

1979 Jan. 26–The bank (Tryon Federal Savings and Loan) forecloses on Bob and Karen Deakin's mortgage. Still injured from the car accident, he is unable to make his land payments. The land goes on the market.

1979 Feb. 28–Oak Feed Miso, Inc. is incorporated in Florida. The initial directors and officers are Sandy Pukel and John Belleme. 1979 Feb?–A contract is drafted by David Young (though never signed) showing what percentage of the proposed Erewhon Miso Co. will be owned by the Erewhon group (comprised of Sendai Miso-Shoyu Co., Michio and Aveline Kushi, and maybe Mitoku / Mr. Kazama) and by the Oak Feed Group (comprised of Sandy Pukel and John Belleme). The Erewhon group was to have the majority ownership, and Japanese companies and individuals were expected to play a major role in the new company.

1979 March–Joseph Carpenter looks for land in Rutherford County, North Carolina. Talks with several insurance agents.

1979 spring–Members of the Oak Feed and Erewhon groups meet in North Carolina in the first attempt to locate a site for the miso plant. In attendance are Michio and Aveline Kushi, Sandy Pukel, John Belleme, Frank Head, and Junsei Yamazaki and his wife (both from California).

1979 April–Barry Evans makes his first investment in the miso company, $50,000.

1979 June?–Sandy Pukel travels to North Carolina and makes the down-payment on a piece of land in Rutherfordton. The roughly 92 acres cost about $110,000 to $120,000.

1979 Aug. 7–Oak Feed Miso, Inc. finalizes the purchase on the 92 acres of land by assuming the second mortgage and paying an additional $11,500 each to Lawrence L. Bridges and E. Milton Singletary. Sandy Pukel (president) and John Belleme (secretary) sign the land deed and deed of trust.

1979 Aug. 16–Subscribers Consent Agreement executed.

1979 Aug. (late)–Joseph and Patricia Carpenter arrive

in Rutherfordton from Florida to live and work on the miso company land.

1979 Oct.–John and Jan Belleme leave for Japan to begin an apprenticeship with a miso master. They stop by the land in North Carolina to visit briefly with the Carpenters, then also visit Thom Leonard at Ohio Miso Co. Arriving in Japan in late October, they visit Mr. Kazama in Tokyo then travel north with him to Yaita, where they study miso-making with the Onozaki family–which makes only dark rice miso. A good, long letter from Jan describing their experiences is published in 1980 in the book *Macrobiotic Cooking for Everyone,* by Edward and Wendy Esko.

1979 Nov. 18–Barry Evans is in a very serious bicycle accident.

1980 April–A detailed letter by John, about his miso apprenticeship with the Onozaki family in Yaita, Japan, is published in *GOMF News,* a small macrobiotic magazine from Oroville, California.

1980 June–John and Jan Belleme return to the USA from Japan. That summer John located the remaining miso equipment in New Jersey and ordered wooden vats from the Arrow Tank Co. in Buffalo, New York.

1980 fall–John and Jan go on the Erewhon payroll.

1980 Sept. 29–Work has just begun at Rutherfordton in leveling the site for miso factory, which is going to be a metal Butler building. By late 1980 John and Jan begin to make their first experimental batches of one-year rice miso, at their home, in the sauna.

1981 early–The project stalls for lack of funds. John starts writing articles about his trip to Japan. One goal is to convince Barry not to abandon the project.

1981 Jan.–"The Master of Hoops," John's first article, is published in *East West Journal.*

1981 March 9–John Belleme is deeded 7.5 acres of land by American Miso Co. in the northwest corner of the AMC property; later he starts to build a house there.

1981 April–"The Miso Master's Apprentice," John's second article, is published in *East West Journal.*

1981 July–"The Miso Master With a Big Heart: Making Miso in a Japanese Village," John's third article, published in *Soyfoods* magazine. Contains many good photos of miso making in Japan.

1981 July–The beautiful and joyous opening ceremony for the Erewhon Miso Co. is held at Rutherfordton, North Carolina. Those present include Michio and Aveline Kushi, John and Jan Belleme, Sandy Pukel, Barry Evans. It is a moving experience for all. But behind the scenes, Erewhon's financial is rapidly deteriorating–due largely to too rapid expansion.

1981 Aug.–John and Jan Belleme begin full-time large-scale production of one-year Onozaki-style red (rice) miso at their plant in Rutherfordton.

1981 Sept. 27–The annual meeting of the Oak Feed Miso Co. is held at Rutherfordton, North Carolina. Barry Evans is appointed acting chairman. Shares in company are owned as follows: Barry Evans 1,400, Sandy Pukel 1,400, John Belleme 900, Yozo Masuda 100, Edmund Benson 100, and James Kenney 50. All stock is converted to one kind, Class A, which is voting stock. Thus, for the first time, Barry gets the right to vote and becomes a member of the board of directors.

1981 Aug.–John and Jan Belleme begin fulltime, large-scale production of miso and koji at their new plant in Rutherfordton, North Carolina. Fourteen months have passed since they returned from Japan. Twelve more months must pass before this miso is ready to sell.

1981 Nov. 10–Erewhon files for bankruptcy protection under Chapter 11 of the Federal Bankruptcy Act because of debts totaling $4.3 million. At this time, Aveline Kushi is the sole owner of Erewhon. Thus, the miso company can no longer count on Erewhon to distribute its products. Apparent disaster!

1981 Dec.–Barry Evans establishes Great Eastern Sun (GES) in Asheville, North Carolina, in part to package and market the miso made by AMC. Mitoku, almost destroyed by Erewhon's collapse, and eager to rebuild, agrees to export Japanese natural foods to GES.

1982 Jan. 4–Barry Evans sends out a letter announcing the opening of The American Miso Company in North Carolina. The company now has a new name (it was officially changed on 5 May 1982). Barry also announces that Linden's Elf Works (Rougemont, North Carolina), run by John Troy, has been appointed as AMC's sole marketing and distribution agent. Note: This arrangement was very short-lived; Elf Works never distributed any of AMC's miso. Great Eastern Sun did all the distribution.

1982 Jan.–Mr. Takamichi Onozaki comes to America from Japan to see how well his students had learned his lessons. He stays and helps make koji and miso for 2-3 weeks, until he is fully satisfied that all is well.

1982 Jan. 31–Barry Evans and Sandy Pukel agree to a swap of stock, such that Barry gets all of Sandy's stock in the miso company and Sandy gets all of Barry's stock in Oak Feed Store and Restaurant. After this, Sandy is no longer involved with the miso company. Barry and John Belleme now own all the company's shares, and Barry owns a large majority.

1982 April–Great Eastern Sun make's its first sale, of products imported from Mitoku in Japan to a natural foods store in the USA.

1982 April–Mr. Onozaki's his adopted son, Haruo, and eldest daughter, Kaoru (Haruo's wife), arrive in Rutherfordton and spend 3 months sharing the Belleme's home, helping Jan who is pregnant, and helping to make miso. The Bellemes' son, Justin, is born on May 24.

1982 July–The first detailed article about American Miso Co. and its method of making miso (with many fine photos) is published in *Soyfoods* magazine: "American Miso

makes a Big Move Down South," by Richard Leviton, who visited the company in April. The company "has struck a careful balance between the traditional approach (as in making koji, which requires skill and personal attention) and labor-saving mechanization (as with bean washing, soaking, cooking, mixing, and moving)."

1982 Sept.–The first miso made by AMC is sold by Great Eastern Sun. It is one-year, Onozaki-style red miso, sold in bulk only in 4 lb, 15 lb, and 40 lb tubs.

1983 Oct. 1–John and Jan Belleme sell all their ownership in the American Miso Co. (900 shares) to Barry Evans for $30,000. However, John continues to work making miso for AMC. Throughout the past year he has been experimenting with making mellow white and mellow barley misos. Great Eastern Sun is now selling about 50,000 lb/year of white miso from other sources.

1984 fall–AMC miso first starts to be sold in one-pound plastic coffee bags (each with a pressure release valve), refrigerated. A full-page ad showing the bag appears in the Jan. 1985 issue of *East West Journal.* Previously, all their miso had been sold in bulk.

1985 Feb.–Don DeBona leaves his job as general manager at Great Eastern Sun and begins to work at American Miso Co., learning the process from John Belleme.

1985 April?–AMC introduces three varieties of relatively sweet, light-colored, short-term misos: Mellow White Miso, Mellow Barley Miso, and Amakuchi Mugi Miso–a shock to traditional macrobiotic followers. These light misos were sold in the plastic bags. As of July 2000, half the company's sales come of such short-term types of light miso.

1985 Dec.–Don DeBona takes over management of the company. John Belleme leaves. It was a difficult transition.

1985 Dec. 31–AMC has its first profitable year, earning $22,000 in calendar year 1985.

1986 early–AMC miso starts to be sold in one-pound plastic cups/tubs, refrigerated. The plastic bags are phased out.

1987 fall–AMC miso starts to be sold in 8-oz plastic cups.

1988 Feb.?–New koji room designed and built by Don DeBona. Constructed at floor level with a large door and high ceiling, it enables the koji crib and racks of koji trays to be wheeled in and out. Before, all the koji had to be carried in and out by hand.

1992 Jan.–Barry Evans is required to take a "federal vacation" in Santa Barbara, California, for 2½ years. He hands the management of American Miso Co. and Great Eastern Sun over to Don DeBona.

1992–American Miso Co. builds a second factory as large as the first.

1993–American Miso Co, now has 41 huge wooden (mostly cedar) miso vats, each of which holds over 4 tons of miso. Starting with only eight vats, they added six in 1986, seven in 1989, five in 1991, and fifteen more in 1993. Also in 1993 AMC begins to export its miso to Europe, where it is distributed by Lima throughout the continent.

1995 April–Greg Gonzales starts work at American Miso Co. learning the process from Don DeBona.

1995–AMC uses up the last of tax loss carryforwards; total past financial losses go to zero.

1997 March–Greg Gonzales takes over management of the company after Don DeBona leaves.

1466. Belleme, Jan. 2000. Work with American Miso Co. (Interview). *SoyaScan Notes.* July 23. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** After she and John had been living at the Onozaki's home in Japan for about a month, a letter came from Mr. Kazama (of Mitoku) saying that Mr. Onozaki did not want to teach them any more about making koji–so they would have to leave any day now. This was disastrous news for them. Then, without an explanation, Mr. Onozaki changed his mind, and they ended up staying for 7 months.

After John and Jan returned from their apprenticeship with Mr. Onozaki in Japan, Jan worked side by side with John making koji and miso. In 1981, when she was pregnant, she had to increasingly take it easy. She worked up until the 7th month of her pregnancy; their son, Justin, was born on 24 May 1982. Address: P.O. Box 457, Saluda, North Carolina 28773.

1467. Parsons, Lee. 2000. Descendants of Nelson Yancy Parsons and Elvira C. Swain–Seven generations. Indianapolis, Indiana. 6 p. 28 cm.

• ***Summary:*** This 6-page descendancy chart was developed by Lee Parsons and printed from his computerized genealogical database Family Treemaker. Nelson Yancy Parsons (1826-1875) and Elvira C. Swain (1828-1893) were the parents of Adrian Alkanah Parsons (1846-1929)–who was the eldest of their two children, and was a soybean pioneer in Indiana. Adrian's only sibling was Oliver E. Parsons, a younger brother born in 1854 in Indiana.

Lee adds (letter of 23 Aug. 2000 to William Shurtleff): "Nelson was the one who brought the family from Guilford County, North Carolina, to Hendricks County, Indiana, in 1852. Pervasive family tradition has it that his [Adrian's] mother, Elvira, was half Cherokee Indian. She looks it in both early and late pictures we have of her, but we have never been able to document or otherwise verify the claim. This descendant outline is, of course, incomplete, but is probably as comprehensive as anyone in the clan has assembled up to now. That work continues." Address: 5846 Scott Ian Court, Indianapolis, Indiana 46254. Phone: 317-290-9446.

1468. Delight Food. 2000. What is the green vegetable soybean? (Leaflet). Cary, North Carolina. 1 p. Single sided.

22 x 10 cm.
• ***Summary:*** This small green leaflet, printed with black ink on green paper, gives a good but brief definition of the green vegetable soybean and its nutritional value. Dana Jacobi found this "take one" next to a bin of fresh edamamé sold in bulk at a specialty store in New York. The green soybeans were apparently grown by farmers in New Jersey. Dana found the beans to be "not very tasty–small, hard, and not very sweet." Address: P.O. Box 5002, Cary, North Carolina 27512. Phone: 919-467-7140.

1469. Hagler, Louise. 2001. Miso cookery. Summertown, Tennessee: The Book Publishing Co. 96 p. Illust. Index. 23 cm.
• ***Summary:*** Contains 70 recipes (each with a nutritional analysis) that use miso as an ingredient, and four full-page color photographs. Contents: Introduction. It's alive!!!! (visit to American Miso Co. in North Carolina). Soups. Spreads. Salads and dressings. Sauces and gravies. Vegetables. Main dishes. Side dishes. Sweet things.

Many recipes call for the use of tofu as an ingredient, and some call for the use of edamame, gluten, soymilk, soy yogurt, tempeh,

On the rear cover is a color photo of Louise Hagler; her vegetarian cookbooks have sold over 750,000 (or 742,000) copies worldwide. Address: Summertown, Tennessee.

1470. *Soybean Digest.* 2001. New Uses: A Soybean Digest special report. Sponsored by United Soybean Board. Mid-Feb. p. 21-32.
• ***Summary:*** This is a special pull-out insert in the mid-February issue of *Soybean Digest.* It includes four full-page color ads by United Soybean Board promoting the checkoff program. They are titled: (1) Our checkoff: Building global knowledge about biotechnology. (2) Our checkoff: Building the aquafeed market in China. (3) Our checkoff: Building biodiesel markets here at home. (4) Our checkoff: Building the edible soy market in Mexico.

The following subjects are covered in the insert: The Taylor family ate a heaping serving of soy every day. Soyfoods are attracting media attention: A survey by *Prevention* magazine in the year 2000 found that twice as many consumers want soyfoods offered on social occasions (one in three) as they did the year before. An hydraulic fluid made from soybean oil. Funding of biofuels research as a way of reducing petroleum consumption and sulfur omissions. New uses in building materials for the home. Soy-bonded plywood. Better edible oil from Satelite soybeans developed at North Carolina State University.

"Soy candles tested nationally: Alltrista Consumer Products began text marketing soybean oil-based candles late last year in Pittsburgh [Pennsylvania], Salt Lake City [Utah] and the Seattle-Portland [Washington–Oregon] metro area. Alltrista purchased the rights to produce the soy candles from the Indiana Soybean Board, which funded their development. Alltrista is marketing the candles under the Earth Lights brand name and displayed the candles at the January Chicago Housewares Show, a prominent national trade show." Note: This is the earliest English-language document seen (April 2004) that contains the term "soy candles" (or "soy candle").

Soy-based lubricants made by Terresolve Technologies, in Eastlake, Ohio. Research on soy oil at NCAUR in Peoria, Illinois. Barrier, a product made from soybean soapstock, that reduces the bad odors from hog feedlots: It reduces hydrogen sulfide gas levels by up to 75% and ammonia levels by 40%. Soyfee's Choice, a soy coffee made by Soy Coffee Roasters in New York: website soycoffee.com. Moving research on soy oil lubricants to the marketplace at the University of Northern Iowa. Polyurethane pickup bed liner made partly from soy oil material called SoyOyl, developed by Urethane Soy Systems Co. (USSC) in Princeton, Illinois. Research at Purdue Univ. (Indiana) to study links between soy consumption and osteoporosis reduction.

1471. *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.

1472. Stephens, Roger; Stephens, Jane Ade. ed. and comp. 2001. Soyfoods guide 2001: Helpful tips and information for using soyfoods. Indianapolis, Indiana: Stevens & Associates, Inc. Distributed by the Soy Protein Partners. 24 p. Illust. No index. 28 cm. [23 ref]

• ***Summary:*** This guide is available only on a limited basis to dietitians and health professionals. Contents: Foreword. Keep your heart healthy: Super soy protein smoothie. Beans, beans, good for the heart: The more you eat, the better your chances of lowering your blood cholesterol levels. Cholesterol: What's in a claim. Sample soy meal planner (4 meals a day for 5 days, to get 25+ grams/day of soy protein). Dietary guidelines for Americans. Composition of soyfoods (table). The healthy bean: Isoflavones, heart disease, menopause and osteoporosis, allergies, diabetes and kidney disease, fat. Isoflavone content of soyfoods (table). The state of soy research. Protein content of soyfoods (table). Soy resources: Web sites, books. Soyfood substitution chart. Descriptions of soyfoods: Traditional soyfoods, soy-based products, soy ingredients. Recipes: Meat alternatives. Textured soy protein. Soy flour. Whole soybeans. Soymilk. Tofu. Soy snacks and smoothies. Soy–Good for your heart.

The Foreword (p. 2) states: "The *2001 Soyfoods Guide* is distributed by the Soy Protein Partners. Partners include state soybean boards from: Alabama, Arkansas, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, North Carolina, South Dakota, Tennessee, Texas, Virginia, and Wisconsin. Industry partners include: American Soybean Association, Archer Daniels Midland Company, Central Soya Co., Minnesota Soyfoods Association, Protein Technologies International, Soy Protein Council, Soyfoods Association of North America, Soyfoods Council and the United Soybean Board." Address: 4816 North Pennsylvania Street, Indianapolis, Indiana 46205. Phone: 317-926-6272.

1473. Kosak, Phil. 2001. Dry roasted soynuts in America (Interview). *SoyaScan Notes.* July 15. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Phil, who has a PhD in food science, has been dry roasting soynuts at his roasting facility in Greensboro since 1997, when he acquired the soynuts business from Nature's Select in Grand Rapids, Michigan. His company is part of Carolina Fine Snacks, which he also owns. Nature's Select started dry roasting soynuts in about 1986-1988; Peter Assaly, the president, would know their history.

How big is the market for soynuts? He would guess about $20 million. Many new companies have started in the last few years.

Many health-minded people prefer dry-roasted soynuts to oil-roasted for several reasons: (1) They contain less calories. (2) The oil in the oil-roasted product oxidizes leading to free radicals. (3) Oil-roasting almost always involves the use of a partially-hydrogenated oil, which leaves *trans* fatty acids in the product. Address: Select Soy LLC, 209 Citation Ct., Greensboro, North Carolina 27409. Phone: 336-605-0773.

1474. McCloy, Johanna. 2001. Work with veggie dogs and the Soy Happy! campaign (Interview). *SoyaScan Notes.* Sept. 17, and April 21, 2003. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Johanna (pronounced yo-HAN-nuh, after her Icelandic grandmother) spent much of her early life overseas, including Spain (7 years), India (2 years), Japan (Tokyo, 6

years from 1975 to 1981), and Venezuela (one year). She moved to the USA to attend Duke University (Durham, North Carolina), and graduated with a degree in Comparative Area Studies and a minor in Anthropology. She speaks Spanish (her first language) and "manageable" Japanese. During the summer of 1985, she studied intensive Japanese at ICU (International Christian University) in Tokyo.

During her six years in Tokyo, Johanna got her first taste for acting; she performed in plays and landed roles in commercials, TV and movies. In 1989 she moved to Los Angeles after being accepted to Sanford Meisner's acting class. Much of her income is from acting and people recognize her from her role as Ensign Calloway in *Star Trek: The Next Generation,* or from her numerous commercials.

In 1989 she became a vegetarian, and in 1999 a vegan.

In about March 2000, while at a Dodgers Game in Los Angeles, when she realized there was nothing in the stadium for her to eat–nothing! So the next day she called the concession manager at the stadium. First she pointed out that no veggie hot dogs were available in the stadium, then added that she was very surprised to find at that, even among the five sandwiches at the Subway stand (Subway is a company known for offering vegetarian alternatives), there were no meatless subs. So asked him to consider having something vegetarian there. The guy said, that the issue of the veggie dogs was a long-term problem that he would be willing to discuss, but as for the meatless Subway sandwich, he would be glad to contact the stand and have it available next week. And the next week they were offering vegetarian food–just like that. Johanna realized that all she had to do was ask! Note: Not until June 2001 did Dodgers stadium started offering veggie dogs–one of the last 3-4 major league parks to do so.

For years, Johanna had been a member of PETA (People for the Ethical Treatment of Animals). In one of their newsletters from a previous year, PETA had suggested that readers who were baseball fans contact their local baseball park for menu information. So she called PETA, told them that she had just called her own ballpark, mentioned the previous newsletter about baseball parks, and asked PETA if they happened to have current menu information from baseball parks because she was curious to know if any of them presently sold veggie dogs–so she could tell her contact at Dodgers' stadium. They said they had a list, but it was very old and needed to be updated. She offered to call all the ballparks to update it if they would fax her a copy. The next day she was on the phone updating the list. She personally called the concession manager at every major league ballpark, introduced herself, encouraged them to start selling veggie dogs, then asked them what their vegetarian menu offerings were.

Then someone advised her to create a Website and post the updated list on it–so many people could access it quickly and easily. She had never dealt with the Internet before, but her e-mail provider helped her to set up a very simple home page. Soon she had posted the upated list on her site. Her Venue Reference Guide contained, for every major league ballpark: Contact information, concession company, current veggie menu offerings, and where the vegetarian foods are located in the ballpark.

In May 2000 a story about her work with vegetarian foods at baseball parks appeared on Vegesource.com–the most popular vegetarian resource website on the Internet. Almost immediately, many people started to visit Johanna's little Website–as shown by the counter on her home page–which soon hit 700 visitors. She also got a few e-mails and phone calls. Then, because of the great interest in this subject, Vegsource.com offered to host her Website. She soon came to value the power of the Internet. Her consumer advocacy campaign began to pick up steam. She e-mailed concession managers, told them of her activities and number of visitors, encouraged them to sell veggie dogs at baseball games, and offered to help them get started by putting them in touch with manufacturers so they could sample different brands. She explained that many vegetarian baseball fans, who now eat before to the game or bring their own food to the ballpark, were potential customers.

In April 2000 she single-handedly started the Soy Happy! campaign to get veggie hot dogs into major league ballparks. Since that time she has devoted herself so wholly to this, and became so completely immersed in the cause and the campaign, that she put her life–her quest for an income and a viable way of life–on "hold."

The first major league ballpark to sell veggie dogs was the San Francisco Giants in about 1989. The product was a vegan hot dog made by Yves in Canada, but the Giants only sold them for about two years at a "Health Stand"–big mistake. Johanna has heard that the Giants did this because the concession manager's daughter was a vegetarian and she was insistent; moreover her dad had had a heart problem that year, and as a result decided to try the meatless hot dogs.

The next team was the Norfolk Tides, a AAA baseball team in Virginia–largely due to the efforts of PETA, which is headquartered in Norfolk. PETA agreed to buy a billboard ad in the stadium if the team would sell veggie dogs there. The first major ballpark to accept her idea was the Chicago White Sox, starting in April 2000. She was surprised and delighted.

In April 2001 she had a video (8 minutes, color) made about the Soy Happy! It was set at the Genesis Awards program. She mailed a copy of the video, with a cover letter, to every major-league ballpark. At that time only one major league park was selling veggie dogs. In July 2001 she added an appendix to the video and announced that seven teams were now selling veggie dogs.

Also in April 2001 she developed and launched the Soy Happy! website which has been very instrumental in this campaign on EarthLink. Within a month, VegSource, the most frequently visited vegetarian site on the Internet,

offered to host her website, make it even more professional, and pay expenses. Jeff Nelson of VegSource has been her "godfather." VegSource also hosts many other vegetarian and animal rights sites.

During the past year Johanna has met and worked with many concession managers at baseball parks. Most major league baseball teams have their own concession stands in addition to those they contract with to come into the ballpark. Johanna believes strongly that veggie dogs should be sold along with the other foods and not in some separate place, such as a "Health Stand." Today they are sold at only a few stands and those are often on a test-run basis, usually not advertised, and often not conveniently located–a formula for failure. The place where Johanna has learned the most about concession food is at Dodgers' stadium in Los Angeles. Their hot dog maker, Farmer John, is a major force at that stadium since it was first created in Los Angeles. Farmer John provides a large portion of the marketing expense and budget for the stadium through their sponsorship. On the back of every Dodger ticket sold is a Farmer John logo.

Since the Hain Celestial Group recently purchased Yves Veggie Cuisine (of Canada), a major source of veggie dogs, Johanna plans to reduce her work with Soy Happy! unless she can work as a paid consultant. However she plans to continue developing and maintaining the website. Acting is a possibility, but it hasn't been her principal focus for a long time. So she is pondering her future, which may include a move to northern California. Her mother lives in Walnut Creek, and she is attracted to that part of the world. She likes to write and is considering writing a book about growing up overseas.

An essay about her path to becoming a vegetarian will appear in the book *Voices from the Garden* (Lantern Books, fall 2001). Address: P.O. Box 42152, Los Angeles, California 90042. Phone: 323-363-7226.

1475. Paige, J. Luck; Lanier, Tyre C.; Daubert, Christopher R.; Wilson, Richard F.; Kwanyuen, Prachaub. 2001. Functionality and viscoelastic behavior of Prolina soy isolate. In: Richard F. Wilson, ed. 2001. Proceedings of the World Conference on Oilseed Processing and Utilization. Champaign, Illinois: AOCS Press. viii + 213 p. See p. 197-202. [22 ref]
• ***Summary:*** Prolina is a high-protein soybean cultivar developed by the USDA's Agricultural Research Service at North Carolina State Univ. This study focuses on gelation and rheology in both plain and comminuted meat systems. Address: 1-3. Food Science Dep., North Carolina State Univ., Raleigh, NC 27695-7624.

1476. Wilson, Richard F. ed. 2001. Proceedings of the world conference on oilseed processing and utilization. Champaign, Illinois: AOCS Press. viii + 213 p. Held 12-17 Nov. in Cancun, Mexico. [300+* ref]
• ***Summary:*** Over 350 attendees from 19 countries. Contents: Preface. Storage, handling, shipping practices. Extraction of fats and oils. Refining fats and oils (incl. physical refining, hydrogenation, interesterification). Waste treatment / environmental. Formulation of finished products. Nutrition in relation to processing. Individual oils: Animal, marine, palm, lauric. Individual oils: Soy, sun [sunflower], rape, and canola. Individual oils: Cottonseed, peanut, safflower, rice bran, olive, and other. Quality control / analytical. Meal- and value-added products. Other topics (incl. Prolina soy isolate; Prolina is a newly released soybean variety). Contains 32 papers; several papers are cited separately. Note: This book contains many errors, including in the title and table of contents. Address: USDA, ARS, Raleigh, North Carolina.

1477. Clarkson, Thomas B. 2002. Soy, soy phytoestrogens and cardiovascular disease. *J. of Nutrition* 132(3):566S-69S. March. Supplement: Fourth International Symposium on the Role of Soy in Preventing and Treating Chronic Disease [30 ref]
• ***Summary:*** "Dietary soy protein has been shown to have several beneficial effects on cardiovascular health. The best-documented effect is on plasma lipid and lipoprotein concentrations, with reductions of approximately 10% in LDL cholesterol concentrations (somewhat greater for individuals with high pretreatment LDL cholesterol concentrations) and small increases in HDL cholesterol concentrations. Dietary soy protein improves flow-mediated arterial dilation of postmenopausal women but worsens that of men. Soy isoflavone extracts improve systemic arterial compliance, an indicator of atherosclerosis extent. Complete soy protein but not alcohol-washed soy protein reduces atherosclerosis of postmenopausal monkeys. No definite experimental evidence exists currently to establish that the cardiovascular benefits of soy protein are accounted for by its isoflavones." Address: Comparative Medicine Clinical Research Center, Wake Forest Univ. School of Medicine, Medical Center Boulevard, Winston-Salem, North Carolina 27157.

1478. Syngenta. 2002. Touchdown herbicide: Better weed control, better yields (Ad). *Soybean Digest.* Mid-March. Inside front cover and p. 3.
• ***Summary:*** When you use Touchdown herbicide with IQ Technology instead of Monsanto's Roundup UltraMAX, you can go to any dealer and choose any brand of Roundup Ready seed including Pioneer Hi-Bred and NK [Northrup King]. For more information, go to www.syngentacropprotection.com or call your Syngenta dealer. Address: Syngenta Crop Protection, Inc., P.O. Box 18300, Greensboro, North Carolina 27419.

1479. Smith, Patricia J. 2002. Macrobiotic Company of America (MCOA, Asheville, North Carolina) is no longer

in business. Bruce Macdonald is importing all of Mitoku's products to the USA (Interview). *SoyaScan Notes.* April 19. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Patricia has heard from reliable sources that after MCOA ceased its operations, Norio Kushi left the company. Bruce Macdonald and his daughter, Crystal, both live in Asheville and run Bruce's company.

Patricia recently visited South River Miso Company where she visited with Christian Elwell, Robin Cole, Megan Calogeras, and Charles Kendall–who is still making natto, amazake, and mochi. Address: Radical Food, P.O. Box 952, Mill Valley, California 94942-0952.

1480. Smith, Patricia J. 2002. Bruce Macdonald has started a new company, Natural Import Company, in North Carolina (Interview). *SoyaScan Notes.* Aug. 7. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** The Natural Import Company (1 Reed Street, Biltmore Village, North Carolina 28803. Phone: 1-800-324-1878). Bruce runs the company with his daughter, Crystal. They have nice retail and wholesale catalogs. He imports foods from Mitoku in Japan and from Clear Spring (owned and run by Christopher Dawson) in England. Bruce has stopped using the word "macrobiotic."

Talk with Bruce Macdonald. 2011. March 29. His partner is now "Mr. Ishibashi, a worldwide professional negotiator. Nobody beats Ishibashi. For example, he negotiates robotics with car companies." The recent earthquake, tsunami, and nuclear reactor disaster in Japan may really hurt Mr. Kazama's business. "Apparently 3 containers of food from Japan (not from Mitoku) landed in Europe, and they were promptly seized and burned." The Europeans are afraid of contamination from radiation. "If Mr. Kazama loses Europe–that is half of his business. He has three containers ready to go, but he's very reluctant to ship them." This could also hurt Bruce's company, which is dependent on Mr. Kazama for his Japanese imports. "I don't know whether I'll have a business or not. Because of the nuclear disaster in Japan, I have sold in three weeks what I would normally sell in three months. I've seen hoarding of foods (miso, seaweed, umeboshi plums) in the macro community in the USA. Our business is basically out of food."

Bruce's daughter, Crystal, now wants to start an amazake business. Bruce is looking for information on the subject. She wants to sell it in a shelf-stable container, aim it at kids, do "Popsicles" (a Unilever trademark for an ice pop), etc. Address: Radical Food, P.O. Box 952, Mill Valley, California 94942-0952.

1481. Stanchich, Lino. 2002. Work with Noboru Muramoto sensei making miso and natural salt in California (Interview). *SoyaScan Notes.* Sept. 11. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Lino was a business partner with Muramoto sensei, first at the Herb-T Company on 11th St. in San Francisco, and later at Great Life Co. in Escondido, California–where they imported sun-dried crude / unrefined salt from Mexico, cleaned it by boiling, washing, and filtering (to remove the pollutants found in sea water), then sold it as different varieties of natural salt and also used the salt to make many different kinds of miso, which they sold commercially. Muramoto moved from Glen Ellen, California, south to Escondido to do research on salt. Lino thinks he moved in about 1980 or 1981. They always lost money on the salt, since it took so much time to remove the pollutants. So they tried to make up for those losses by selling miso. Lino and his wife, Jane, were with Muramoto in Escondido from August 1983 to 1985. Lino helped. Lino was never in Glen Ellen. Muramoto stayed in the USA legally in terms of immigration.

The various types of miso and Lino's best guess as to the date of introduction is as follows: Chick Pea Miso (fall 1983). Barley miso (1984). Peanut Miso (1984). Green pea miso (1984). Three-year Hatcho miso (1985). They also sold tamari collected from various types of miso, and they made tamari as a separate product.

As far as Lino knows, Muramoto was the first person to make and sell chick pea miso in the USA. It was a sweet miso that fermented for about one year. The koji was always made with rice; sometimes soybeans were used with the chick peas and koji, whereas at other times no soybeans were used. He sold hundreds of pounds of Chick Pea Miso in 1-lb plastic bags, mostly by mail order, but also through a few natural foods stores–in San Francisco (California), Boston (Massachusetts), and Florida. Muramoto was in charge of food production (he had a few assistants) and Lino was in charge of sales.

Lino was born on the border between Italy and Croatia near Trieste; his first name is Italian and his surname Croatian. Address: 101 Willow Lake Dr., Asheville, North Carolina 28805. Phone: 828-299-8657.

1482. *SoyaScan Notes.* 2002. New port facility in Wilmington, North Carolina, is importing soybean products to the USA (Overview). Sept. 14. Compiled by William Shurtleff of Soyfoods Center.

1483. Belleme, Jan. 2002. Miso production in the USA (mainland), Hawaii, and Canada. Miso exports from Japan to the USA and the UK (Interview). *SoyaScan Notes.* Oct. 23. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** John interviewed each of the miso manufacturers in these three regions and they gave him their company's production statistics, sometimes on the understanding that he would only publish aggregate figures–which are: USA (including Hawaii) 1,326,000 lb/year (601.5 metric tons/year). Hawaii 660,000 lb/year (299.4 metric tons/

year). Canada 313,200 lb/year.

Miso exports from Japan to the USA were 5,561,160 lb/year (2,520 metric tons/year) and to the UK were 308,644 lb/year (140 metric tons/year).

Note: Comparing these figures with comparable 1982 figures published in *The Book of Miso* (1983, p. 240): Miso production in the USA (including Hawaii) has decreased 56.7% from 3,064,444 lb/year (750 metric tons/year) in 1982. Miso production in Hawaii has decreased 53.3% from 1,410,944 lb/year (640 metric tons/year) in 1982. Miso imports from Japan to the USA have increased 263% from 2,114,211 lb/year (959 metric tons/year). Address: P.O. Box 457, Saluda, North Carolina 28773.

1484. Belleme, John. 2002. Mitoku–Japan's natural foods pioneer. *Macrobiotics Today* (*Oroville, California*) 42(6):22-25. Nov/Dec.

• ***Summary:*** A good history of Akiyoshi Kazama and the company he founded, Mitoku. With photos.

"If you are cooking with a high quality, traditional Japanese food that was made in Japan or drink organic green tea that was grown in Japan, there is about an 80% chance it came from Mitoku Company, Ltd., of Tokyo, Japan. This company has profoundly influenced the eating habits of food conscious Americans and has been very influential in setting the manufacturing standards for Japanese natural and macrobiotic foods made in Japan and other parts of the world. However, the statement 'made in Japan' has not always been held in such high esteem. In fact, I am old enough to remember when 'made in Japan' was a joke.

"After the devastation of World War II, Japan reindustrialized with an eye toward export markets in the United States and Europe. However, Japan's early attempts at exporting consumer goods were tacky and not very good quality. About 35 years ago all that changed. Those remarkable transistor radios you could hold in the palm of your hand appeared first, then tiny tape recorders and 'tummy TVs'. We began trading in our gas guzzlers for fuel efficient Hondas, and before long, Japanese steakhouse chefs were tossing shrimp into the air with spatulas and catching them in plates behind their backs.

"Ironically, about the time Americans and Europeans were warming up to the dazzling array of new high tech consumer goods from Japan, George Ohsawa was roaming the globe preaching his philosophy of yin and yang, an eclectic blend of ancient Shinto, Taoist and Buddhist principles and Oriental medicine, which he called 'macrobiotics'. In Boston, two of Ohsawa's students, Michio and Tomoko (Aveline) Kushi, were busy teaching macrobiotics to a growing number of students who were drawn to the life changing possibilities of this new way of living.

"The Kushi's timing could not have been better. The philosophy of yin and yang attracted people from many walks of life, including hippies, intellectuals, old Bohemians, and people disillusioned with America's materialistic ways. After lecturing for several years, in 1967, the Kushis founded Erewhon, a small Boston natural foods store supplying macrobiotic students with staples such as grains, beans and other basic foods that are part of the dietary recommendations of the macrobiotic way of life. However, the Kushis soon realized that the quality of food needed was not available in the United States. When Michio Kushi discussed his difficulties with an old university friend, his friend remembered a former schoolmate who was now in the import and export business. He thought his business friend in Tokyo, Japan, might be able to help. That man was Akiyoshi Kazama, the founder of Mitoku.

"Kazama's business experience in both the United States and Japan made him a prime candidate for the type of partnership Kushi was looking for. A graduate of Waseda University, in Tokyo, Kazama was selected by Yamanashi prefecture, in 1956, to study business in the United States. After arriving in the Chicago area he was placed with a firm, and to his astonishment, learned that one of his coworkers was none other than Iva Togun, 'Tokyo Rose', the infamous voice of Radio Tokyo who taunted allied forces in the Pacific during World War II. His relationship with Iva was short-lived, however, because he was immediately drafted into the American Army and earned the dubious distinction of being the first Japanese national to serve in the United States military after World War II. In the service, Kazama was entrusted with the responsibility for large sums of money.

"The association between 39-year-old Kazama and the Kushis was to be a perfect match, for Kazama was both a sharp businessman and a great lover of good food. Although he had never encountered macrobiotics before, as a connoisseur he had made his own discoveries about the best quality foods. Invariably his personal favorites were traditionally made from the finest ingredients and free of high tech processing and chemical additives. Above all he admired those foods that had what he called 'spirit'. But Japan, like other industrialized countries, had turned away from their traditional dietary roots in favor of mass-produced, highly processed foods with little of the integrity, flavor, or health promoting qualities of the original product. For example, just about all of Japan's important fermented foods, such as shoyu, tamari, miso, rice vinegar and mirin were being made by hurried, high temperature aging and contained highly processed ingredients. Mr. Kazama knew that finding producers willing to meet Kushi's macrobiotic standards would not be easy, but he was inspired by the idea of introducing Americans to the ancient culinary treasures of Japan.

"In the late sixties and early seventies, Mr. Kazama began crisscrossing the Japanese archipelago in an all out effort to supply Erewhon with macrobiotic quality foods. Many early possibilities led to dead ends and frustration;

however, there were a few notable exceptions, such as Johsen shoyu, which was naturally aged in twelve-foot-tall cedar tanks for eighteen months and made from whole soybeans and wheat, and dark, rich Hatcho miso, which has been made by the same recipe and method for over eight hundred years! Soon Kazama was joined by Westerners such Blake Rankin, an American, Christopher Dawson, a New Zealander, and Robbie Swinnerton, an Englishman, who helped in the search and export of traditional Japanese foods. By the end of the 1970s, Kazama and the Mitoku band of wandering food detectives had uncovered a virtual cornucopia of rare, flavorful, and medicinal foods, such as long-aged, whole soybean, wheat free tamari; brown rice vinegar that is aged for twelve months in one hundred-year-old earthen jars that are buried in the earth to help regulate the temperature of the delicate fermentation process; kanten and tofu that are freeze-dried in the snow just as it was done before the introduction of electricity; sweet amber mirin made from aging distilled sake and amazake; and natural grain malts with a gentle sweetness that does not overwhelm the taste buds like modern syrups made from enzymes.

"Meanwhile, in the United States macrobiotics was booming. Erewhon had grown from a small store to one of the country's largest natural food distributors, delivering Mitoku products down the East Coast to large stores in New York, Philadelphia, Baltimore, and Washington, D.C. Another Erewhon store had opened in Los Angeles and was importing Mitoku products. In the south, Tree of Life was branching out from its home in St. Augustine, Florida, and Westbrae was importing Mitoku products into California and distributing them in the western states. Although more slowly, macrobiotics was spreading on the other side of the Atlantic, with budding communities in the United Kingdom, France, and Belgium. Companies such as Lima in Belgium and Sun Wheel in England were a few of the early importers of Mitoku products in that part of the world.

"With macrobiotics catching on around the world, Mitoku's future looked secure, however, everything changes to its opposite, particularly in the world of business and finance. Erewhon was growing so fast that it was soon stretched to the limits of its cash flow and financing capacity and, in 1979, began experiencing financial difficulties. As these troubles worsened, many companies stopped shipping to the Boston firm. Because of a deep personal commitment to the Kushis, Kazama continued to fill orders. When Erewhon finally collapsed in the fall of 1981, Mitoku was its largest creditor and took a three hundred thousand dollar loss" (Continued). Address: Saluda, North Carolina.

1485. Belleme, John. 2002. Mitoku–Japan's natural foods pioneer. *Macrobiotics Today* (*Oroville, California*) 42(6):22-25. Nov/Dec.

• ***Summary:*** (Continued): "Erewhon's demise nearly destroyed Mitoku, however, with the help of the foreign and Japanese staff, Kazama nurtured the company back to health. Twenty-two years later, Mitoku is the world's largest exporter of traditional Japanese foods. With more than thirty customers in twenty-two countries, Mitoku exports over five hundred products to firms in North America, South America, Central America, Asia, the Middle East, the United Kingdom, Europe, and Australia. Sales have grown from Erewhon's first order of three thousand dollars in 1968 to over twelve million dollars in 2002. Mitoku is also one of Japan's largest importers and distributors of organic and natural foods from the United States, Canada, and Europe, selling these products along with traditional Japanese products to over ten thousand customers in Japan.

"Mitoku's success has transformed the lives of not only Kazama and his family, but, like a pebble dropped into a still pond, Mitoku's influence has had a ripple effect on people and businesses around the world. In Japan small family shops were able to revive ancient food traditions and sell their products at home and abroad. Names such as Johsen, Uchida, Mikawa, Onozaki, Ryujin, and others have become known in natural food stores from Paris to Rio de Janeiro. Moreover, Mitoku producers were introduced to using organic ingredients as Mitoku began importing organic grains and beans for domestic production. (There are very few Japanese organic growers.) As macrobiotics spread, Mitoku products led the way as Kazama rushed to keep up with the ever-increasing needs of the rapidly expanding market. Although demand often surpassed production, Mitoku never wavered from the standards outlined by the Kushis in 1968. Products must be made by traditional methods and recipes, aged at natural temperatures in traditional vessels, and made with organic ingredients, if at all possible.

"Even after the collapse of Erewhon the personal bond between the Kushis and Mr. Kazama continued to grow as their joint effort to introduce the world to macrobiotic foods moved forward with increasing momentum. Moreover, many of the westerners who came to work for Mitoku in the early years went on to start companies of their own. Christopher Dawson owns Clearspring, Mitoku's largest importer and Europe's foremost distributor of traditional Japanese foods. Blake Rankin went on to start Granum, a Seattle-based Mitoku importer. Bruce Macdonald, who helped open the Erewhon store in Los Angeles, is now the owner, along with daughter Crystal, of Natural Import Company, this country's main distributor of Mitoku brand products.

"My wife Jan and I were also profoundly influenced by Kazama and Mitoku. In 1979 we were sent to Japan as part of a joint venture between Oak Feed, a Mitoku importer located in Miami, and Erewhon to make miso in the United States. We met Mr. Kazama in October of that year and he placed us at the Onozaki shop, which is located north of Tokyo. This was the greatest adventure of our lives, and we will be forever grateful to Kazama and Mitoku for the

opportunity. We returned to the United States to build Erewhon Miso Company, but when Erewhon went into Chapter 11, the miso project was taken over by Great Eastern Sun, yet another Mitoku importer in Asheville, North Carolina.

"The history of Mitoku is the story of one man's uncompromising dedication to quality and tradition. When I recently asked Mr. Kazama about the importance of his company in the world natural food movement, he did not talk about how his company raised the standards of natural foods around the world, but rather how Mitoku helped create an opportunity for numerous small Japanese family shops to rediscover their culinary roots and pass this heritage on to future generations. However, from the wider perspective, Michio Kushi has said, 'The history of Mitoku Company, Ltd. is a symbol of the history of the macrobiotic movement throughout the world.'

"Although, at 72, Mr. Kazama looks at the past with gratitude and marvels at the mystery of it all, the future is certainly not clear. As the dollar began to weaken in the eighties, the price of Mitoku products became much more expensive. Soon Japanese foods were being made in other parts of the world at a cheaper price. However, some of these foods are either made by faster, less expensive methods or use lower quality ingredients. Mr. Kazama's goal is to let consumers around the world know there is a difference. When it comes to food, Mitoku has created a whole new meaning for 'made in Japan.'" Address: Saluda, North Carolina.

1486. **Product Name:** The Wizard's Organic Vegetarian Worcestershire Sauce (Regular, Wheat Free).
Manufacturer's Name: Edward & Sons Trading Co., Inc.
Manufacturer's Address: P.O. Box 1326, Carpinteria, CA 93014. Made in North Carolina.
Date of Introduction: 2003 March.
Ingredients: Apple cider vinegar*, tamari* (water, wheat, soybeans, salt), molasses*, filtered well water, wheat syrup*, salt, tamarind*, ginger root*, lemon juice concentrate, garlic*, spices*, xanthan gum, shiitake mushrooms*, citrus extracts*, spice extract*, natural smoke flavor.
Wt/Vol., Packaging, Price: 5 oz, 10 oz, and 8.5 oz bottle.
How Stored: Shelf stable.
New Product–Documentation: Sell sheet (8½ by 11 inch, color) sent by Patricia Smith from Natural Products Expo West (Anaheim, California). 2003. March. Shows the bottles of three products. Regular (5 oz, 10 oz), and Wheat Free. On the rear is listed the ingredients and nutrition facts for each product.

1487. Messina, Mark; Hughes, Claude. 2003. Efficacy of soyfoods and soybean isoflavone supplements for alleviating menopausal symptoms is positively related to initial hot flush frequency. *J. of Medicinal Food* 6(1):1-11. Spring. [86 ref]
• ***Summary:*** This is a review of the literature. "Nineteen trials (13 using a parallel design) involving more than 1,700 women were identified. Six trials were excluded from analysis [for various reasons]... Initial hot flush frequency explained about 46% of the treatment effects, and hot flush frequency decreased by about 5% (above placebo or control effects) for every additional initial hot flush per day in women whose initial hot flush frequency was five or more per day. Although conclusions based on this analysis should be considered tentative, the available data justify the recommendation that patients with frequent hot flushes consider trying soyfoods or isoflavone supplements for the alleviation of their symptoms." Address: 1. Dep. of Nutrition, Loma Linda Univ., Loma Linda, California 92350; Nutrition Matters, 439 Calhoun St., Port Townsend, Washington 98368; 2. Quintiles, Inc., P.O. Box 13979, Research Triangle

Park, North Carolina 27709-3979; Dep. of Obstetrics and Gynecology, Duke Univ. Medical Center, Durham, NC 27710.

1488. Belleme, Jan. 2003. New developments with Mitoku and with miso (Interview). *SoyaScan Notes.* June 23. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** At the end of March 2003, Mr. Kazama closed Mitoku's office in the USA which John and his wife, Jan, ran as a home business. So John is looking for other sources of income.

Rudy Shur plans to publish John's new book on miso in October or November of this year; the title will probably be *The Miso Book.* The book is a wholistic look at miso with emphasis on health benefits.

Vern Verona, a long-time macrobiotic, wrote a book titled *Cancer Preventing Food,* published in 1994 by Prentice-Hall. Vern is now writing a book about miso. John is involved in a miso-marketing venture. He and Sandy Pukel are organizing a 7-day "wholistic health" cruise to the western Caribbean.

Update: 2009. Jan 27. In the spring of 2005 Sandy Pukel and his partner, John Belleme, launched Holistic Holiday at Sea, a fun filled cruise vacation with gourmet vegan fare and extraordinary educational opportunities. The Taste of Health and Holistic Holiday cruise (as it has come to be known) has become a full-time and very successful business, with revenue of more than $1 million a year. They do only one cruise a year–in the summer. Last year more than 1,000 people went on the cruise. This coming summer will be the 6th cruise. It is organized entirely by John and Jan Belleme and Sandy Pukel. On a typical day, John and Jan work 12 hours a day. The cruise rates per person range from $1,195 to $3,000.

Chris Dawson, who now owns Clearspring in London, has built it into a thriving $10-12 million dollar a year import and distribution business. He imports from Japan and China and also distributes many natural foods made in Europe. John wrote a book for him titled *The Real Taste of Japan,* published by Cross Media. Address: P.O. Box 457, Saluda, North Carolina 28773.

1489. **Product Name:** Miso Master Salad Dressings [Five Flavors].
Manufacturer's Name: Great Eastern Sun (Marketer). Made in North Carolina by American Miso Co.
Manufacturer's Address: 92 McIntosh Rd., Asheville, NC 28806.
Date of Introduction: 2003 September.
Wt/Vol., Packaging, Price: Bottled.
New Product–Documentation: Talk with Barry Evans of American Miso Co. 2004. Jan. 12. This line of five dressings was first sold in retail stores in Sept. 2003. They are sold in 8 oz bottles.

1490. Friedeck, Kristofer Gregg. 2003. Soy protein fortification of a low fat dairy based ice cream. MSc thesis, North Carolina State University. vi + 89 p. *

1491. **Product Name:** Revival Baked Pasta Soy Chips.
Manufacturer's Name: Revival Soy.
Manufacturer's Address: Distributed by Physicians Laboratories, Winston-Salem, North Carolina 27101. Phone: 1-800-Revival.
Date of Introduction: 2003.
Ingredients: Non-GMO soy flour, non-GMO soy protein concentrate, non-GMO soy isolate, potato starch, mid-oleic sunflower oil, sugar, dextrose, salt, spice, corn starch, caramel color, malic acid, honey, fructose, natural flavors, corn syrup, tea solids, less than 2% silicone dioxide to prevent caking. Does not contain dairy (lactose free), gluten, wheat, egg or animal products.
Wt/Vol., Packaging, Price: 25 gm green plastic bag.
How Stored: Shelf stable.
New Product–Documentation: Bag brought by Marina Li. 2006. June 23. Front panel: "Oh My! Apple Pie! 70% less fat than potato chips & fewer carbs." "Revival Soy–#1 Doctor-recommended soy protein. Heart healthy snack."

1492. Evans, Barry. 2004. Macrobiotic foods and miso in America today (Interview). *SoyaScan Notes.* Jan. 12. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Macrobiotic foods is no longer a product category. Awareness of macrobiotics and macrobiotic foods among consumers has slowly but steadily declined over the past 10-15 years. Even though miso is historically a macrobiotic food, it has not benefited much, if at all, from the general uplift that all soyfoods have gotten in recent years. It is still an obscure food.

Many consumers also have a poor understanding of organic foods. Whole Foods did a survey recently which showed that the average Whole Foods shopper thought that every food product sold at Whole Foods was organically grown–otherwise Whole Foods would not carry it. This, of course, is incorrect.

Barry has had to struggle and struggle every step of the way to keep American Miso Company (AMC) viable: Its two big miso competitors are Westbrae (now owned by the Hain-Celestial empire) and Miyako / Cold Mountain (which has fixed past problems in its organic labeling so that it is now accurate). AMC was not profitable in 2003; the company is still having a terrible time making a profit. Two new miso products are Miso Master dressings (Sept. 2003) and corn miso. Alberts Organics (now owned by UNFI; their produce branch) has an exclusive on the miso dressings through the end of November, but they don't operate in California and the Pacific Northwest. The dressings have sold very slowly.

Great Eastern Sun (GES) has never presented itself as a macrobiotic company, but it has always carried a full line of macrobiotic products; the two most important product categories are miso (40% of business) and seaweeds (20%). GES now carries some products that are not macrobiotic–such as sugar and black tea. Address: Owner, American Miso Co., Inc. and Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1493. Evans, Barry. 2004. Failure of nori crop in Kyushu, Japan. Sea vegetables imported to America today (Interview). *SoyaScan Notes.* Jan. 12. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** About 40% of all the nori produced in Japan comes from the Ariake Sea off the western coast of Kyushu, where it has been cultivated on nets for more than 25 years. This bay was ringed by wetlands, which were gradually filled in by developers. In early 2001 the entire nori crop in that bay failed because of an unseasonal outbreak of red tide–which had several causes, including a land reclamation project which destroyed wetlands that are no longer able to purify the sea water. The Japanese believe that nori will never be grown in that bay again–a huge disaster for thousands of nori farmers! This had led to more of the sea vegetables imported to the USA coming from China and Korea. Barry thinks that 80-90% of all the sea vegetables now consumed in Japan comes from China.

It is generally believed in Japan that, of the various sea vegetables, the kombu crop is the cleanest and most free of heavy metals such as lead, mercury, and arsenic. That is because most of the kombu harvested in Japan comes from the area around Hokkaido, Japan's northernmost large island, where the cold, clear current flows down from the north. Japan has made a big effort, over the past 10-20 years, to clean up its environment and coastal waters.

China, on the other hand, has little pollution control. Its main goal is to be the low-cost producer of any product that consumers desire–worldwide. It produces a growing percentage of the world's sea vegetables–but heavy metal content is an issue.

Eden Foods, which is the leading seller of sea vegetables in the USA, buys all of its sea vegetables from Japan and pays more for them than if it bought them from China or Korea. In recent years, Great Eastern Sun (GES) has built its seaweed business on having less expensive products, imported from China. The only sea vegetable GES imports from Japan (Mitoku) is arame, which is not available from China. Address: Owner, American Miso Co., Inc. and Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1494. Novo Nordisk. 2004. The history of Novo Nordisk (Website printout–part). www.novo.dk/backgrou/history/ Retrieved Jan. 19.
• ***Summary:*** An excellent company history with many photos. Contents: 1. Nordisk Insulinlaboratorium is founded (3 p.). In 1922 August and Marie Krogh lecture in the USA at the invitation of Yale University; in 1920 August, a professor at the Univ. of Copenhagen, Denmark, had received the Nobel Prize in physiology. Hearing of people with diabetes treated with insulin. On 21 Dec. 1922 in Denmark, Krogh and Hans Hagedorn succeed is extracting a small quantity of insulin from a bovine pancreas. In March 1923 the first patients were treated. 2. Novo Terapeutisk Laboratorium is founded–to build machines for insulin production (3 p.). 3. New insulin products–in the 1930s (3 p.). Nordisk wins lawsuit over ZPI insulin between Nordisk and Novo. 4. The search for purer insulin (2 p.). 5. International growth (3 p.). 6. Human insulin (2 p.). 7. Not just insulin (4 p.). 7. News from Nordisk (3 p.; launched its first enzyme–trypsin–extracted from the pancreas and used for the softening of leather). 8. News from Nordisk (3 p.). 9. A dynamic merger (in 1989 of Novo Industry A/S and Nordisk Gentofte A/S; 2 p.). 10. The Novo Nordisk Foundation (2 p.). 11. Novo Nordisk–Towards new goals (industrial enzymes is one of the company's four core areas, 2 p.). 12. Milestones (2 p.–chronology).

1923–Nordisk Insulinlaboratorium founded.

1925–Nordisk Terapeutisk Laboratorium founded.

1932–Nordisk Insulinlaboratorium founds the Steno Memorial Hospital.

1938–Novo founds Hvidore Hospital.

1941–Novo launches its first enzyme–trypsin–extracted from the pancreas and used for the softening of leather.

1947–Penicillin Novo–Novo's first product to be manufactured through fermentation.

Alcalase®–Novo's first detergent enzyme produced by fermentation.

1979–An enzyme factory is built in the USA in Franklinton, North Carolina.

1981–Novo becomes the first company in Scandinavia to be quoted on the New York Stock Exchange.

1987–Novo starts production of human insulin with the help of genetically engineered yeast cells.

1988–Nordisk Gentofte markets genetically engineered human growth hormone.

1988–Novo launches Lipolase®, the world's first fat-splitting enzyme for detergents. It is also the first enzyme to be produced on the basis of genetically engineered microorganisms.

1989–Novo Industry A/S and Nordisk Gentofte A/S (both Danish companies) merge to become Novo Nordisk, the world's leading producer of insulin. Address: North Carolina.

1495. Revival Soy. 2004. Home page and some links (Website printout–part). www.revivalsoy.com Retrieved Jan. 19.

• ***Summary:*** Links across the top of the Revival Soy home page are: Soy benefits. Why Revival Soy. Products. Community. Order. Links in the upper right are: About Revival. Revival in the news. Healthcare professionals. Giving back. Newsletter. Links under "Shop" in the upper left are: Soy bars. Soy shakes. Soy pasta chips. Soy pasta. Soynuts. Soy "coffee." At the top center, immediately below the links, is a large color photo (which changes from time to time) showing one of the company's products, in this case soy protein bars. Below that: "Naturally concentrated. Great taste. #1 doctor recommended. Patented benefits." "Product of the month: Revival Soy Pasta. Limited time offer: Buy 5 bags of pasta for only $10..." Become a "Revival Family Member: Save with the Revival Family Plan." Legal disclaimer: Revival is a dietary supplement. Full disclaimer. Copyright Physicians Laboratories, Inc.

Suzanne's Story (2 p.): Explains how the company was started (but gives no dates) when Suzanne Tabor (Dr. Aaron Tabor's mom) started having severe menopausal symptoms. It begins: "The old saying that necessity is the mother of invention certainly applies to the birth of Revival Soy. This story is about how God used my son, Aaron, to create Revival Soy, which has given me the best health of my life."

About Revival (1 p.): "Revival Soy is a nutrition, medically-research based company committed to improving lives with the proven health benefits of soy." Explains why Revival isn't sold in stores. The company sells products directly to consumers through its website (revivalsoy.com) and by telephone (1-800-Revival).

Revival in the news (1.1 p.): News releases by and about the company only. Giving back (to the community and world) (2 p.): Amber Alert missing child program. Breast cancer, substance abuse, Operation Blessing, medical relief.

Products: Soy shakes. Soy bars.

Note 1. This company is floating in the void, with no history, no dates, and no address.

Note 2. Talk with Lindsay Sutton, Exec. Assistant Public Affairs. The company was founded in 1995. Dr. Tabor is age 33. He works in the laboratory. This is a family-run business. The company has 100 SKUs but their main products are bars and shakes. Their first product was a chocolate soy shake. Address: North Carolina.

1496. *National Enquirer.* 2004. Miracle snack beats heart disease: 'It lowers cholesterol and blood pressure.' Major university studies reveal. Jan. 27. p. 12-13. Cover story.

• ***Summary:*** Written across the top of the cover of this tabloid newspaper: "University studies reveal: Miracle snack beats heart disease."

The article begins: "Forget about salty peanuts and fatty potato chips. The newest snack craze sweeping the nation is nothing less than a miracle food–tasty, crunchy and it fights heart disease too." Dr. David Jenkins (University of Toronto, Ontario, Canada) says that "one terrific way to get your soy is by eating edamame beans." They are easier to digest than mature soybeans and full of disease-fighting nutrients and protein. Mark Messina, PhD (Loma Linda University) says there is "no downside to eating edamame beans." Also cites positive studies at Wake Forest University school of medicine (North Carolina), New York's Mt. Sinai Medical School, and the University of Alabama. The American Heart Association endorses soy as part of heart-healthy diet.

Sunrich of Hope, Minnesota, a leading grower of edamame, sells 2 million pounds of the miracle snack food a year and can hardly keep up with the demand, which has been increasing by 25% a year.

Photos show: (1) A tray filled with edamame, ready to eat. (2) Aerial close-up of a field of green soybean plants. "Edamame is easy to digest." (3) A barefoot lady in Asia, seated on a step, shelling edamame in a wooden bowl.

1497. Adair, Linda S.; Prentice, Andrew M. 2004. A critical evaluation of the fetal origins hypothesis and its implications for developing countries. *J. of Nutrition* 134(1):191-93. Jan. [27 ref]

• ***Summary:*** The fetal origins hypothesis (formulated and developed by Prof. David Barker and colleagues at the MRC Environmental Epidemiology Unit in Southampton, U.K.) proposes that the period of gestation has significant impacts

on the developmental health and wellbeing outcomes for an individual ranging from infancy to adulthood. Research in the areas of economics, epidemiology, and epigenetics offer support for the hypothesis. Address: 1. Dep. of Nutrition, Univ. of North Carolina, Chapel Hill, NC.

1498. Hymowitz, Ted. 2004. Update on soybean rust (Interview). *SoyaScan Notes.* Feb. 6. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Soybean rust in Brazil is spreading very rapidly. Ted was under the impression that it had infected about 70% of the acreage, but the latest estimates are 90%. The only way to control this rust is to spray it with fungicides, since there are no commercial soybean varieties with rust resistance. Brazilian farmers are spraying heavily with fungicides made by Syngenta, BASF, Bayer, etc., and these chemical companies are reaping windfall profits. They all sold out of herbicide last year, so Brazilian farmers who wanted to spray were unable to do so, and the rust in their field spread. The key to spraying is timeliness; the crops must be sprayed at exactly the right time for the fungicide to be most effective.

When soybean rust reaches the USA, soybean farmers will have to spray. Even though these herbicides have not been approved by the USDA (since we have no rust, they cannot be tested), they have been given "temporary registration" based on performance in other countries. Once we start spraying, before long more herbicide will be sprayed on soybeans than on all other U.S. crops combined. And what will organic soybean farmers do. They might be sued by conventional farmers for not spraying–even if no rust has been detected in their organic fields.

How about developing soybean varieties that are resistant to rust. There are two major problems: (1) The resistance of species of plants gradually breaks down as the pathogen evolves. (2) It takes about 10 years to develop a good, commercial rust-resistant variety because of the time required for basic research, seed multiplication, and multi-year testing and comparison with standard varieties.

But the USDA is not prepared. Recently senator Feingold of Wisconsin wrote the USDA to ask them what they are doing about soybean rust. They do have a good system for detecting and reporting the rust, but they are not otherwise prepared to respond to an outbreak–which is inevitable.

What would Ted do if USDA put him in charge of a rust response program with full authority and adequate funds? He would offer to serve as a part time consultant. The person in charge should: (1) Develop a team of the smartest, most experienced people available. (2) Obtain adequate facilities (buildings, labs, fields) and money. (3) Develop new varieties based on the work that Ted has done in Taiwan with wild perennials that have rust resistance. Work done on these varieties at Fort Dietrich (the Pentagon's Biological Warfare Defense Center in Frederick, Maryland, and a quarantined lab for rust research in the USA) has shown that some soybean varieties that had rust resistance in Taiwan no longer have it, whereas other varieties which did not have rust resistance in Taiwan now have it in the USA! Are the rust strains different? Have they evolved?

There is no world center for the study of soybean rust. AVRDC used be active in the field, but they no longer do much with soybeans. Dr. Tadashi (who graduated from the University of Illinois), a pathologist at EMBRAPA in Brazil, is swamped with work from Brazil's rust problem. Ted will travel to Brazil this month to speak on the various kinds of resistance found in wild perennial *Glycine* species (soybean relatives), including soybean rust.

It is now illegal to import soybeans (but not soybean meal) from Brazil into the USA, for fear that they or the foreign matter that comes with them will be contaminated with soybean rust. This import ban began about 1-2 years ago. A major port for importing soybean meal from Brazil is Wilmington, North Carolina. Address: Prof. of Plant Genetics, Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

1499. Stubby, Brenda. 2004. Soy waxes for candles sold by Cargill, Inc. (Interview). *SoyaScan Notes.* May 21. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Cargill's brand name / registered trademark for vegetable-based waxes is NatureWax. These never contain any petroleum products. Most are made from soybeans, and those are generally referred to as "soy waxes."

Cargill makes and sells three basic types: Container wax, pillar wax, and votive wax. There are three types of container wax (but only one type each of pillar and votive wax): C-1 is a vegetable blend (mostly soy) with other plants; it was introduced about 5 years ago. C-2 is an improved 100% soy wax (largely outdated). C-3 is the latest all-soy container wax, introduced in Feb. 2004.

In Wichita, Kansas, where Cargill NatureWax is located, there is a soybean crushing plant, a vegetable oil refinery, and the plant that manufactures NatureWax, which is sold in two forms and quantities: Flakes in 50-lb boxes and bulk in tankers. These products are also made in Charlotte, North Carolina, and Sidney, Ohio.

Note: Brenda's surname is pronounced STEW-bee. Address: Sales Coordinator, Cargill, Wichita, Kansas. Phone: 877-727-0696.

1500. Belleme, John; Belleme, Jan. 2004. The miso book: The art of cooking with miso. Garden City Park, New York: Square One Publishers. vi + 182 p. May. Illust. Index. 23 x 19 cm.
• ***Summary:*** An attractive and informative vegetarian cookbook by two experts in the field. Contents: Acknowledgments. Introduction. Part I: All about miso.

1. Shedding light on miso: Introduction, what is miso?, making miso (traditionally made, naturally aged, temperature controlled), types of miso (determining quality, when used in cooking), preserving miso, the popularity grows. Sidebar: The miso master's apprentice: Making miso in a traditional shop (John Belleme). 2. Miso medicine: Miso and western awareness, other early studies, isoflavones–soy food's silver bullet, the role of fermentation, a link to lowered cholesterol, miso and blood pressure, a source of antioxidants, miso and breast cancer, miso and chronic pain reduction, miso and food allergies, miso and enhanced immune function, miso and osteoporosis, miso as a natural antacid, miso and essential fatty acids, effectiveness of miso's brown pigment, benefits of longer-aged miso varieties, what constitutes a health dose?, let tradition be your guide. Sidebars: Lowering high cholesterol: Conventional medicine or miso? A nutritional powerhouse. Miso, macrobiotics, and Chinese medicine. Breakfast of emperors: Making miso in a traditional factory. 3. Making miso at home. Part II: Cooking with miso. 4. Cooking guidelines. 5. Dips and spreads. 6. The salad bowl. 7. Soup for all seasons. 8. Sauce sensations. 9. Eat your vegetables! 10. Pasta east and west. 11. Grains and beans. 12. Seafood entrées. Address: P.O. Box 457, Saluda, North Carolina 28773.

1501. Carter, Thomas E.; Nelson, Randall L.; Sneller, Clay H.; Cui, Zhanglin. 2004. Genetic diversity in soybean. In: H. Roger Boerma and James E. Specht, eds. 2004. Soybeans: Improvement, Production, and Uses. 3rd ed. Madison, Wisconsin: American Society of Agronomy. xxv + 1144 p. See p. 303-416. Chap. 8. [523 ref]

• ***Summary:*** Contents: 1. A conceptual framework for genetic diversity. 2. Formation of the global reservoir of genetic diversity in soybean. 3. Status of global soybean germplasm collections. 4. The USDA soybean germplasm collection. 5. Genetic diversity in germplasm collections. 6. Genetic diversity in soybean breeding–an overview. 7. Techniques and concepts for quantitative measurement of genetic diversity. 8. Status of diversity in North American soybean breeding. 9. Status of diversity in Chinese soybean breeding. 10. Status of diversity in Japanese soybean breeding. 11. Comparison of Chinese, Japanese, and North American breeding. 12. The role of exotic germplasm in breeding for increased yield potential in North America. 13. Northern and southern North America as mutually important reservoirs. 14. Breeding for improved pest resistance using exotic germplasm in North America. 15. Genetic diversity for pest resistance in China. 16. Breeding for value added traits using exotic germplasm in North America. 17. Summary. Address: 1. Research Geneticist, USDA-ARS, 3127 Ligon Street, Raleigh, North Carolina.

1502. Cui, Zhanglin; James, A.T.; Miyazaki, Shoji; Wilson, Richard F.; Carter, Thomas E., Jr. 2004. Breeding specialty soybeans for traditional and new soyfoods. In: KeShun Liu, ed. 2004. Soybeans as Functional Foods and Ingredients. Champaign, Illinois: AOCS Press. xii + 331 p. See p. 264-322. Chapt. 14. [217 ref]

• ***Summary:*** Contents: Introduction. Soybean and soyfoods in China: Domestication of soybean, ancient utilization and processing, traditional soyfoods cultivars, current soyfoods markets, modern soyfoods cultivars (cultivars for bean curd {tofu} and soymilk, cultivars for small-seeded soybeans {sprouts, natto}, cultivars for vegetable soybeans {*maodou*}, cultivars for soy sauce, *doujiang, douchi,* and medicine, cultivars with improved seed composition).

Soybean and soyfoods in North America: Introduction of soybean, current soyfoods markets, modern soyfoods cultivars, genetic base and diversity of soyfoods cultivars. Soybean and soyfoods in Japan: Introduction of soybean to Japan, traditional soyfoods in Japan, current soyfoods markets, modern soyfoods cultivars (cultivars for tofu {bean curd} and soymilk, cultivars for *miso* {soybean paste}, cultivars for natto {fermented soybean; Japanese cultivars registered with the Ministry of Agriculture, Forestry and Fisheries (MAFF) include Suzumaru, Kosuzu, Natto-shoryu = Natto-Kotsubu}, cultivars for *nimame* {boiled soybean}, cultivars with low allergenic properties).

Soybean and soyfoods in Australia: Current soyfoods markets, modern soyfoods cultivars. Breeding for the soyfoods market: Tofu (environmental influences on tofu yield and solubility of seed dry matter, genotypic effects on tofu yield, seed protein and gelling properties of tofu, seed color, sugar content, undesirable flavors in tofu), natto, *edamame* or *maodou,* soymilk. Designing future soyfoods cultivars: Increasing protein and oil concentration, soybean protein composition (potential for altering protein composition, mutations in 7S storage-protein genes, mutations in 11S storage protein genes, influence of nutrition on storage protein gene expression, association with protein functionality), soybean carbohydrate composition (genetic regulation of oligosaccharide content), soybean fatty acid composition (genetic modification to reduce saturated fatty acid composition, genetic modification to alter unsaturated fatty acid composition, influence of multiple gene combinations on oil composition), Tocopherols and isoflavones in soybean seed (tocopherols, isoflavones). Summary. Acknowledgments.

Figures: (1) Diagram of two-dimensional representation of genetic relationships among 89 soyfood cultivars derived from a two-dimensional multidimensional scaling (MDS) analysis based on coefficient of parentage. (2) Bar chart of distribution of protein concentration among accessions of the USDA soybean germplasm collection. (3) Bar chart of distribution of oil concentration among accessions of the USDA soybean germplasm collection. (4) Diagram of the stachyose and phytic acid synthetic pathways in soybean. (5) Graph of relation of tocopherol concentrations to C18:3

concentration in mature seed of soybean germplasm with altered linolenic acid concentration, based on germplasm from the population N93-194 x N85-2176. (6) Graph of relation of total isoflavone and protein concentration among soybean cultivars.

Tables: (1) Distribution of releases of 193 public soyfood cultivars developed in China from 1923 to 1995. (2) Origin and description of 193 soyfood cultivars released in China from 1923 to 1995. (3) Distribution of releases of 123 public soyfood cultivars developed in North America from 1956 to 2000. (4) Origin and description of 123 public soyfood cultivars released in North America from 1956 to 2000. (5) Ancestors of North American soybean that contribute to soyfood cultivars but do not contribute significantly to commodity cultivars. (6) Distribution of release of 97 specialty-use public soyfoods cultivars developed in Japan from 1950 to 1995. (7) Origin and description of 97 public soyfood cultivars developed and released in Japan from 1950 to 1995. (8) Cultivars used for soyfood purposes in Australia. (9) Cultivars of Asian origin currently being employed in soyfood breeding in Australia. (10) Desired breeding traits for traditional soyfood cultivars. (11) Ratio of 11S to 7S proteins in seeds of soybean cultivars. (12) Genetic manipulation of soluble carbohydrate concentration in soybeans. Address: 1. North Carolina State Univ., Crop Science Dep., 3127 Ligon St., Raleigh, North Carolina, 27607, USA.

1503. Belleme, John; Belleme, Jan; Spevack, Ysanne. 2004. The real taste of Japan: Using the finest ingredients. London: Cross Media Ltd. 155 p. Illust. by Osamu Miyagi. 19 cm. [12 ref]

• ***Summary:*** See next page. Written and published for Clearspring, a natural foods importer and distributor in London.

Contents: Miso. Shoyu. Tamari. Mirin. Toasted Sesame Oil. Brown Rice Vinegar. Ume Plum Seasoning. Dashi. Sea Vegetables: Hijiki, Arame, Nori, Wakame, Kombu, Sea Vegetable Salad. Noodles: Lomein, Udon, Soba. Pickles & Condiments: Umeboshi Plums, Takuan, Sushi Ginger, Tekka, Shiso Condiment. Wasabi. Dried Tofu [Dried Frozen Tofu]. Mochi. Maitake Mushrooms. Shiitake Mushrooms. Lotus Root. Agar-Agar. Kuzu. Japanese Teas: Sencha, Hojicha, Kukicha, Genmaicha. Brown Rice Malt Syrup. Amazake.

This book contains at least one recipe (often several) for the use of each separate type of food. Recipes marked by an esterisk (*) are by Montse Bradford. Peter Bradford helped manage the book's production.

Useful websites–Food:

www.clearspring.co.uk An overview of Clearspring's product range

www.goodnessdirectco.uk Mail order supplier of Clearspring foods

www.mitoku.com More information on Clearspring's Japanese Foods

www.southrivermiso.com The story of a craft miso maker

www.soyinfocenter.com Soya foods information

Cooking and lifestyle:

www.montsebradford.com Recipes and classes using Japanese foods

www.macrobioticcooking.com Cooking the macrobiotic way

www.macrobiotics.co.uk A good introduction to macrobiotics

www.organicfood.co.uk Organic magazine featuring Ysanne's writing

Japan:

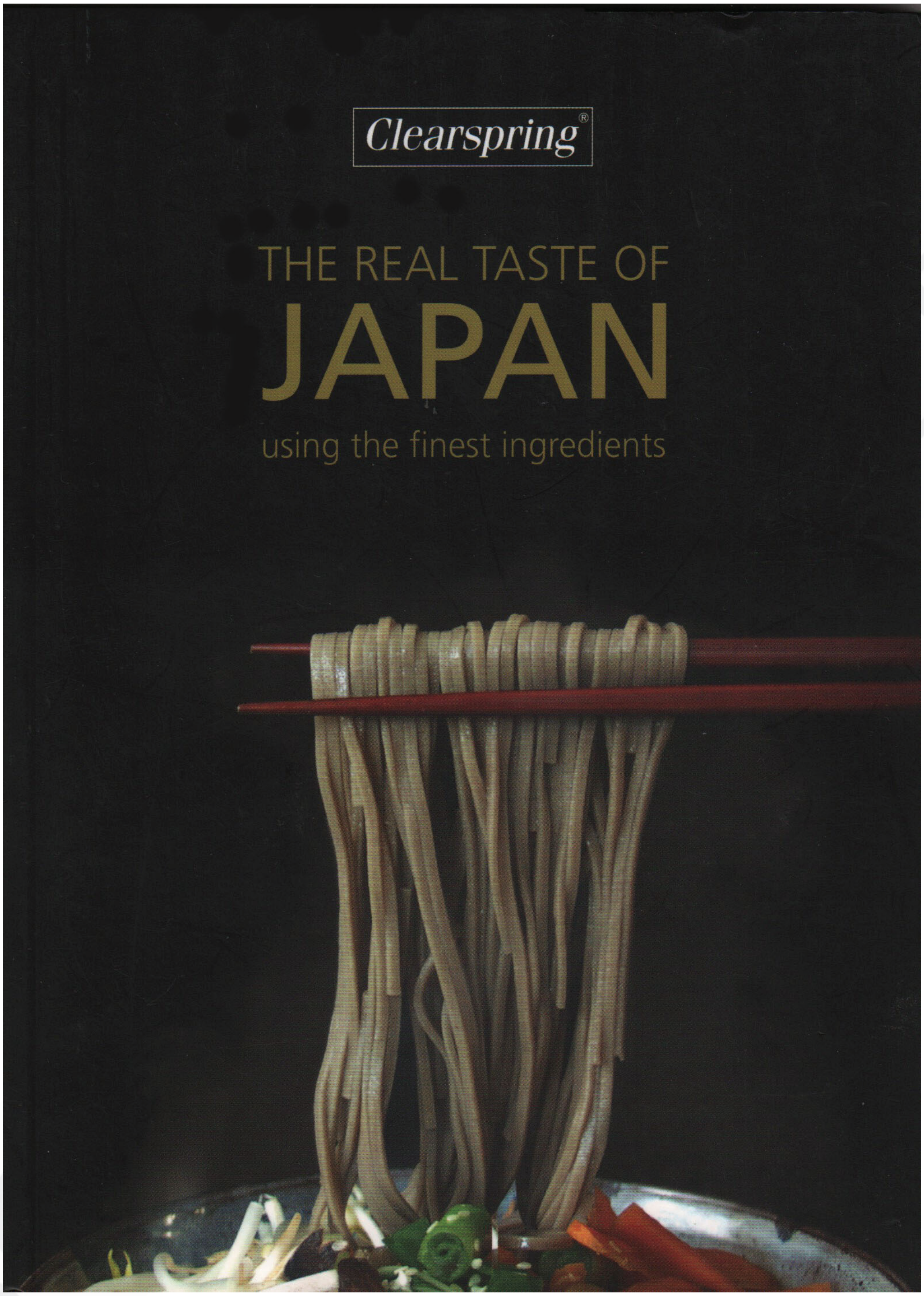
www.eat-japan.com Exploring Japanese Food

www.jinjapan.org Japan Information Network

www.teriyaki.co.uk Directory of Japanese restaurants in the UK Address: 1-2. Saluda, North Carolina; 3. London, UK.

1504. Hottinger, Greg. 2004. The best natural foods on the market today: A yuppie's guide to hippie food. Vol. I. Asheville, North Carolina: Huckleberry Mountain Press. 223 p. Index. 23 cm. [94 ref]

• ***Summary:*** This book looks very commercial because it mentions many natural products by brand name. We wonder if companies paid to be mentioned. Contains scattered recipes for branded products, and scattered sidebars titled "Hippie wisdom." Discusses: Almonds, almond butter, almond milk, American Miso Co., antibiotics (used in agriculture in 4 different ways; prevention, treatment, and control of disease, and growth promotion. In 1998 the European Union banned the use of antibiotics to promote growth in livestock. In Oct. 2000 the FDA proposed a ban on two antibiotics also used to treat humans), antioxidants, Bifidobacterium (bifidus), bovine growth hormone, bovine somatotropin (BST), Bragg Live Foods, Bragg Liquid Aminos, breast cancer, calcium, canola oil, celiac disease, cereal & Kellogg Brothers, cheese alternatives, dulse, edamame, Eden Foods (says "Eden Foods opened shop in 1968. By 1969 they were grinding their own flours and bottling their own oils and nut butters"), FDA, flaxseed oil, Galaxy Foods (says they "started in 1972 when founder Angelo Morini invented a new way to make a cheese product free of saturated fat, cholesterol, and the milk sugar, lactose"), genetically engineered foods, ghee, ginger, gluten sensitivity, glycemic index, GMO [genetically engineered] crops, Graham–Sylvester, heart disease, hippie foods, Horizon Organic, hormones, Lactobacillus, lactose intolerance, Lappe–Francis Moore, Lightlife Foods, magnesium, Maine Coast Sea Vegetables, Messina–Mark, milk–problems with, miso, Miso Master brand, nutritional yeast, oils, olive oil, omega-3 and omega-6 fatty acids, organic farming, palm oil, phytochemicals, phytoestrogens,


Clearspring®
THE REAL TASTE OF
JAPAN
using the finest ingredients

prostate cancer, protein, Red Star nutritional yeast, quinoa, saturated fat, sodium, soymilk, soy products, soy sauce, soy supplements and concerns, soy yogurts, spelt, Stonyfield Farm, tahini, tamari, tempeh, trans fats (hydrogenated oils), WholeSoy Company. Near the back are many color coupons for the companies mentioned in the book by name. Address: MPH, RD, Asheville, North Carolina.

1505. Squires, Sally. 2005. The argument over soy: The FDA is weighing its health benefits, even as some experts caution that too much could pose a risk for children. Lean plate. *Los Angeles Times.* Aug. 22. p. F3.
• ***Summary:*** Are Americans getting too much of a good thing–soy? Some FDA administrators are asking this question as they consider a "petition to give soy products a new boost: a qualified health claim for possible prevention of breast, colon and prostate cancer. This type of claim, unlike full-fledged health claims, is based on emerging research that points to, but does not prove, health benefits.

In recent years, qualified claims have been given to nuts, olive oil, and omega-3 fatty acids. Soy protein received its first full-fledged FDA health claim in [Oct.] 1999. Since then, consumption of soy protein has more than doubled in the USA, so it is now 2.2 gm per person per day from all sources. This is about one-fourth the amount consumed daily in Japan.

Soy is a rich source of high-quality protein, with many other good nutrients. "But its the isoflavones in soy that may be of greatest benefit and concern." They have some of the same properties as the female hormone estrogen.

Mark Messina, PhD, an expert on soy nutrition, says that most of the safety issues pertain to infants and children. "With adults, its hard to find any cause for concern," he adds. In July 2005, the Israeli Ministry of Health announced plans to recommend that young children limit soy products to one a day and advised that infants avoid them altogether. The French government recently advised that soy products not be given to children younger than age 3.

"But a recent review at the National Institute of Environmental Health Sciences in Research Triangle Park, North Carolina, reached a different conclusion. Though the researchers found that soy-fed infants are exposed to enough compounds that are pharmacologically active, they concluded that 'there is no indication of such action in the 50 years the formulas have been used.'"

A little goes a long way. Dr. Mark Messina advises adults to aim for 15 to 25 grams of soy per day–about the amount found in one-half to one cup of tofu or several cups of soy milk. "If you've got high blood cholesterol, 'shoot for 25 grams per day,' he said, noting 'the limitation is not based on any safety concerns, but the dietetic principle of eating a varied diet.'"

A large color photo shows an overhead view of edamamé (green vegetable soybeans in the pods) in a round blue bowl. Address: Special to The Times.

1506. Bullard, Everett; Summers, David. 2005. History of the soybean crushing plant at Cameron, South Carolina (Interview). *SoyaScan Notes.* Nov. 29. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** David recalls that in about 1956-1957, when he was age 16, he and his girlfriend were given a ride up in the elevator to the top of about 12 connected towering concrete storage bins at Cameron; they could see for many miles in every direction. He is sure there was no soybean processing plant there at the time; only the storage tanks–used to store soybeans and many other grains such as oats, wheat, etc. The property was owned by Mr. Harper and Mr. Bowers, owners of Southern Soya Corp. in Estill, South Carolina.

Everett had a long background in soybean processing before he arrived in Cameron, South Carolina. In 1947 he started at Wilson, Arkansas, with Lee Wilson & Co., Soybean Division (subsidiary of Lee Wilson & Co.); it was a solvent extraction plant. In 1948 he was at Osceola, Arkansas with Osceola Products Co. (a hexane solvent plant, which was in operation when he arrived). In 1958 he was present in Selma, North Carolina, where he helped to build and start the Selma Soybean Corp. He was plant superintendent at the time he moved to Cameron. He arrived in Cameron in Aug. 1965 and went to work at the Southern Soya Corp. of Cameron, of which Stiles M. Harper was president. The solvent plant at Cameron had started operation in about 1963. Cameron, located in the center of South Carolina, was not a very good site for a soybean processing plant; since it was not near any river or ocean, the soybeans had to be brought in and the oil and meal taken out by rail or truck–which was quite expensive.

In about Aug. 1972 there was a hexane solvent explosion at the plant; Everett was plant manager at the time. He lived about a mile out of time and he heard the explosion from his home at about midnight. An article about the explosion was probably published in a local newspaper, *Orangeburg Times and Democrat* or the *Calhoun Times.* He called two local fire departments but they couldn't get through the chain link fence around the plant. Everett was extremely worried. If the fire reached the hexane in the bottom of the Rotocel extractor, it could cause a huge explosion and widespread damage. So he called Shaw Air Force Base near the town of Sumpter and they sent a big fire truck carrying foam. The truck backed over the chain link fence, then quickly smothered the fire with its foam. "They saved the day–and the town–recalls Everett."

David recalls that the hexane gas explosion was in early Aug. 1972. A man named Mr. Ed Polin [Charles Edward Polin, age 53] died from the explosion, about 10-14 days later, after being treated for several days in a burn center–probably at Augusta or Columbia. A black workman, named Bubba, picked him up, carried him to a place with water, and

tried to help him. Mr. Polin's son says that he was buried on Aug. 28 or 29 [sic, Polin died on Aug. 29].

Southern Soya rebuilt the plant promptly and enlarged it.

Continental Grain Co. purchased the mill at Cameron from Harper and Bowers in about 1973. Initially Continental had its own letterhead on the stationery for the Cameron plant. Then they were notified to change the letterhead from "Continental Grain Co." to "Allied Mills." But after less than a year they were told to change it back to "Continental Grain Co." He never understood what that was all about. Initially he traveled to Continental's head office high in a sky scraper in New York City (He recalls couches made of unborn calf leather, and staying the night at the Waldorf Astoria), then later to Chicago [Illinois], then still later back to New York. "Continental was always very secretive–even with the people who ran their own plants! They always had to have their man, out of their main office, down here at Cameron as "manager." One was a young man named Gene Gawthorp, and he knew almost nothing about running a soybean processing plant." Everett, who actually ran the plant, was called "production manager." Few Whites were willing to work in a soybean plant in South; the dust was terrible, the soybeans smelled awful when wet, and the work was hazardous.

Everett continued working at the Cameron plant until 1983, when he retired. He thinks Continental sold the plant (located at Highway 33 & Cemetery Rd.) to ADM in late 1987. ADM, which operated a plant in Kershaw, South Carolina, never operated their plant in Cameron; Everett thinks they bought it in order to shut it down and thus to get rid of excess processing capacity in South Carolina. Also, he thinks anti-trust law prevented them from operating it. ADM shipped out the machinery they needed at other plants, but they continued to use the concrete storage bins for storing soybeans and other grains. ADM cut up the steel storage tanks and sold them as scrap.

David recalls that in about Dec. 2000, ADM asked David if he wanted to buy the land–before the year's end. He did and now he owns it. The concrete bins are presently used to store peanuts.

David also recalls that shortly after the soybean plant began operating, his 35 acres of pecan trees stopped bearing fruit; he never understood why, until the 1980s, when ADM shut down the plant. The next year they started producing pecans again. He now believes that the dust from the soybean plant got on the little sticky part of the flower and prevented the pecan pollen from adhering to it, and thus prevented the pecans from pollinating. Address: South Carolina.

1507. Center for the Evaluation of Risks to Human Reproduction (CERHR). 2005. Federal panel to explore possible health risks of genistein, soy formula: Comments invited (News Release). Research Triangle Park, North Carolina: CERHR. 4 p. [2 ref]

• ***Summary:*** Today the NIH (National Institutes of Health, a governmental organization) announced that its Center for the Evaluation of Risks to Human Reproduction (CERHR) has compiled two draft expert panel reports on soy formula (soy-based infant formula) and genistein. Dr. Michael D. Shelby is director of CERHR.

An expert panel will meet on 15-17 March 2006 in Alexandria, Virginia, to review and revise each of the two reports, and to "reach conclusions regarding whether exposure to genistein or soy formula is a hazard to human development or reproduction. The expert panel will also identify data gaps and research needs." The meetings will be "open to the public with time scheduled for oral public comment." Following the "meeting and completion of the expert panel reports, CERHR will post the final reports on its website [http:cerhr.niehs.nih.gov] and solicit public comment on them through a *Federal Register* notice. Note: NIEHS stands for National Institute of Environmental Health Sciences, of which CERHR is a part.

Contact information is given for those wishing to comment on the expert panel reports and having any other correspondence.

Supplementary information: Background: Genistein (CAS RN: 446-72-0) [Chemical Abstracts Service Registry Number] is a phytoestrogen found in some legumes, such as soybeans and clover. Phytoestrogens are non-steroidal, estrogenic compounds that occur naturally in plants and plant products. Each expert draft report has 5 sections, which are given. Request for comments. Preliminary agenda. Members of CERHR expert panel. Background information on CERHR, which was established in June 1998, within the Department of Health and Human Services. Address: North Carolina. Phone: 703-683-6000.

1508. Krinsky, Beryl Fiana. 2005. The development of a lexicon for frozen vegetable soybeans and effect of blanching time on sensory and quality parameters of vegetable soybeans during frozen storage. MSc thesis, Dep. of Food Science, North Carolina State University. xi + 97 p. Internet resource. PDF file. Illust. (some color). 29 cm. *
Address: Raleigh, North Carolina.

1509. Center for the Evaluation of Risks to Human Reproduction (CERHR). 2006. Draft–NTP-CERHR Expert Panel Report on the reproductive and developmental toxicity of soy formula. Research Triangle Park, North Carolina: CERHR. viii + 184 p. 28 cm.

• ***Summary:*** NTP is the National Toxicology Program of the US Department of Health and Human Services. Contents: Members of expert panel. Abbreviations. 1. Chemistry, use, and human exposure. 2. General toxicity and biological effects. 3. Developmental toxicity data. 4. Reproductive toxicity data. 5. Summaries, conclusions, and critical data needs. 6. References. List of tables. List of figures.

Note: The preface, summaries, and conclusions do not appear in this draft report, but will appear in the final report. Address: North Carolina. Phone: 703-683-6000.

1510. Center for the Evaluation of Risks to Human Reproduction (CERHR). 2006. Draft–NTP-CERHR Expert Panel Report on the reproductive and developmental toxicity of genistein. Research Triangle Park, North Carolina: CERHR. ix + 238 p. 28 cm.
• ***Summary:*** NTP is the National Toxicology Program of the US Department of Health and Human Services. Contents: Members of expert panel. Abbreviations. 1. Chemistry, use, and human exposure. 2. General toxicity and biological effects. 3. Developmental toxicity data. 4. Reproductive toxicity data. 5. Summaries, conclusions, and critical data needs. 6. References. List of tables. List of figures.

Note: The preface, summaries, and conclusions do not appear in this draft report, but will appear in the final report. Address: North Carolina. Phone: 703-683-6000.

1511. **Product Name:** Toasted Soycrisp [Barbecue, Jalapeño Jack].
Manufacturer's Name: Nature's Select, Inc. (Marketer-Distributor). Made and packaged by Select Soy, LLC, Greensboro, North Carolina 27409).
Manufacturer's Address: 500 Cascade W. Parkway S.E., Grand Rapids, MI 49546.
Date of Introduction: 2006 March.
Ingredients: Potato starch, soy protein concentrate, vegetable oil (contains one or more of the following: mid or high oleic sunflower seed oil, high oleic canola oil, low linoleic soybean oil), pea fiber, salt, whey, natural flavors (including dairy products), onion powder...
Wt/Vol., Packaging, Price: 1 oz (28.4 gm) in foil pouch. Retails for $0.79 to $0.89 per bag.
How Stored: Shelf stable.
Nutrition: Contains 7 gm of soy protein per bag.
New Product–Documentation: Product with Label sent by Peter Assaly, president and founder of Nature's Select, Inc. 2010. Feb. 9. He says this product was launched in March 2006 and retails for the price given here. Each bag is 4.5 by 6.5 inches. Black, yellow, brown and red on white. Front panel: "For your good health. "the Protein That Goes Crunch!"(TM). A color photo shows many Soycrisps. Superimposed on the lower right corner of these is a red "Heart Healthy" on a white circular background.

Soyinfo Center taste test. Very tasty and crunchy when each is dipped in low-fat sour cream.

1512. McNatt, Linda. 2006. These soybeans smell rotten, taste cheesy and sell like crazy. *Virginian Pilot* (*Norfolk, Virginia*). May 18.
• ***Summary:*** "Isle of Wight County–If Americans ever develop a hankering for specialty soybeans that smell slightly rotten and taste like strong cheese, Bill Taliaferro and his brothers at Montague Farms Inc. will be overwhelmed.

"As it is, the family farm operation in Essex County on the Middle Peninsula [of Virginia], has more than it can handle supplying the Japanese market with the specialty bean called natto. The Japanese eat them for breakfast, in a sandwich spread and in soups.

"The company shipped more than 10,000 tons of the beans last year, so Montague Farms is expanding its operation into Isle of Wight County."

"Researchers at Virginia Tech have developed a new variety of the natto bean that grows particularly well in the mid-Atlantic region, from Maryland to North Carolina. They call it the vanatto." "On the existing market, farmers get $2.25 a bushel more for the food-grade soybeans than regular soybeans, used for oil and animal food, said Rachel Morris, rural economic development manager in Isle of Wight."

1513. **Product Name:** Laura Lynn Original Enriched Soymilk.
Manufacturer's Name: Ingles Markets, Inc. (Marketer-Distributor).
Manufacturer's Address: Asheville, North Carolina 28816.
Date of Introduction: 2006 June.
Ingredients: Filtered water, whole organic soybeans, evaporated organic cane juice, natural flavors, calcium carbonate, sodium citrate, potassium citrate, sea salt, carrageenan, vitamin A palmitate, vitamin D2, vitamin E, vitamin B2, vitamin B12, zinc sulfate.
Wt/Vol., Packaging, Price: 1 quart plastic bottle. Retails for $1.29 (2006/06, Oakland, California).
How Stored: Refrigerated.
Nutrition: Per 1 cup (240 ml): Calories 90, calories from fat 30, total fat 3.5 gm (5% daily value; saturated fat 0.5 gm), cholesterol 0 mg, sodium 160 mg (7%), potassium 560 mg (16%), total carbohydrate 10 gm (dietary fiber 2 gm [7%], sugars 5 gm), protein 6 gm. Vitamin A 10%, calcium 30%, vitamin D 30%, thiamin 6%, vitamin B6 4%, vitamin B-12 50%, magnesium 20%, copper 25%, vitamin C 0%, iron 8%, vitamin E 25%, riboflavin 40%, folate 15%, phosphorus 8%, zinc 10%, manganese 20%. Percent daily values are based on a 2,000 calorie diet.
New Product–Documentation: Product with Label purchased by Martine Liguori in Oakland, California. 2006. June. Plastic bottle shaped like a bowling pin. 9.5 inches tall. Red, black and gold on white. Front panel: Black and white photo of a stream of white soymilk streaming into a clear glass. "Lactose free. No cholesterol... Vitamins... Calcium enriched. 31 mg isoflavones." Back panel: "We use the whole bean." Taste test: Tastes good, not great. Good to dilute in warm tea.

1514. McNatt, Linda. 2006. Japanese demand for natto beans gives Virginia farm all the business it can handle. *Non-GMO*

Report (*The*) (*Fairfield, Iowa*) 6(8):3-4. Aug.

• ***Summary:*** From the *Virginian-Pilot.* Natto is fermented whole soybeans that "smell slightly rotten and taste like strong cheese." Natto soybeans are grown by Bill Taliafero and his brothers at Montague Farms, Inc. in Essex County, Virginia. The company shipped more than 10,000 tons of the natto beans last year. "Researchers at Virginia Tech have developed a new variety of the natto bean that grows particularly well in the mid-Atlantic region from Maryland to North Carolina. They call it the Vanatto." Natto soybeans are smaller than typical soybeans and are bright golden in color. Farmers get $2.25 a bushel more for the food-grade natto beans than for regular soybeans used for oil and animal feed.

1515. Wrenn, J. Ernest. 2006. A history of peanuts in Virginia. Virginia: Published by the author. [iii] + 93 p. Illust. (mostly photos, some color). No index. 28 cm.

• ***Summary:*** This is a very interesting, original, and rare book, a history of the peanut in Virginia, supported by many old photos and illustrations.

Contents: Acknowledgments (with the 3-letter initials of 20 major contributors of photos, text, or books). The peanut plant. The peanut's journey to Virginia. Types of peanuts grown in Virginia. How peanuts grow: from pegs to pods. Location of first commercial crop. The Virginia peanut growing area. Securing credit. Tenancy. Preparing for planting. Securing needed seed. The blacksmith. Planting. Cultivating. The wicked world of weeds. Other production threats. Irrigation. Equipment. Tractors gain acceptance. Peanut digging. Peanut picking. Combining and drying. Marketing (including peanut butter and peanut oil). World War II. Farm organizations. The Great Depression. Better farming through research. Spreading the word. Peanut production contest. Peanut museums [in Virginia]. The peanut farmers' dilemma. About the author.

Photos show: (p. 4a) A roadside marker identifying the "Location of the first commercial crop of peanuts grown in the United States, between Wakefield and Waverly, Virginia." It reads: "K 308. Early peanut crop. One mile northwest Dr. Matthew Harris grew the first commercial crop of peanuts in the United States. According to tradition in or soon after 1842" [before the Civil War]. (p. 4b) There was so much labor involved in growing peanuts in the early days that it limited the acreage a farmer could grow."

(p. 5) A map of Virginia showing the major peanut growing counties: Southampton, Isle of Wight, Sussex, Surry, Nansemond (City of Suffolk), Greensville, Dinwiddie, Prince George.

(p. 6) A country store which played an import part in providing for the needs of peanut farmers. (p. 7) An old shack. "The days of the tenant farmer or sharecropper have long departed. (p. 9a) Two horses pulling a moldboard plow, turning the soil, with a farmer walking behind, holding both handles. (p. 9b) A close-up view of the moldboard plow or turning plow–the first step in preparing the soil for planting. (p. 10a) An early stalk cutter used to cut up, in small pieces, stalks of corn and cotton to prepare for planting the land. Pulled by two mules. Many of the farm implements shown in photos are from local museums. (p. 10b) A So Rite spreader. It would be pulled by a tractor and used to sow lime and fertilizer.

(p. 11a) A riding disc harrow, used to prepare land for planting after plowing. Pulled by two mules or more. (11b) One of the early tractor-drawn discs. (p. 15a) A crude "homemade" hand-cranked peanut sheller. (p. 15b) A high-speed efficient peanut sheller built by Hancock Peanut Co. in Courtland County shortly after World War II. It had a capacity of shelling 1,500 pounds per hour.

(p. 16) A replica of an early blacksmith shop located at the Southampton Ag and Forestry Museum of Courtland. (p. 17a) A row marker. Pulled across the field by a mule to mark off where the rows will be. (p. 17b) Before the invention of the peanut planter, peanut dotters like this were used to plant the crop. This wooden peanut dotter is over 100 years old. Pulled by one mule, with a farmer walking behind holding the handles, it made shallow holes in the row about 18 inches apart. A worker following it dropped two seeds in each hole covering them with his/her foot.

(p. 18a) One of the peanut planters invented and patented by Caleb "Chic" Everett in 1892. He lives near Statesville in Southampton County. (p. 18b) The Ayers peanut planter patented in the late 1890s by J.R. Ayers of Petersburg, Virginia. Manufactured and sold by him. (p. 19a) J.R. Ayers sold the patent rights to his planter to Ferguson Mfg. Co in Suffolk. They built them with both names on them. (p. 19b) A popular planter made by Cole Mfg. Co. in Charlotte, North Carolina. It was designed to plant peanuts, corn or soybeans. (p. 21) A 1901 full-page ad for "Ayers' Peanut Planters." (p. 22) Reproduction of page 1 of U.S. Patent No. 601,130 for a "Peanut Planter" issued to J.C. Drake on 23 March 1898.

(p. 23a) "Before the time of chemical weed control, farm families had to work hard, hoeing and cultivating, to have a clean crop of peanuts." (p. 23b-c). "One horse or mule drawn cultivators used to control weeds and grass." (p. 24a). "Weeding hoes for chopping out weeds in peanuts." (p. 24b) "Peanut weeder used to cultivate weeds out of peanuts. Pulled by one mule and a worker walked behind holding on to the two handles." (p. 24c). "Peanut weeder attached to 3-point hydraulic lifting arms on a tractor." (p. 24d) "Pull-type rotary hoe for controlling weeds mounted on 3-point hydraulic lift on tractor.

(p. 25a) "A one-row riding cultivator pulled by two mules or horses. The worker being able to ride instead of walking behind made a big difference." (p. 25b). "The ultimate in mechanical weed control, a Ferguson Tilrovator, manufactured by the Ferguson Mfg. Co., Inc. in Suffolk. This type implement was called a power rotary hoe and was

mounted on a 3-point hydraulic hitch on a tractor.

(p. 29a) A two-row spreader used to apply landplaster (calcium) in a band over each row to improve kernel quality. It was pulled by one mule or horse. (p. 29b) A very old duster pulled by one mule. Sulfur dust was placed in the wooden box in the middle and blown out of the metal tubes onto the plants for control of leafspot disease." And many more.

Note: As of Feb. 2015, this book can be ordered from Mrs. Lynda Updike, 33335 Statesville Rd., Newsoms, VA 23874. $21.00 + $6.00 shipping. Make check payable to Southampton County Historical Society. Address: Newsoms, Virginia.

1516. Ayres, Bill. 2007. Pioneering Interchem Industries and the commercial production of soy biodiesel in the USA. Part IV (Interview). *SoyaScan Notes.* March 8. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Continued: At some time before May 1992, when the big soy diesel transit projects were generating a lot of positive publicity, Bill or Kenlon got a phone call from AGP; it may have been from Bill Lester. "This was when we were still making our own soy diesel. We talked them into donating about $3,000 gallons of soy oil to us. Several years before that, AGP had tested several blends of soy oil and diesel fuel–with poor results. Then they started to support some of our promotional activities." AGP was the first co-op or private company to get seriously interested; they asked John Campbell to be the liaison between AGP and the budding soy diesel movement.

In about 1994 Bill and Doug Pickering left Interchem Environmental, a small, developmental company, which continued to work on wood gasification, wood oil, and pyrolysis projects. They had worked on these projects for several years to try to get them funded, but they never could. As a result, Bill and Doug had very little cash. They hooked up with AGP (Ag Processing Inc), which eventually purchased Midwest Biofuels. Bill Lester was a big supporter early on; AGP also gave Bill a little bit of help at Interchem.

Midwest Biofuels (MB) went to an alternative fuels vehicle show in Milwaukee, Wisconsin. AGP brought one of their semi-tractor trucks to the show. Together they did a neat demonstration, outside a tent, where they had petrodiesel in one tank and a 50:50 blend with soy diesel in the other. They ran the truck, and many people saw biodiesel in action for the first time. The motor ran quieter and their was less black smoke in the exhaust.

Interchem, at this time, really had no money; in fact they owed money to many people. The other partners at Interchem did not like what Bill was doing with the soy diesel. When he brought in Doug Pickering to help, they didn't like that either. The partners believed that their work would pay off in the future, and that Bill's would not.

At one point, AGP came to Kansas City [Kansas?], looked at Interchem's books, and proposed a deal. They proposed to fund Interchem's work, but they would own 95% of the company, however they would allow the partners to buy back in up to 50% eventually. They also wanted to control the money, but one of the partners who was president of Interchem at the time said "absolutely not." "AGP wasn't really interested in the rest of Interchem; they were interested in Doug and me. Remember that Midwest Biofuels was 100% owned by Interchem." It was at that time that we came up with the SoyGold name, which is still the registered trademark / brand name of AGP's biodiesel.

Bill was behind on mortgage payments, had a daughter in college, lots of credit card debt, and he had no money.

1994 Oct. 5–Bill and Doug resigned from Interchem, and AGP immediately hired the two men as consultants.

1995 April 7–AGP put together a joint venture named Ag Environmental Products LLC; it was owned 95% (90%?) by AGP and 2½% each by Doug and Bill. AEP continued to work with the soy diesel industry and the National SoyDiesel Development Board.

When Procter & Gamble found out the Bill and Doug were now working with AGP, they stopped selling they soy methyl esters (soy diesel). The reason they had sold to the two in the first place was to protect their glycerine market. They knew that AGP was a big enough company that, if it started to make soy methyl esters, it would have glycerine as a by-product which it could use to compete against P&G.

When Doug and Bill left Interchem, the remaining partners at Interchem changed their minds; they decided to stay involved with soy diesel. So Gary Wilson and Gary Haer, who were with Interchem / Midwest Biofuels, started to get involved with West Central Co-op in Ralston, Iowa. This was very important, because West Central ended up making and selling soy diesel in Sept. 1996, three months before AGP. Thus West Central became the first major company to make and sell biodiesel at a dedicated plant. "What makes it even more interesting is that West Central Co-op is one of the bigger owners of AGP." 1996 Aug.–AGP announces that it plans to build a soy methyl ester plant at Sergeant Bluff, Iowa.

1997 June–The AGP plant begins to produce soy methyl esters, made from soybean oil made at AGP's soybean crushing plant at Sergeant Bluff, Iowa.

When Procter & Gamble stopped selling the methyl esters it made to Doug and Bill, the two men went to a company named Chemol, which also made methyl esters in Greensboro, North Carolina. Fred Wellons was president. Chemol made these from animal fats (mainly tallows) to be used as lubricants in the textile industry. A deal was signed and AGP started shipping rail cars of soybean oil to Chemol; they would make it into soy diesel, then ship it back to Ag Environmental Products LLC, which would sell it. They worked out of Doug's house, and Bill started to get paid regularly for the first time in ages.

Unfortunately Bill and Doug separated from AGP on

somewhat unfriendly terms, but it was a business decision. Address: Ag Bio Energy LLC, Kansas City, Missouri.

1517. Draelos, Zoe Diana; Blair, R.; Tabor, A. 2007. Oral soy supplementation and dermatology. *Cosmetic Dermatology* 20(4):202-04. [12 ref]
• ***Summary:*** This article looks at the use of soy to enhance the appearance of skin, hair, and nails. Soy is very versatile; it can be administered both topically and orally in a variety of forms and for a variety of purposes. Address: 1. M.D., Clinical Assoc. Prof., Dep. of Dermatology, Wake Forest Univ. School of Medicine, Winston-Salem, North Carolina.

1518. Pickering, Doug. 2007. Pioneering commercial production of soy biodiesel in the USA. Part I (Interview). *SoyaScan Notes.* May 28. Conducted by William Shurtleff of Soyinfo Center.
• ***Summary:*** Doug has a stack of spiral notebooks ten inches high with the day to day notes of what he and Bill Ayres did to develop the biodiesel industry in the USA from scratch.

1990–Dr. Tom Reed of the Colorado School of Mines produces biodiesel / methyl esters from used grease from Der Wienerschnitzel (a hot dog franchise) to run a bus demonstration project in Denver. Tom was the first person in the modern American biodiesel movement to make methyl ester. He wanted to call the new fuel "McDiesel" because he thought he could get all the waste restaurant grease he needed from McDonald's–but the lawyers from McDonald's got hold of him and encouraged him to "rethink" that name.

1991 Jan.–The Missouri Soybean Merchandising Council (headed by Kenlon Johannes) agreed to fund a one-year project for $22,000 to test a diesel pickup burning 100% soybean oil fuel. But the project had no fuel. So in the spring and summer of 1991, Leon Schumacher, in search of fuel for use in the for project, located Bill Ayres of Interchem Industries of Leawood, Kansas, who agreed to provide esterified soybean oil for the project. Bill Ayres was not making soy methyl esters at the time, but he said he could make and provide the fuel. Bill Ayres and Dr. Tom Reed had been working on alternative fuels and alternative energy since the late 1970s. Bill called Dr. Reed, who provided him with the formula over the telephone. Using Dr. Reed's formula for the transesterification process, Ayres started making the first batches of methyl esters in the gravel parking lot of his uncle's tree service business in Kansas City; Interchem did not have a plant facility in Kansas City at that time.

1991 Dec.–Doug Pickering and Bill Ayres had been friends in high school. They had stayed in touch because of their mutual interest in alternative fuels and alternative energy; they had worked together for years on wood pyrolysis and wood or cellulose gas projects. In the 1980s, Doug had invested in a company that provided alternative wood chips. Bill used to bounce his many ideas off Doug. Bill went to see Doug one day, explained the details of biodiesel and his interest in it, then asked Doug what he thought about the whole thing. Doug replied: "For the first time in your life, I think you're onto something that actually has longevity to it."

1991 summer–Doug and Bill Ayres were both present at an important meeting at Stratco Engineering with Diane Graham (owner), Steve Howell (new products development engineer), and Dr. Tom Reed. Dr. Reed talked about the future of biodiesel as an alternative fuel. Stratco had agreed to supply the engineering, staff and hardware for a biodiesel pilot plant if Interchem would provide the facility.

1991 Dec.–Bill Ayres and Kenlon Johannes were planning to drive to Washington, DC, in the Missouri Soybean biodiesel demonstration truck. They expected to be gone for at least 10 days, during the time that the Stratco plant was to be installed. So Bill called Doug Pickering, who was then in the construction business, and asked: "Since your business is slow in January, would you be willing to oversee the installation to make sure it is done right?" Doug said okay.

1992 Jan.–Doug and Bill Ayres start to work together on their first biodiesel project, as Doug oversaw the installation of the Stratco pilot plant that was designed to make methyl esters / biodiesel in Kansas City. The new project involved leasing a building and creating a new company name. Bill came up with the name Midwest Biofuels, which was a subsidiary of Interchem–the company for which Bill Ayres worked. The building, which Interchem leased, was a former rendering plant consisting mainly of a 4,000 square foot room in Kansas City, Kansas, in the industrial bottoms (down near the river). Interchem paid the rent (about $600 a month) and the utilities, yet they did not pay either Bill or Doug a salary. "This is the way R&D companies often operate–and it ain't for everybody," says Doug. "It's either get rich or starve. Somebody usually gets rich from it, and its seldom the pioneers, who are lying on the trail face down, with blood marks their shirts. Interchem thought Bill was involved with something strange again. Doug recalls: "Interchem said, 'If you want to do that, go do it, but were not going to pay you. We're doing other projects.'" However Midwest Biofuels was funded by various grants, totaling over $1 million, which Bill and Doug had raised. Since the grants were designated for specific projects, Bill and Doug could not use that money to pay their salaries. Doug recalls: "I got paid exactly $13,000 and I survived on my savings and credit cards. Bill got about the same amount–maybe a little more–and survived in about the same way. Interchem also paid another employee intermittently to do logistics and shipping.

The Stratco installation took about 3 weeks and the little plant, which had a rated capacity of 50,000 gallons a year, began trying to start operation about Feb. 1. Since there wasn't much money available yet, Doug didn't get paid

much for his work. Stratco paid no rent. Midwest Biofuels and Stratco had an arm's length relationship. Midwest provided the space, Stratco provided the technology. If it worked, Midwest would benefit from the technology, if not then too bad.

As it turned out, the Stratco plant never worked, even though Stratco invested well over $100,000 in it; they paid the bills themselves, and staffed and operated the pilot plant with their people. They were very secretive about the whole thing and were doing it for their own proprietary technology development. Stratco produced a product named a "Stratco contactor," which is a device used in the oil refinery industry. Most refineries own a Stratco Contactor. Diane wanted to diversify beyond the Stratco Contactor. She envisioned biodiesel plants around the world and she wanted to have the state of the art technology to be able to license it to those plants. "In all fairness, they were petroleum engineers. Our product was oleochemical, which is completely different from petroleum. We taught Stratco more than we ever learned from them."

Meanwhile, inside the same building, Doug and Bill constructed their own biodiesel pilot plant. They mounted two 55-gallon drums on stands, had a sump pump, a garden hose, some methanol and some caustic soda. They had a 250 gallon tub that they used to wash the fuel to purify it. The whole thing "was as crude as could be." They did not distill their biodiesel.

There was a ready market for this biodiesel from the growing number of biodiesel demonstration projects. They sold their product and began to earn a little money. Midwest Biofuels was the first commercial manufacturer of biodiesel in North America; Bill and Doug were pioneering a new industry! Doug recalls: "We would load up drums of biodiesel and take them to the project at the St. Louis airport. We'd get the empty drums, replace them with full drums, and drive back."

Midwest Biofuels, based on Bill and Doug's pilot plant, operated for 6-12 months and made an estimated 10,000 to 12,000 gallons of biodiesel fuel. They made two products: SoyDiesel (biodiesel, for fuel), and SoyClean (an industrial solvent); they were exactly the same product, yellow methyl esters.

Doug notes: "Over the ensuing years, Ayres was the visionary, with a very high I.Q. He was the market development and front man. I was the executioner, follow through guy, and political operator." It soon became apparent that Midwest Biofuels could grow into a nice, valuable little company.

1992 May–Procter & Gamble (P&G) contacted Bill and Doug and said they could supply all the methyl esters that Midwest Biofuels would ever need. "On the same day that the policemen who beat Rodney King in Angeles were acquitted [29 April 1992] and there were riots in Los Angeles, we held an open house and plant dedication at our production facility and announced that we were going to build a big plant to make methyl esters / biodiesel. Present at the open house were John Campbell of AGP, Brian Peterson of the Sunrider expedition, and a small number of other people. This was the first time Ayres and Pickering had ever met John Campbell. We didn't get much press coverage for our event, because the media was scurrying to cover the riots caused by the Rodney King story. However we also sent out news releases and one was published in the *Wall Street Journal.* The Procter & Gamble people read it, called us up, and said they wanted to talk with us. They brought in four people to meet with and convince us not to build our plant: Ray Bitzer (global sales manager), Ian Edwards (top man, in charge of their global operations for methyl esters), Howard "Mac" Findley, and one other man. P&G was already making methyl esters, which are a precursor to fatty alcohols which is a big product line is their line of surfactants (soaps and detergents). Their main products in Kansas City were surfactants, methyl esters, and glycerol / glycerin. Procter & Gamble's main goal was to prevent Bill and Doug from making glycerine, which is a big profit center for them. They weren't concerned about the methyl esters.

The methyl esters that P&G made were all double distilled. That made them extremely pure, as clear as water, and more effective as an industrial solvent–whereas typical methyl esters (the type Bill and Doug had made at their pilot plant) were yellow in color. However the double distillation did not necessarily produce the best methyl esters for fuel; it removed some of the natural antioxidants that were present in yellow biodiesel and which helped to maintain product stability.

It took about 1-2 months before Bill and Doug actually received their first methyl esters from Procter & Gamble. Bill & Doug still sold the same two products under the same names, except that now both were double distilled and as clear as water. Continued.

1519. Pickering, Doug. 2007. Pioneering commercial production of soy biodiesel in the USA. Part II (Interview). *SoyaScan Notes.* May 28. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Continued: Now that Bill Ayres did not have to worry about making methyl esters, he devote almost all of his time to developing new biodiesel demonstration projects. He worked closely with Kenlon Johannes in doing this, and both helped to raise grant money as well. Among the early projects that Bill played a major role in establishing were: (1) The University of Missouri-Columbia project with Leon Schumacher (1991). (2) Lambert Airport project in St. Louis. (3) The Cincinnati Transit project. (4) The Connecticut Transit project. (5) The Sunrider Expedition. "Bill Ayres was so committed to that project that he took a cash advance on his American Express credit card to pay for a transmission repair on Brian Peterson's truck to keep him going–so he

could call on these soybean councils to raise money. After Sunrider started on its journey around the world, we did all the logistics on all the fuel internationally." It was a huge, complex, and very expensive project.

1993 April–Bill Ayres and Doug talked with AGP, told AGP that they were stressed financially, and ask for financial support for their efforts to develop biodiesel. AGP asked "What is the minimum amount of money you would need to make it to the end of the year?" "We told them we needed $20,000 a month; they said they would give us $10,000 a month." The money was paid from September to December (4 months). The money was needed, useful, and appreciated. The agreement ended at that time.

1993 late–Procter and Gamble begins the shutdown of its Kansas City plant that makes methyl esters. At about the same time they raise their prices slightly. These changes have very little effect on Midwest Biofuels because P&G had always supplied methyl esters from one of its 3 manufacturing plants in Kansas City, Cincinnati [Ohio], or Sacramento [California] (Doug and Bill never knew where it came from), or from that storage facility which had load-out capability and was closest to the end user. For example, if there was an order from a project in Cincinnati, Doug and Bill arranged for a truck to be sent to the P&G plant there, they would load the truck with the desired amount of biodiesel, weigh it, and then the truck would deliver it to the project. There were various ways of getting the biodiesel from Procter & Gamble to Midwest's clients.

1994 Aug.–AGP makes an offer to fund Midwest Biofuels (still a subsidiary of Interchem), pay their payroll and travel expenses, etc., in essence to fund their operations. The ownership of Interchem (which did not include Doug) did not want to accept the offer, because they thought it would give AGP too large a share of the company for too little money. In September, AGP withdrew the offer. But the incident showed Bill and Doug that AGP was looking seriously at Midwest Biofuels.

1994 Oct. 5–Bill and Doug resign from Midwest Biofuels / Interchem, and AGP immediately hires the two men as consultants; they were paid $5,000 a month each, until 1 May 1995. However, even though their income had improved, these were 7 months of hard times, working in limbo in Doug's basement in Overland Park, Kansas. They had no supply of methyl esters, no samples, no brochures or literature–nothing. They had two phones, so they mostly talked to people.

1995 April 7 to May 1–AGP establishes Ag Environmental Products LLC (AEP) as a joint venture; AGP owned 90% of the shares. and Doug and Bill each owned 5%–with the option of working up to 10% ownership. AGP later "arranged so that the work-up to 10% never happened." Doug recalls: "On May 1, when we left Kansas City to go to Omaha to sign the papers, Joe Meyer said 'Have a name for the company and a name for the products before you get here." Doug came up with three names: Ag Environmental Products for the company name (since the parent company's name was Ag Processing Inc), SoyGold for the biodiesel (which was yellowish gold in color), and SoyClear for the double-distilled industrial solvent. AGP liked these names, and uses them to this day. After all the papers were signed, Bill and Doug each began to receive a paycheck. AEP was to "be a research and development company, which would develop new industrial demand for soybean oil and its derivative products."

Shortly after AEP was formed, with Bill and Doug as partners, they moved their headquarters out of Doug's basement in Overland Park, Kansas, to 9804 Pflumm Road, Lenexa (pronounced luh-NEX-uh), Kansas–about 3 miles southwest of Overland Park. They soon had biodiesel samples and literature.

As soon as Procter & Gamble learned about AEP, they notified Bill and Doug that they would no longer supply them with methyl esters. Doug thinks there were two reasons for this. First, since AEP which was basically an oleochemical company (AGP crushed soybeans to produce oil and meal), they concluded that AEP would be producing its own methyl esters before long, and they didn't want to be supporting a potential competitor.

Second, shortly after AEP was established, Bill and Doug set up a meeting with Procter & Gamble. Doug recalls that John Campbell, who was there, "tried to dictate to them what he was going to pay them for their methyl esters." P&G did not appreciate this. It was after this incident that P&G stopped selling to AEP.

So Bill and Doug, with the permission of AGP's Joe Meyer, a Group Vice President and John Campbell's boss (at an open management meeting where Campbell was present), arranged another meeting with P&G, made amends, said that Campbell was "out of line" and that AEP still desired to buy methyl esters from them. "Bill and I gave P&G assurances that the industry was going to be a billion pound industry within 10 years. They said, 'We think you guys are going to do it.' We said, 'There's no reason for you not to participate all the way through.'" P&G changed their position about 4-6 months after cutting off AEP, and started supplying them again with methyl esters–all double distilled as always, because AEP needed a double distilled product.

Not long after AEP was founded, the new company began to establish storage facilities for their methyl esters. They acquired a storage tank of 3-5 million lb capacity just outside Cincinnati so they could load out as needed for railcars and trucks. They also positioned one or more rail cars (160,000 lb capacity) filled with methyl esters on a rail load-out site near Sacramento, California. Eventually they also had some storage in Omaha, Nebraska.

1995 fall–Procter & Gamble began shutting down their plant in Kansas City, Kansas, as they expanded their plant in Cincinnati, Ohio, and kept their plant in Sacramento.

As soon as AEP was established, with their supply from P&G cut off temporarily, Bill and Doug had to look for new suppliers.

1520. Pickering, Doug. 2007. Pioneering commercial production of soy biodiesel in the USA. Part III (Interview). *SoyaScan Notes.* May 28. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Continued: Over the years, they had been in touch with almost every maker of methyl esters worldwide. Now they shared these contacts with AGP. On behalf of AEP, both Bill and Doug, and AGP contacted these and placed orders. They purchased methyl esters (biodiesel) from Chemol (Greensboro, North Carolina; they are primarily a specialty molecule company in smaller volumes), Halterman Chemical (a custom producer from soybean oil out of Houston, Texas), Calgene (Chicago, Illinois), Surftec (Chicago), Carolina Byproducts, and Corsicana Chemical (Corsicana, Texas), and Procter & Gamble (Cincinnati, Ohio), At one point Halterman made a big batch of about 2 million pounds of distilled methyl esters to meet fuel specifications.

AEP was also in charge of supplying the methyl esters to the growing number of projects across America that needed them–on time, to meet specifications, and in the right quantity. AGP took care of all the accounting–billing and collecting the money.

1995-2000–AEP developed tens of millions of pounds of demand for soy methyl ester products with names like SoyGold SoyDiesel, SoyGold 1000 (which replaced the industrial solvent name SoyClean, which was owned by Interchem and Midwest Biofuels), SoyGold 2000, SoyGold (plus some number) used in making special high-tech papers by one customer only, SoyGold (plus some number) that was an industrial solvent containing a surfactant to make it water rinseable, and SoyClear (the double distilled industrial solvent, which could have no color bodies present, as in coatings, and thus looked as clear as water). Other applications included agricultural adjuvants They had record sales and volume levels year after year. They even sold more than AGP could make.

1996 Aug. (late)–AGP announced that it would build a new $6 million plant to make soy methyl esters at Sergeant Bluff, Iowa.

1996 Nov.–AGP's new plant starts to make methyl esters in Sergeant Bluff, Iowa. It had a capacity of 7 million gallons/year (40 million lb/year). Bill and Doug were in charge of selling all of the methyl esters made by this new plant worldwide. The new relationship between AEP and AGP was different from the one Bill and Doug had had with Procter & Gamble: (1) AEP was guaranteed the lowest cost esters in the world, and the subsidiary had an exclusive agreement with AGP to provide all the soy methyl esters made in AGP's new plant. AGP did not sell SoyGold to anyone but their subsidiary AEP (run by Bill and Doug; so AEP did *not* compete with AGP). (2) AEP was selling a methyl ester product made by AGP to meet a fuel specification, whereas Procter & Gamble had to meet a generic specification for the oleochemical industry–and not for fuel. Thus AGP's SoyGold was a better product for use as a fuel.

Unfortunately, during at least the first three years, AGP's plant never produced more than about 20% of the level it was designed to produce at due to design flaws by the engineering and construction company, which Doug thinks was Crown Iron Works. Therefore AGP continued to order methyl esters (although in somewhat smaller quantities) from exactly the same suppliers it had ordered them from before November 1996, when AGP also started making them. AEP was able to sell more soy methyl esters than the AGP plant was able to make. So occasionally, at these times, they would go to outside suppliers such as Chemol, and when the ester plant was shut down for maintenance and repair, or if they needed the special clear double distilled, they went to other suppliers. They did not distill at the AEP plant.

During harvest time, the Union Pacific Railway was almost always backed way up and in gridlock. At this time of year AEP was often unable to get product from AGP's plant because they couldn't get railcars; they were all used for hauling soybean oil in hauling methyl esters out. A joke has it Union Pacific's vice president of logistics tried to commit suicide. He had himself tied and gagged and laid on the UP railroad track. He died of starvation. That just how bad it really was. AEP did its best to fill its orders from product stored in tanks across the country.

2000 Nov. 1–AGP Chief Executive Officer Jim Lindsay retires. Joe Meyer, a Group Vice President, was put in charge of AEP; then he retired about a year after Lindsay. The years during which Bill and Doug worked under Jim Lindsay and Joe Meyer were good ones. They won a sales award and a plaque with a special dinner of recognition for achievement and profitability. But after Lindsay and Meyer retired, everything changed–for the worse.

Lindsay was replaced as CEO by Marty Reagan; he basically put John Campbell in charge of AEP and biodiesel. The subsequent conflict that developed for Bill and Doug was largely with John Campbell. Doug thinks the conflict was mainly about power and money. He and Bill were in line to be making bonuses of $500,000 a year. They had made substantial bonuses under Jim Lindsay but no where near six figures–although they were certainly on track to.

2001–2003. More record volumes and record sales. Then in 2002 there starts an insidious sabotage of AEP's profitability by the new senior management at AGP. Bill and Doug file a formal complaint, requesting that management honor their written operating agreement.

2003 Oct.–Bill and Doug are fired from AEP by AGP. "They just closed the operation. This was a surprise to us

and a breach of our contract, which said that all management functions would be discussed with all managers and owners. In exchange for our 5% ownership (each), they offered us the equivalent of $25,000 each, two-thirds of which was vacation pay, severance, etc. They then said, 'We know you won't like that, so you can sue us,' and we did.

"AEP had more than $20 million in yearly sales. Our forensic accountant told us that each of our 5% was worth roughly $1-1.5 million. We had record profits year after year until AGP began thinking about shutting down AEP. Then they made sure it began losing money; any controlling interest can make a company lose money and net worth if they want to. They began making six-figure contributions from AEP to political action committees or lobbying groups, and they increased the corporate overhead charges to AEP to a level that worked its way up to $28,000 a month. AEP had only 5 employees. That went on for more than two years, until they announced that AEP had to be shut down because it was not doing well financially.

John Campbell, who was now generally charge of AGP's biodiesel operations threatened Bill and Doug by saying that AGP had the power to make AEP have no profits and they would never get any bonuses. "After Jim Lindsay retired, AGP did not value the fact that we were bring them a steady stream of new customers." "John Campbell told us that the agreement that Jim Lindsay and Bill Lester signed with us would make it possible for us to make more than the CEO of AGP–and that's not gonna happen." The CEO of AGP at the time was Marty Reagan. Doug believes that Jim Lindsay, who was an honorable man, would have treated them fairly. "Jim was a tough businessman and demanding, but fair; people liked to work for and with him."

The lawsuit took about 2 years and the initial agreement contained a non-compete clause that lasted for 3 years after termination. Doug and Bill were finally forced to settle. They felt quite sure that if AGP had lost, they would have appealed the case.

Doug is now in the commercial concrete business. His company forms it, pours it, and finishes it. "You know who wins in lawsuits: Accountants and lawyers. We did not get enough out of it to make the lawsuit worth it–just a token amount. We had hundreds of thousands of dollars in legal and accounting fees. Do you know the definition of a pioneer? Somebody laying face down on the trail with an arrow stuck in his back. If AGP had done something rational and fair, we would have accepted it and gone quietly away." Doug agrees with Bill Ayres that they did not get a good deal from AGP for the biodiesel marketing company they had built.

Today Doug, a pioneer in biodiesel in the USA, is with a concrete company named Concrete, Masonry and Restoration.

1521. Gorn, Heather. 2007. 25 years of vegetarianism and a look into the future. *Vegetarian Journal* (*Baltimore, Maryland*) 26(3):6-13.
• ***Summary:*** This issue celebrates the Vegetarian Resource Group's 25th (silver) anniversary. The article contains interviews with and a photo of each of the following vegetarian pioneers: Frances Moore Lappe (author of Diet for a Small Planet), Seth Tibbott (inventor of Tofurky and owner of Turtle Island Foods), Laurel Robertson (author of Laurel's Kitchen), Jim Rosen (founder of Fantastic Foods), William Shurtleff (author of The Book of Tofu), Andy Berliner and Rachel Berliner (co-founders of Amy's), Ingrid Newkirk (co-founder and President of People for the Ethical Treatment of Animals (PETA)), Tom Reagan (professor emeritus of philosophy, North Carolina State Univ. His most recent book is Empty Cages: Facing the Challenge of Animal Rights), Michael Jacobson (co-founder of Center for Science in the Public Interest (CSPI)), and Nanci Alexander (founder of Sublime Restaurant and the Animal Rights Foundation of Florida). Address: Undergraduate, Univ. of Pennsylvania and longtime volunteer with the VRG.

1522. Dolinoy, Dana C.; Huang, Dale; Jirtle, Randy L. 2007. Maternal nutrient supplementation counteracts bisphenol A-induced DNA hypomethylation in early development. *Proceedings of the National Academy of Sciences, USA* 104(32):13056-61. Aug. 7. [45 ref]
• ***Summary:*** "The hypothesis of fetal origins of adult disease posits that early developmental exposures involve epigenetic modifications, such as DNA methylation, that influence adult disease susceptibility. In utero or neonatal exposure to bisphenol A (BPA), a high-production-volume chemical used in the manufacture of polycarbonate plastic, is associated with higher body weight, increased breast and prostate cancer, and altered reproductive function."

Messina (2016, p. 18) comments: "Although the low isoflavone intake among the soy consumers (mean intake, 3.4 mg/day) in this study raises doubt about the plausibility of these findings, they do agree with animal data." Address: 1. Dep. of Radiation Oncology and Univ. Program in Genetics and Genomics, Duke Univ., Durham, North Carolina 27710.

1523. Belleme, John; Belleme, Jan. 2007. Japanese foods that heal: Using traditional ingredients to promote health, longevity, and well-being. Tokyo, Rutland, Vermont, Singapore: Tuttle Publishing. 224 p. Illust. Index. 26 cm.
• ***Summary:*** On the dedication page is a portrait photo of Takamichi Onozaki. Contents: Pronunciation guide. Foreword, by Christina Pirela. Preface, by John and Jan Belleme. Introduction: Food is medicine. 1. Miso: A health secret to savor. 2. Toasted sesame oil: The cooking oil supreme. 3. Shoyu: King of condiments. 4. Tamari: Wheat-free soy sauce. 5. Amazake: Sweet ambrosia. 6. Kuzu: The wonder root. 7. Brown rice vinegar. 8. Shiitake: Miracle mushroom. 9. Brown rice malt syrup: Heavenly sweet

water. 10. Umeboshi: Venerable pickled plumbs. 11. Mochi: Sweet rice cakes. 12. Noodles. 13. Tofu: The square egg. 14. Seitan: The vegetarian alternative. 15. Sea vegetables: Underwater harvest. 16. Mirin: Sweet rice wine. 17. Maitake: The king of mushrooms. 18. Japanese tea: A healthy tonic. Acknowledgments. Shopping resources. Glossary. Recipe index.

Note: Tuttle Publishing is an imprint of Periplus Editions (HK) Ltd., with editorial offices at 364 Innovation Dr., North Clarendon, Vermont, 05759. Address: P.O. Box 457, Saluda, North Carolina 28773.

1524. Parsons, Lee. 2007. Adrian A. Parsons: Indiana's soybean pioneer. Indianapolis, Indiana. 1 p. Dec.
• ***Summary:*** "The soybean industry in Indiana started on a farm located just a few miles southwest of Avon in Washington Township, Hendricks County. It was there that Adrian A. Parsons (1846-1929) started growing soybeans in the latter part of the Nineteenth Century. He was the first farmer of record to engage in the purposeful and sustained experimentation with and production of the crop in the state.

"Born in Guilford County, North Carolina, young Adrian immigrated with his family to the Avon area in 1852, and he resided in Washington Township [Indiana] most of the rest of his life. While still a teenager, he enlisted in the 9th Indiana Cavalry of Union volunteers during the Civil War, and was severely wounded in action south of Franklin, Tennessee, in December 1864. After the War he settled into farming, and also taught school, served a term as Hendricks County Recorder, and several terms as Washington Township Trustee.

"With diminished robustness from the effects of his war wound, Adrian compensated by closer study of and experimentation with unconventional agricultural crops and methods. Around 1891 he obtained a batch of soybeans imported from Japan, and started growing the exotic legume while grappling with issues of variety adaptability, culture, and utilization. Recognizing early on that soybeans were useful for building soil fertility and as forage for livestock, he urged other farmers, through personal contacts and the farm press, to try the crop. His advocacy of the soybean was at first met with resistance and even derision, but his persistent demonstration of the crop's utility on the average farm helped advance its acceptance in Hoosier agriculture. The development of industrial soybean processing capability in the 1920s compounded the crop's value as a grain commodity, and set the stage for its major economic importance today.

"Adrian Parsons lived to see his own community become a leader in soybean production, and he was recognized by the American Soybean Association and the farm press as Indiana's soybean pioneer. As agricultural journalist A.E. Andrews summarized in a 1931 tribute: 'Mr. Parsons was like many a man of the best and most practical intentions–he was criticized by those who did not fully understand him; but today his county follows the path he blazed, and who can measure his influence on the nation's agriculture?'"

Note: Lee wrote this text when he was asked to provide a succinct statement of Adrian Parson's significance for posting on the Town of Avon website. Adrian's farmstead, still carefully preserved by his granddaughter Virginia Parsons Vapor who lives there, has been annexed into the Town of Avon. Address: 5846 Scott Ian Court, Indianapolis, Indiana 46254. Phone: 317-290-9446.

1525. **Product Name:** Liquid nigari (Bittern).
Manufacturer's Name: Natural Import Co. (Importer). From Japan.
Manufacturer's Address: 9 Reed Street, Biltmore Village, NC 28803. Phone: 828-277-8870 or 1-800-324-1878.
Date of Introduction: 2008 February.
Ingredients: Seawater.
Wt/Vol., Packaging, Price: 5 oz plastic bottle or ½-gallon container.
How Stored: Shelf stable.
New Product–Documentation: Talk with Bruce Macdonald. 2008. July 1. His company began selling this product in Feb. 2008. They import it from Ishigaki Island, located 430 km southeast of Okinawa, Japan. The entire island, surrounded by pristine coral reefs, is a natural sanctuary and protected from development. It is registered for a "Ramsar Convention on Wetlands"–signed in Ramsar, Iran in 1971 for the conservation and wise use of wetlands. The company started making natural seasalt in 1996 with 5 staff members. They now have a staff of 20 people, all professional salt-masters. They pipe up the sea water in bamboo pipes from 20 meters depth in the midst of the coral reefs. Then they boil it slowly for 3 days until the density is 28%, which Ishigaki Seasalt starts to appear. During the drying process, which is patented, the temperature never exceeds 90ºC (below boiling). No refined salt or chemicals are added. From this the liquid nigari (called bittern) is made–but Bruce is not sure how. They are a environmental activist company. Long ago Bruce visited Robert Salazar, who made Muramoto seasalt; he put natural salt in a sack and let the nigari drip off.

A diagram from the company shows that the following steps are used in making sea salt and nigari: Sea water > filter > concentration > separation > natural sea salt goes off. Check density of liquid > Filter 100 mesh > weighing > packing in bottles. Note: This process could be reverse osmosis or ultrafiltration.

1526. Messina, Mark J.; Wood, Charles E. 2008. Soy isoflavones, estrogen therapy, and breast cancer risk: analysis and commentary. *Nutrition Journal* 7(1):17+. June 3. [136 ref]

• ***Summary:*** An excellent, fair and balanced review. Contents: Background: Background on isoflavones, effects of isoflavones on mammary / breast cell proliferation (Animal studies, clinical studies), estrogen and breast cancer risk. Summary and conclusion.

The "existing data should provide some degree of assurance that isoflavone exposure at levels consistent with historical Asian soyfood intake does not result in adverse stimulatory effects on breast tissue." Address: 1. Nutrition Matters, Inc., 439 Calhoun St., Port Townsend, Washington 98368; 2. Dep. of Pathology, Section on Comparative Medicine, Wake Forest Univ., School of Medicine, Winston-Salem, North Carolina.

1527. Bakkum, Leila. 2008. Update on Barry Evans and American Miso Co. (Interview). *SoyaScan Notes.* July 1. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Barry Evans has moved to China and is now living and traveling there and in Thailand. He is traveling throughout the country, visiting existing suppliers, trying to find new ones, and working to be able to go direct, to eliminate middle-men. He seems to be having the best time of his life.

American Miso Co., Inc. (Rutherfordton, North Carolina) will soon be celebrating its 30th anniversary. Greg Gonzales, a former miso maker, has moved on, and Joe Kato is now the main miso maker.

Update: e-mail from Barry Evans. 2008. July 2. "I have had the most interesting, most exciting three years of my life here in Asia. I don't know why I didn't leave the US long ago!" He has found the top expert on Thai massage and has had over 100 two-hour superb treatments from her at $6/ hour. He has also become an expert on and grown to love Thai cuisine.

"Thai people don't like to leave Thailand because they can't get real Thai food abroad and they never really like other cuisines very much. Now I know why."

"I have had a chance to travel widely through much of East Asia in search of the best sources of organic food and I can state unequivocally that in my own experience the Chinese especially are quite conscientious in their devotion to organic standards and have a keenly developed ecological consciousness." Address: Great Eastern Sun Trading Co., 92 Macintosh Rd., Asheville / Enka, North Carolina 28806. Phone: 828-665-7790.

1528. *SoyaScan Notes.* 2008. Chronology of major soy-related events and trends during 2008 (Overview). Dec. 31. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** April 2–United Soybean Board announces that livestock and poultry consume about 98% of domestically used soybean meal (SBM). The top 10 SBM-consuming states in ranking order are Iowa, North Carolina, Arkansas, Georgia, Texas, Minnesota, Alabama, Mississippi, California and Oklahoma. Of these, only Iowa and Minnesota produce enough soybeans to meet the demands of their livestock and poultry producers.

April 3–*The Soy Daily* (an online weekly newsletter founded by Paul and Gail King; the first issue appeared on 13 Nov. 2000. Now published by Norman and Szasz Benedict) announces in Vol. 8, No. 13, that it will change its title to *The Healthy Newsletter.*

Sept. 12–USDA announces a change in regulations, which now allow schools to offer soymilk instead of cow's milk to children who bring a written statement from their parents or legal guardians identifying their special dietary need. This applied to both school lunch programs and school breakfast programs. While this change does make it easier for parents to request soymilk, schools are not required to offer soymilk; they are simply allowed to offer it. Soymilks are required to meet certain guideline for nutrient content to be allowed as alternatives. This rule may eliminate a significant amount of the soymilk in public schools.

Dec. 10–The American Soybean Association files a complaint with the U.S. Department of Agriculture (USDA) and requests an audit of the soybean checkoff program to ensure that money paid by farmers is being used properly.

1529. Bliss, Rosalie Marion. 2008. Drought-hardy soybean lines show their stamina. *Agricultural Research* (*USDA*) 56(10):14-15. Dec.

• ***Summary:*** Thomas Carter, soybean geneticist at the Sandhills Research Station in North Carolina, "is developing soybean breeding lines that have improved tolerance to reduced moisture and flourish over a variety of geographic areas." Address: ARS [Agricultural Research Service].

1530. Lam, Alex. 2009. Update on The Soy Shop, Atlanta, Georgia (Interview). *SoyaScan Notes.* April 14. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** His father, Kich Lam bought The Soy Shop (which started in July 1979) from Steve and Sarah Yurman in April 1985; he bought it mostly for the equipment. But before he bought the company, he had been making tofu in the basement of his home in Decatur, near Atlanta.

The Yurmans left the keys to the shop with their employees; one reason the Yurmans sold their company was because of employee theft. The employees came in in the middle of the night and made tofu, then delivered it the next morning. But the quality was not very good. After the Lams bought the company, Alex's mom scared the employees away and the Lams began to make better quality tofu. But in the mid-1980s, there were not many Asians in the southeastern USA–so it was pretty tough times. And there was competition from Calco and Jimmy Wang, both of whom were better capitalized and were ahead of the Lams. But the Lams worked harder and harder, then eventually took the whole market from them. Alex's father passed away

in the year 2000. Up that time, his father had been the tofu maker and Alex had handled the business side of things–billing, logistics, etc. In Jan. 2008 the company moved from Decatur to Atlanta. The company has had great growth for the past 10 years. Today, Alex thinks, The Soy Shop is the biggest tofu manufacturer in the southeastern USA (Florida, Georgia, North Carolina, South Carolina, Tennessee, and Alabama).

Today the company makes only two products: firm and soft tofu. Ten years ago he used to make tempeh, soysage, and soymilk. But tofu, the company's bread and butter, grew so fast that he had to discontinue the other soyfood products.

Now growth has begun to slow, because of the economic downturn and new competition. This has been his company's slowest year in the last ten years. In Oct. 2006 House Foods opened a brand new tofu factory in Somerset, New Jersey. They are now flooding the market with low-cost tofu. Alex is slowly seeing the products come into his market. Address: 5289 McCall Dr., Atlanta, GA 30367. Phone: 770-458-7808.

1531. Nesbitt, Duncan. 2009. History of Triple "F" and Insta-Pro (Interview). *SoyaScan Notes.* May 1. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Triple "F" was founded in 1961 in Des Moines, Iowa. Triple "F" was the holding company, which had a feed business (Pharm-Tech), an extrusion business (Insta-Pro, which was established in the late 1960s), and SoyInnovations (which started in about 2000 to 2002). Triple "F" was originally primarily in the business of extruding whole soybeans on farms as a source of "high-energy" animal foods. Why should a farmer sell his soybeans to a soybean crusher when he could now produce his own feed right on his own farm using an extrusion cooker. The original extruder was developed on a farm, powered with the drive (PTO = power take-off) of a tractor.

The Russians liked the idea, bought 100 units, but had a motor put on each. That was a turning point in Triple "F's" early history.

The extruder was used to support the Triple "F" feed division, which sold base mixes and mineral mixes to farmers. Initially Triple "F's" main business was selling mixes, not machinery.

Soy Innovations was formed behind the InstaPro conference room–a tiny plant making soy flour and textured soy flour. InstaPro makes the extrusion cooker machinery that Soy Innovations uses to make soy products.

Prior to Aug. 2008, all these companies were subsidiaries under the Triple "F" holding company which was founded by four people: Mr. Wayne Fox (who was the inventor of the extruder; he died about a year ago June), Dr. Leroy Hansen (he was the youngest of the four and a nutritionist), Ken Leplee (who died 6-7 years ago), and Art Satterlee (treasurer),

Wayne Fox had succession plan. The group that purchased the Insta-Pro Division, which is now a stand-alone company, is now owned by Heartland Agri-Partners, a recently formed company in Des Moines, Iowa. The sale was announced on 5 Sept. 2008.

Soy Innovations was sold to a group of former food executives; the company name was changed to Harvest Innovations. Their plant, which is in Indianola, Iowa, uses only Insta-Pro extruders and oil presses. Address: Insta-Pro sales rep, North Carolina.

1532. **Product Name:** Cool Beans: Handmade Tempeh [Soy Tempeh, Soy & Yellow Split Pea Tempeh, Soy & Black Bean Tempeh, Soy & Pinto Bean Tempeh, Soy & Garbanzo Bean Tempeh].
Manufacturer's Name: Viable Cultures.
Manufacturer's Address: P.O. Box 6051, Asheville, NC 28816. Phone: (828) 768-7931.
Date of Introduction: 2009 May.
Ingredients: Soybeans, culture.
Wt/Vol., Packaging, Price: 8 oz or 16 oz in plastic bag. Retails for $5.49 (8 oz single bagged) or $8.50 to $9.49 (16 oz double bagged)–including NC sales tax (7.75%).
How Stored: Refrigerated.
New Product–Documentation: Talk with Brian Moe, founder of Viable Cultures. 2009. July 7–I returned his call about Professional Edition of *The Book of Tempeh.* He makes two types of tempeh: soybean tempeh and specialty tempeh (soy and split pea, with nutty flavor).

Letter (e-mail) from Brian Moe. 2009. Dec. 9. He makes three fermented foods in Asheville: tempeh (5 kinds), raw krauts, and kombucha. The most recent, exciting, development for the business is that the tempeh is now being made with locally-grown soybeans (the beans are grown in Old Fort, North Carolina, about 30 miles east of Asheville). He sells his tempeh locally, at farmers' markets, to food stores, and to restaurants. His five basic types of tempeh (which all use the same self-adhesive label except for different ingredients) are: (1) Basic soy tempeh was first sold commercially in May 2009 in the two basic sizes in which he sells all his tempehs. (2) Soy & split pea tempeh (launched July 2009; made with yellow split peas). (3) Soy & black bean tempeh (launched July 2009). (4) Soy & pinto bean tempeh (launched July 2009). (5) Soy & garbanzo bean tempeh (launched Aug. 2009). His four "specialty" tempehs are one dollar per package more expensive than his soy tempeh.

Brian first learned to make tempeh in a workshop within a food conference, that was put on by the Sequatchie Valley Institute, near Chattanooga, Tennessee in 2001. Brian knows Sandor Katz of Liberty, Tennessee, and actually attended one of his fermentation workshops, years ago. "He is a great fellow and has done much to popularize the merits and how-to's of fermented foods." For more information: www.viablecultures.com.

1533. **Product Name:** Tempeh.
Manufacturer's Name: Smiling Hara.
Manufacturer's Address: Candler, North Carolina. Blue Ridge Food Ventures kitchen.
Date of Introduction: 2009 October.
Ingredients: Water, soybeans, culture.
Wt/Vol., Packaging, Price: 1 lb.
How Stored: Frozen
New Product–Documentation: Talk with Chad Oliphant of Smiling Hara. 2012. May 12. Chad and his wife, Sarah Yancey started the business together. Its official / legal name is Smiling Hara. The company operates out of Blue Ridge Food Ventures kitchen in Candler, North Carolina–about 7 miles west of Asheville. Chad and his wife live in Mars Hill, North Carolina–about 20 miles north of Asheville. Asheville is near the eastern edger of the Great Smoky Mountains National Park. Chad is the executive manager of Smiling Hara (involved with sales, deliveries, overseeing and marketing) and she is the administrative manager, involved with administration, bookkeeping and raising a 2-year old child. He has a production manager, as well as a tempeh maker–four employees making the tempeh.

Chad knows how to make tempeh. He was the first tempeh maker, then he taught his wife how, and they made tempeh together. As the company has grown, they hired new people.

They started selling Soy Tempeh in Oct. 2009. He had been in development for about a year before starting. He learned how to make tempeh at the Kushi Institute, and then from *The Book of Tempeh,* by Shurtleff and Aoyagi. He has not read *Tempeh Production* ($39.95 on Amazon.com) or History of Tempeh (2012, on Google Books). Their two main initial accounts were restaurants.

The company typically makes 700 lb of tempeh in a production run; before the recall, they were typically doing 2 production run a week and sometimes two.

In the summer of 2010 they introduced black bean tempeh, black-eye pea tempeh, azuki tempeh, and yellow split pea tempeh; none of these contain soybeans. They are softer than soy tempeh and the proper cooking time is the key to their texture. He initially sold these innovative, specialty tempeh products at farmers markets.

On Wed. 25 April 2012 Chad learned that his tempeh had a health problem. He began the first tempeh recall ever in the United States. He now knows that the starter he was buying was the cause of the problem; it was tested and shown to contain a rare strain of *Salmonella* bacterium, named *Salmonella paratyphyi B.* To date, so far as Chad knows, 60 people have gotten sick (half from consuming tempeh, and half through person to person contact) and 7 have been hospitalized.

1534. National Toxicology Program (NTP), Center for the Evaluation of Risks to Human Reproduction (CERHR). 2009. Expert panel evaluation of soy infant formula. Alexandria, Virginia. 3 p.
• ***Summary:*** "The National Toxicology Program (NTP) Center for the Evaluation of Risks to Human Reproduction (CERHR) convened an expert panel on December 16-18, 2009, in Alexandria, Virginia to evaluate soy infant formula.

"The 14-member, independent, scientific panel reviewed and evaluated the available scientific data on soy infant formula. In their deliberations, the expert panel considered the quality and strength of the scientific evidence that soy formula or its isoflavone constituents might cause adverse effects on human development. The expert panel also identified gaps in the available scientific data on the possible effects of soy formula and suggested areas where additional research is needed. Soy formula is an infant food made using soy protein and other components. It is fed to infants as a supplement or replacement for human milk or cow milk formula. Soy formula contains isoflavones, naturally occurring compounds found primarily in beans and other legumes including soybeans, peanuts, and chickpeas. The three main isoflavones in soy formula are genistein, daidzein, and to a smaller extent, glycitein.

"All members of the panel served as individual experts and not as representatives of their employers or other organizations.

"The NTP and expert panel use a five-level scale to express their conclusions to characterize the likelihood of an adverse human health effect resulting from exposure to a substance or chemical, in this case soy infant formula. The concern levels range from highest to lowest: "Serious Concern, Concern, Some Concern, Minimal Concern, Negligible Concern.

"Expert Panel Conclusions: The Expert Panel expressed minimal concern for adverse developmental effects in infants fed soy infant formula.

"The panel voted 10 yes, 2 no in favor of the conclusion. The two panel members voting no included one member who expressed negligible concern and one member who expressed some concern. This conclusion is based on:

"Lack of clarity on whether studies in experimental animals treated with genistein only can be extrapolated to infants fed soy infant formula, i.e., exposure to a single isoflavone versus soy infant formula.

"Interpretation of findings from experimental animals as demonstrating adverse effects, i.e., advanced vaginal opening, effects on the mammary gland in the context of interspecies comparisons.

"Although there are a large number of experimental animal studies published on genistein or soy, there are only a limited number of studies where experimental animals were treated only during the relevant life stage of birth to weaning. Multigenerational studies do not permit discerning effects attributed to gestational or lactational exposure.

"However, a number of studies in experimental animals and one study in humans reported effects related to the reproductive system and this elevates the concern from 'negligible' to 'minimal.'

"Studies of sufficient quality in humans have not been conducted to address the concerns raised from the experimental animal findings or to identify previously unrecognized endpoints.

"Background: The NTP convened a panel in 2006 to evaluate soy formula and genistein. The NTP did not complete the evaluation or issue a final opinion on this topic. Since 2006, a substantial number of new publications have been published for these substances; therefore, CERHR determined that an updated evaluation of soy formula was needed before NTP could develop its opinion on this topic. The panel considered all of the data and not just information published since 2006.

"The expert panel, with assistance from CERHR staff, prepared an updated expert panel report that was released for public comment on October 19, 2009, and finalized at the December expert panel meeting.

"Information about the CERHR evaluation of soy infant formula is available at: http://cerhr.niehs.nih.gov/chemicals/genistein-soy/SoyFormulaUpdt/SoyForm ula-mtg.html.

"Next Steps: Following the December 2009 meeting of the expert panel, the NTP will solicit public comment on the expert panel report. The NTP will use the expert panel report, public comments, and any new scientific literature deemed relevant to the evaluation to prepare the NTP Brief that expresses the NTP's level of concern conclusions for soy infant formula.

"The draft NTP Brief is tentatively scheduled for release for public comment in March 2010 and peer reviewed by the NTP Board of Scientific Counselors at a meeting on May 10, 2010, at the National Institute of Environmental Health Sciences in Research Triangle Park, North Carolina. Following the peer review, the NTP will finalize its conclusions on soy infant formula and release the NTP Monograph containing the NTP Brief, expert panel report and public comments. The NTP Monograph on Soy Infant Formula will be available to the public, appropriate regulatory authorities, and health professionals for use to make personal or public health decisions.

"The NIEHS supports research to understand the effects of the environment on human health and is part of the NIH. For more information on environmental health topics, visit our Web site at http://www.niehs.nih.gov."

1535. Assaly, Peter. 2010. Re: History of Nature's Select, a snack food manufacturer and maker of soynuts. Letter (e-mail) to William Shurtleff at Soyfoods Center, Feb. 15–in reply to inquiry. 1 p.

• ***Summary:*** What year and month did Nature's Select, Inc. begin making and selling its first commercial soy product? "I founded Nature's Select, Inc. and incorporated in June of 1989 as a snack food manufacturer of the world's first shelf stable Dry Roasted Sunflower Nut available in flexible packaging. Also produced in shell Dry Roasted Sunflower Seeds, Dry Roasted Pumpkin Seeds and Pepita. Then started processing Dry Roasted Soynuts in October 1991, and subsequently launched a full nut line in 1994.

I purchased a building in Jackson, Michigan in late 1991 where we first processed en masse our Dry Roasted Soynuts for Amway Corporations Modern Magic Meals private label program. In March of 1992 we had our first export of a 14-foot container to a company in Italy which lead to the development of packaging and the introduction of our Nature's Select Brand "Original Home Style" in 1993.

2. What was the company's address at that time? "Nature's Select, Inc., 500 Cascade West Pkwy, SE, Grand Rapids, MI 49546."

3. Soy product names and initial flavors. Nature's Select Brand Dry Roasted Soynuts–Original Home Style (Herbs & Spices). Nature's Select Brand Dry Roasted Soynuts–Lightly Salted. Nature's Select Brand Dry Roasted Soynuts–No Salt. Nature's Select Brand Dry Roasted Soynuts–Spicy Mexican Flavor (Salsa). Nature's Select Brand Dry Roasted Soynuts–Honey Coated.

4. 4. Did you sell in bulk only? Who first bought your soynut products? Here's only a partial list of our first original packaged customers: 1. S. Abraham & Sons, Inc. the 6th largest Candy & Tobacco Wholesale distributor in the U.S. selling to convenience stores and small supermarkets. 2. Army & Air Force Exchange Commission. 3. Private label to Amway Corporation. 4. Nature's Best, Brea, California. 5. Food for Health, Phoenix, Arizona. 6. Tree of Life, Clayburne, Texas: Bloomington, Indiana: etc. 7. Atlantic Dominion Distributors. 8. Correctional institutions. 9. Vending companies.

Partial list of bulk sale customers included Wild Oats Market, Whole Foods Market, Mountain People's Warehouse; Cornucopia; Rainbow Natural Foods; Northeast Co-Op; United Natural Foods; Tree of Life. Fred Meyer Stores–Nutritional Centers, Clackamas, Oregon. Caudill Seed.

Note: As of 3 Feb. 2011, Nature's Select has its own plant in Greensboro, North Carolina. It is managed by Peter's partner, who has a PD degree. Address: President, Nature's Select, Inc., 500 Cascade W. Parkway S.E., Grand Rapids, Michigan 49546. Phone: 616-956-1105.

1536. **Product Name:** Cool Beans: Handmade Tempeh [Soy & Blackeyed Pea Tempeh].
Manufacturer's Name: Viable Cultures.
Manufacturer's Address: P.O. Box 6051, Asheville, NC 28816. Phone: (828) 768-7931.
Date of Introduction: 2010 March.
Ingredients: Soybeans, culture.

Wt/Vol., Packaging, Price: 8 oz or 16 oz in plastic bag. Retails for $5.49 (8 oz single bagged) or $8.50 to $9.49 (16 oz double bagged)–including NC sales tax (7.75%).
How Stored: Refrigerated.
New Product–Documentation: Letter (e-mail) from Brian Moe. 2010. June 17. This tempeh was first made and sold in March 2010.

1537. Shike, Jennifer. 2010. Bernard breeding better edamame at 83 (News release). College of Agricultural, Consumer, and Environmental Sciences (ACES), Univ. of Illinois at Urbana-Champaign. 2 p. June 16.
• ***Summary:*** "At the age of 83, when many people have long since retired, University of Illinois researcher Richard Bernard unveiled his 14th variety of Gardensoy edamame.

"Bernard has been breeding soybeans and edamame, or vegetable soybeans, since 1954. And he has no intentions of stopping now.

"In fact, after the release of Gardensoy 51, he is looking ahead to his next projects: developing varieties that have higher protein content, higher concentration of omega-3 fatty acid, and creating varieties that do not have the genes that cause allergic reactions.

"Bernard's fascination with edamame began in the 1930s and 1940s when edible soybeans were a popular vegetable being pushed in the United States for their nutritive value.

"'As a boy, I was curious and tried them,' Bernard said. 'I've been enjoying them ever since. The first varieties I tried were Etum and Tastee, and they are still among my favorites.'

"A city kid from Detroit, Bernard grew up working in an auto factory before joining the army. After the war, he was hitchhiking through southwestern Illinois when a farmer stopped and picked him up.

"'The farmer mentioned soybeans, and I had to ask what they were,' Bernard said. 'He hit the brakes and made me go out in the field and take a look. That was my first experience with soybeans. Little did that farmer know what he was starting when he stopped the truck and took me out into that field.'

"Bernard went on to obtain his bachelor's and master's degrees from The Ohio State University, and his Ph.D. from North Carolina State University where he studied peanuts. At NC State, he worked next door to Herbert Johnson who was leading USDA soybean breeding efforts nationwide at the time.

"Johnson later hired Bernard as a USDA research agronomist at the U of I, where he coordinated northern regional testing for soybean varieties and became the curator of the U.S. Germplasm Collection.

"'I developed varieties of soybeans for Illinois farmers,' Bernard said. 'The majority of Midwest acres planted in the 1960s and 1970s were my varieties.'

"One accomplishment in particular stood out in Bernard's mind. 'Back then, a cultivar named 'Harosoy' was widely grown,' he said. 'It was probably the most susceptible to Phytophthora root rot–a devastating disease that had recently hit the area.'

"Bernard backcrossed in a gene for resistance to the disease, resulting in Harosoy 63. This variety saved farmers a lot of money.

"In the 1980s, he began breeding edamame as a hobby with a goal to develop 'especially good eating' large-seeded edamame with higher protein content. He also wanted to develop edamame that would grow well in Illinois.

"'Large-seeded edamame have a better mouth feel for eating,' Bernard explained. 'Those varieties mainly come from Japan and Korea, but they tend to be prone to shattering and susceptible to diseases. I wanted to create edamame varieties with improvement in those areas.'

"Bernard released the first six edamame varieties in 2000, followed by seven more in 2002. He named them Gardensoy with numbers following to reflect the soybean maturity group and release order. His latest release, classified in soybean maturity group V, adds a later-maturing variety to the mix and will be the last one to harvest before the frost hits.

"'For years, I mailed out free seed packets for people to grow Gardensoy in their home gardens,' he said. 'Most people have a hobby that costs them money. I consider that the price of mine.'

"Overcoming misconceptions about eating soybeans has been Bernard's greatest challenge in breeding edamame over the years. 'People are harder to change than soybeans,' Bernard said. 'In the Midwest, people have been slower to accept edamame, despite its great taste and nutritional value.'

"As more and more people learn about the great taste, convenience and nutritional benefits of this complete protein vegetable, demand for edamame has increased. However, most of the demand has been met through the import of product from China, said Theresa Herman, U of I research specialist.

"Gardensoy varieties are perfect for growing in gardens, Bernard said. Due to harvesting and storage challenges, only a few operations in the United States are currently producing edamame on a large scale. However, consumer interest is quickly increasing along with the number of farmers growing edamame to sell at farmer's markets.

"'The U.S. edamame industry has yet to take off in a big way, but with increasing demand, sustainability of local production is more and more likely,' Herman said. 'As more edamame are grown and consumed in the U.S., it remains to be seen whether the Gardensoy varieties will be chosen favorites. However, Dr. Bernard will always be in the group of pioneers who saw the potential of this crop in the U.S.–for human health and for grower profit.'" Address: Urbana, Illinois.

1538. Panthee, Dilip R. 2010. Varietal improvement in soybean. In: Guriqbal Singh, ed. 2010. Soybean: Botany, Production, Uses. Wallingford, Oxfordshire, UK, and Cambridge, Massachusetts: CAB International (CABI). xii + 494 p. See p. 92-112. Chapt. 5. [66 ref]
• ***Summary:*** Contents: Introduction. Wild relatives and genetic resources: Annual relatives, perennial relatives. Mode of reproduction. Crossing methods: Selection of parents, crossing block, emasculation, pollination. Breeding objectives: Agronomic traits, seed composition, abiotic stress tolerance, herbicide tolerance, disease resistance, insect resistance, functional foods. Breeding procedures: Hybridization and advancement of the generation, selection methods, testing at early stages, testing at later stages, multi-location trials, release of variety or germplasm. Seed production: Breeder's seed, foundation seed, certified seeds. Future prospects. Address: Dep. of Horticultural Science, North Carolina State Univ., Mountain Horticultural Crops Research and Extension Center, Mills River, North Carolina.

1539. Tibbott, Seth. 2011. Update on tempeh, Tofurky and Turtle Island (Interview). *SoyaScan Notes.* Jan. 19. Conducted by William Shurtleff of Soyinfo Center.
• ***Summary:*** Tempeh sales constituted about 10.7% of Turtle Island's total sales last year; the remaining 89.3% was Tofurky products. "The various types of Tofurky have steadily become our dominant products by far. Yet sales of all our tempeh products increased 39.8% during calendar year 2010. The increase was in two areas: In March 2009 we launched tempeh strips [Marinated Tempeh] in 3 flavors (Lemon Pepper, Coconut Curry, and Sesame Garlic), and packaged each in a nice box. In June 2010 we added a fourth flavor–Smoky Maple Bacon." The 39.8% sales increase figure refers to sales of these tempeh strips (4 SKUs, in a 12-pack to the natural food market and a 6-pack to the mass market) and sales of cake tempeh and tempeh strips to the mass market. Last year, Seth sold 27,000 cases of tempeh strips and 29,000 cases of tempeh cakes (of various types) in the natural foods market. Seth has been selling tempeh in cakes for about 30 years, but in strips for less than 2 years. So the strips (which weigh 7 oz per individual package) have caught on very rapidly and are almost at the level of the cakes (which weigh 8 oz per individual). In short, natural foods customers like flavored, heat-and-serve, 2nd generation tempeh products. But here's the kicker; sales of the strips are growing fastest in the mass market (supermarkets), where Seth sells about 10 times as many cases of strips as he does cakes. And its just getting started. In places like North Carolina and South Carolina they just can't get enough of these 6-pack cases of marinated strips.

Turtle Island was already in mass supermarkets in the southeastern United States, but by mid-2011 the tempeh products were added as line extensions in those accounts–especially in Florida, North Carolina, South Carolina, and Georgia, in that order. The Sesame Garlic and the Smoky Maple flavors are the best sellers in the line.

There are a growing number of voices in America talking about the health and flavor benefits of fermented foods.

Seth's tempeh sales (all cakes) (all types) were $472,000 in calendar year 2002, rising to $1.3 million in 2009. So sales of tempeh cakes are way up compared with 10 years ago.

The biggest tempeh maker in the USA by far is Lightlife Foods (in Massachusetts); they make about 10 times as much tempeh (Fakin' Bacon and cake tempeh) as Turtle Island. No. 2 is Turtle Island, followed by Hain ("Where good brands go to die"–which now makes Westsoy Tempeh, which was originally made by Steve Demos of White Wave and is probably still made at the former White Wave plant in Boulder, Colorado), then (in the natural foods market) Surata Soyfoods (Oregon), Northern Soy / Soy Boy (Rochester, New York), Rhapsody (Vermont), Wildwood Natural Foods (Pulmuone, southern California, made by Turtle Island), Bountiful Bean (Madison, Wisconsin), Central Soyfoods (Lawrence, Kansas), 21st Century Foods (Jamaica Plain, Massachusetts), Sweet Earth (Birmingham, Alabama), M Café, and Hearty Vegan (Texas).

In the SPINS data there is no category for tempeh alone; rather the category is "Tempeh and Seitan." That category was $6.1 million in 2006, increasing to $6.5 million in 2009–but those numbers are inaccurate because Whole Foods recently stopped selling its data to SPINS.

How long will Seth continue to be in charge of his business? Good question. His stepson, Jaime Athos, who is extremely bright, has a PhD in neurobiology from the University of Washington (Seattle), is a vegetarian, and has good business sense, is "chomping at the bit" to take over the business from Seth. Seth wants to continue working there, but perhaps in an emeritus position and as chairman of the board. Seth's 60th birthday is coming up on April 20, 2011, so he has to start thinking about succession and what else he wants to do. He is considering starting a foundation.

Yet his basic financial situation is "rags to better rags; it's not rags to riches." Seth does not have a big attraction to money. "It's never been about money for me. In 1980 when I was first starting Turtle Island on my 2,500 bucks, I had never taken a class in business, but there were these free classes from the SBA [Small Business Administration] on how to start and run a business. So I figured, well, its free and I don't have any money, so I'd better go there and learn about business. So I go the first class and this guy stands up there and his first question to this room-full of entrepreneurs is: 'How many of you people are out there to save the world?' And my hand shot up. I looked around and no one else's hand was up. And I go, 'Oh god. Its a rhetorical question. I just flunked my first business exam.' And then he goes, 'How many of you are out there to make

money?' Every hand shot up. The place went wild. I was embarrassed–but... I see myself as the cosmic goof–the least likely person to succeed in business. Anyone with a good work ethic, little luck, a good product–so long has she doesn't take herself too seriously–can succeed in business.

"When I was younger, I was always this humorous guy. But when I started a business making tempeh I suddenly transformed into this serious guy. The conventional wisdom was–you don't want to make this funny; just play it straight. You don't wanna upset the middle class with a joke. And I lost tons of money. It was only when I came out with this wacky Tofurky product, that people thought was a joke, did I start making money. Humor started creeping into the way Turtle Island presented itself at that time. The subject lent itself naturally to humor. "I could feel I was letting my true self come through in the business."

One important development: Pasteurizing tempeh by using vacuum sealing for longer refrigerated shelf life. This has been taking place since the mid-1990s, but it has been steadily improved. Refrigerated tempeh has a better texture and flavor than frozen, and requires much less energy use.

Also: People are increasingly becoming aware of the many important benefits of fermented foods and fermented soyfoods.

There has been a shakeup at Lightlife Foods. Top management has been asked to leave Turner Falls and move to Conagra Headquarters in Omaha, Nebraska. At least one top manager has quit.

In June 2010 Turtle Island launched a new product which has, so far, been extremely successful–Tofurky Pizza (vegan), in 3 SKUs. The cheese they use is the remarkable new tapioca-based Daiya Vegan Cheese, made by Daiya Foods, a relatively small start-up company in Vancouver, Canada (www.daiyafoods.com) that was founded in mid-2007 by Andre Kroecher and Greg Blake. They have taken the cheese-alternative category by storm. You can find shredded pieces of Daiya at any Whole Foods Market in the non-dairy cheese section.

Seth asks:

"Have you heard the joke about the fire in the vegetarian cheese factory? Everything melted except the cheese!" This non-dairy cheese really melts and stretches, is gooey and tastes great. Amy's owns the natural foods pizza category but Seth's 3 vegan pizzas are moving up fast on the charts. They started to be sold commercially in June 2010.

Sales of the three Tofurky products (Roast & Gravy, Feast, and Roast) reached 353,250 units in calendar year 2010. Sales have increased every year since Turtle Island started making the product in about 1995. The number sold has increased every year as follows (numbers prior to 2002 were rounded off to the nearest thousand): 1995–500. 1996–1,500. 1997–18,000. 1998–45,000. 2000–84,000. 2002–118,000. 2004–152,070. 2006–201,108 (one millionth Tofurky roast sold!). 2008–308,436. 2009–339,996 (two millionth Tofurky roast sold!). 2010–353,250. Total: 2,360,734.

Tofurky Feast (3.5 lbs): First sold in November 1995. Gone through several incarnations of size and product offerings. Current pack holds: two pound Tofurky Stuffed Roast, 14 oz Savory Tofurky Gravy, 11 oz Amy's Vegan Chocolate Cake, one set of Tofurky Jurky Wishstixs, Happy Tofurky Day card, coupons for Tofurky products. Sold Frozen, mainly in Natural Foods stores like Whole Foods, Berkley Bowl, etc.

The Tofurky Roast has always had tofu in it; the first two years it was all tofu, no wheat gluten. In 1997 wheat gluten was added to give more turkey-like texture and to aid in freeze/thaw process. Tempeh Drumettes were part of the original Tofurky Feast but were replaced with Cranberry Apple Potato Dumplings in 2003, which were in turn replaced with Amy's Vegan Chocolate Cake in 2010.

Tofurky Roast (26 oz): First sold in October 2002. Only the Tofurky Stuffed Roast. Sold Frozen, mainly in Natural Foods market.

Tofurky Roast and Gravy (2.5 lbs): First sold in October 2005. Includes one 26 oz Tofurky Stuffed Roast and 14 oz of Savory Tofurky Gravy. Sold Refrigerated in Mass Market accounts like Trader Joes, Publix, Safeway, etc. Address: President and Founder, Turtle Island Foods, Inc., P.O. Box 176, Hood River, Oregon 97031. Phone: (503) 386-7766.

1540. Kushi, Norio. 2011. Re: My brothers and sister. Letter (e-mail) to William Shurtleff at Soyinfo Center, March 2. 1 p. • ***Summary:*** "My sister and brothers are:

"Lily, Lillian Midori Kushi, born July 20 1953.

"Norio, Arnold Norio Kushi, born December 15, 1954.

"Haruo or Larry, Lawrence Haruo Kushi, born December 10, 1956.

"Phiya, Phillip Yoshio Kushi, born October 29, 1959.

"Hisao, Hisao Tenshin Kushi, born June 8, 1965.

"Phiya is a nickname that I came up with when we were children and the name stuck. My father picked the western names, which were used as the first name and my mother picked the middle Japanese names, with the exception of our youngest brother Hisao. When Hisao was born, my grandparents on my father's side were living with us. My mother picked the name Hisao, which was decided to be the first name and my grandmother picked the name Tenshin to be used as the middle name.

"The four older children were born in New York City and Hisao, was born in Cambridge, Massachusetts. All of us kids were born in a hospital. "My sister spelled her name 'Lilly' for most of her life. However, in her later years, perhaps the last five years of her life, definitely after the book titled *Aveline* was printed, she began spelling her name 'Lily.' She never made a big deal about it and never corrected anyone if someone were to spell her name 'Lilly.' However, she herself would always spell her name 'Lily.'

Norio (who has long loved cars) writes (3 March 2011, in reply to a question): "I initially started driving a truck in 1981. I also drove for Greyhound and helped to start a bus company, Premier Coach of Vermont for the owner, Ron Charlebois. I went back to driving a truck back in 2002 and have been doing so since then, other than a short period when my father got sick and went into the hospital. I pretty much live in the truck full time, getting home to Asheville, North Carolina, about once a month. I left Asheville on Monday and am currently in Oxnard, California, having made a delivery here this afternoon.

A photo shows Norio, holding a guitar, with truck in background. Address: Traveling by truck.

1541. *Gainesville Sun.* 2011. Obituary: Harrison, Dr. David W. May 29.

• ***Summary:*** "Dr. David W. Harrison, Age 90, Retired Medical Doctor with 30+ Years of Missionary Medical Service in Africa, US Army Veteran, died Thursday, May 26, 2011, at E.T. York Care Center (Gainesville, Florida).

"Dr. Harrison, a self-supporting Seventh-Day Adventist Medical Missionary, has done pioneering work in introducing soybeans and soyfoods into Africa starting in the 1960s. Africa Basic Foods, which he founded in Uganda in 1962, was the earliest known company in Africa to make and market a line of commercial soyfoods. His work with soybeans and soyfoods in Ghana, Uganda, and Kenya affected the lives and nutritional well-being of thousands of people from government officials to school children and villagers.

"Born into a black Seventh-day Adventist family in Nebraska in 1921, the family moved to California when he was five years old. He received his B.S. Degree from Pacific Union College and attended Loma Linda University, where he earned his M.D. Degree in 1945. Dr. Harrison interned at Harlem Hospital (New York City) and began his medical career in North Carolina. From there, he was called to military service (in 1951). He earned a degree in public health in Texas in 1951 then went to Korea for a year as a Captain in the Army, working with the United Nations Civil Assistance Command. There he first began to develop an interest in nutrition to supplement the strong education he had received in nutrition at Loma Linda Medical School. Back in the United States, he was a Resident in General

Surgery at a hospital connected with Duke University.

"Funeral Services will be held 11:00 AM Tuesday, May 31, 2011, at Duncan Brothers' Chapel (Gainesville, FL) with Pastor Joseph P. Lewis officiating. Burial (with Military Honors) will follow at the Florida National Cemetery (Bushnell, FL) at 2:30 PM. Dr. Harrison will only be viewed at the Chapel 1 hour prior to the Services–And with the Processional.

"Dr. Harrison is immediately survived by: Wife–Edith Stokes-Harrison of Gainesville, FL; Sons–William Kenneth Bennett (& Janis) of Orlando, FL, David Michael Bennett of Washington, DC and David W. Harrison (& Fatima) of Upper Marlboro, Maryland; Daughters–Liza Widmer and Linda Stokes of Gainesville, FL; Grands; Great Grands; Nieces & Nephews; In-Laws; Cousins; & Friends."

"Arrangements entrusted to: Duncan Brothers' Funeral Home, 428 NW 8th Street, Gainesville, Florida."

1542. Hester, Kathy. 2011. The vegan slow cooker: simply set it and go with 150 recipes for intensely flavorful, fuss-free fare everyone (vegan or not!) will devour. Beverly, Massachusetts: Fair Winds. 224 p. Illust. (color photos). Index. 24 cm.
• ***Summary:*** The index contains 24 entries for tofu, 9 for tempeh, two for seitan (p. 21-22, using homemade seitan), and one each for Soy chorizo black beans stew (with "½ package {6 ounces, or 170 gm} soy chorizo, p. 62), and for soy or coconut creamer (nondairy creamer and milk, p. 15).

A "slow cooker" is exactly the same as a "Crock Pot"–but the latter is a brand name. For many recipes, below the recipe name is printed "Soy-free. Gluten-free." Address: Durham, North Carolina.

1543. Simon, Karen. 2012. Speedy soybean breeding: Year 'round research advances variety selection. *Iowa Soybean Review* (*Iowa Soybean Association, Urbandale, Iowa*) 23(4):22-25. Jan. Cover story.
• ***Summary:*** A big idea from a young soybean breeder has made a huge difference in increasing soybean variety development and production in the United States.

"Dr. Walter Fehr joined the faculty at Iowa State University (ISU) in 1967. He brought with him an idea that changed the future of soybean breeding.

"While working on his PhD dissertation, Fehr worked with Dr. Lambert at the University of Minnesota who was accelerating his soybean breeding program by growing a crop in Chile during the winter. 'It was obvious to me,' says Fehr, 'that the breeding program at ISU could not be as effective as that of other universities if we continued to grow only one crop a year.'

"Although Chile was an attractive option, Fehr wanted to accelerate his research even faster by growing two crops in the winter instead of one. His first attempt, a project in Hawaii, didn't turn out as well as he had hoped because of pests, and salt water in the irrigation."

In March 1970 he and his wife, Elinor, traveled to Puerto Rico; he took with him a suitcase full of soybean seeds. There he met Dr. Charles Brim, a USDA-ARS [Agricultural Research Service] researcher from North Carolina State University who was having some success growing one crop a year at a USDA facility in Puerto Rico. Fehr could not use his facility because he was not a USDA employee, so he visited the state experiment station in Isabella–and was welcomed. That is how the visionary soybean breeding program began. After the first year, Fehr expanded the work to cross plants as well.

"'Walt Fehr's vision of how soybean breeding could be done defined the way the industry operates today,' says David Wright, director of contract research for the Iowa Soybean Association.

"In 1972 the Iowa Soybean Promotion Board saw that Dr. Fehr's vision was the right way to go to exponentially speed up soybean research, and agreed to support the year 'round nursery in Puerto Rico–a novel decision for a state commodity organization."

Photos show: (1) Walt Fehr examining a soybean plant in a field (recent photo). (2) Walter Fehr with his 3 children in Dec. 1975 in a soybean field at Isabela, Puerto Rico. (3) On the cover of this issue, Walt Fehr standing in a field of soybeans (recent photo).

1544. Troy, John. 2012. Update on life and work since the year 2000 (Interview). *SoyaScan Notes.* March 7. Conducted by William Shurtleff of Soyinfo Center.
• ***Summary:*** John is now age 72, retired, and still married to Carol. They live on 20 acres of land in Cedar Grove, North Carolina, in a home that he has been building for the last 16 years or so. His ancestors came from North Carolina, and when he was growing up he spent a lot of time hiking in the Great Smoky Mountains.

In 2006 John sold his sauce manufacturing and bottling company for $7 million to an investment company named Dogwood Equity. He was making and bottling about 500 different products (SKUs) at the time, most for other people / companies. Everyone he asked said he would be less happy after he sold it than he was at the time, but he sold it anyway. Dogwood changed the name from The Wizard's Cauldron Ltd. to a name that was not as good, diversified into the wrong products, and generally messed things up. It was an "asset purchase" and they bought the rights to make the products. Many of the companies who were John's customers are no longer with Dogwood.

Why did John name his company "Wizard's Cauldron"? His wife, Carol, threw the *I Ching* (using special coins) and got Hexagram #50, the Cauldron. Then she threw it again and got the same hexagram. So "Cauldron" became a key word in his company's name.

His original company was named American Natural

Foods. Pure and Simple (owned in part by Jimmy Silver) was his distributor and had a large inventory of his products. When Pure and Simple went down the tubes (bankrupt), John's company did too.

John is now very much involved with travel and spiritual practice. He also has a radio program, "Conversations with Avant-Garde Sages," on WCOM 103.5 FM in Chapel Hill, North Carolina, or Cyber Satsang via live streaming audio (www.thewizardllc.com). Every Tuesday, Eastern Time from noon until 1 pm. He has hosted people such as Norio Kushi (who has written a book).

Where does creativity and everything else come from? "It all emerges out of silence." "The 'I' thought is the big mistake and the problem." John once asked Doug Greene, who founded *Natural Foods Merchandiser,* what he felt was the secret to his life and work. John said: "I just went with what wanted to happen."

John has written one book titled "Wisdom's Soft Whisper" and another titled "The Human Gospel of Ramana Maharshi." Address: 5134 Boone Village Trail, Cedar Grove, North Carolina 27231.

1545. 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.

1546. Beavers, D.P.; Beavers, K.M.; Miller, M.; Stamey, J.; Messina, M.J. 2012. Exposure to isoflavone-containing soy products and endothelial function: A Bayesian meta-analysis of randomized controlled trials. *Nutrition, Metabolism & Cardiovascular Diseases* 22(3):182-91. March. [60 ref]
• ***Summary:*** "Endothelial dysfunction [EF] has been identified as an independent coronary heart disease risk factor and a strong predictor of long-term cardiovascular morbidity and mortality. Data on the effects of exposure to isoflavone-containing soy products on EF are conflicting." Address: 1. Dep. of Biostatistical Sciences, Wake Forest Univ. School of Medicine, Winston-Salem, North Carolina, USA.

1547. Tibbott, Seth. 2012. Salmonella outbreak on unpasteurized tempeh in North Carolina (Interview). *SoyaScan Notes.* May 9. Conducted by William Shurtleff of Soyinfo Center.
• ***Summary:*** The tempeh recall is now underway. The company that made the tempeh was Smiling Hara Tempeh, a small producer in Asheville, North Carolina that makes about 1,000 to 1,700 lb/week. Some 46 people have gotten sick from eating the unpasteurized tempeh and 5 people have been hospitalized.

The company operates out of Blue Ridge Food Ventures kitchen in Candler, North Carolina. Chad Oliphant is the executive manager.

The outbreak was caused by a rare strain of *Salmonella* bacterium, named *Salmonella paratyphyi B.* The source of the problem has been traced to the tempeh starter culture.

Note 1. Tempeh Online (Rockville, Maryland) sold the tempeh starter to Smiling Hara.

Note 2. Smiling Hara also makes "Handcrafted unpasteurized black bean tempeh" and "Handcrafted unpasteurized black-eyed pea tempeh." Address: President and Founder, Turtle Island Foods, Inc., P.O. Box 176, Hood River, Oregon 97031. Phone: (503) 386-7766.

1548. *Food Safety News* (*Online*). 2012. Lawsuit filed in Salmonella outbreak linked to unpasteurized tempeh. June 19.
• ***Summary:*** The first lawsuit has been filed against Smiling Hara, a small tempeh maker in Asheville, North Carolina. The lawsuit was filed jointly by two Asheville firms, one of which represents the plaintiff, Mary Ann Hurtado, who became very sick after eating a tempeh sandwich with tempeh made by Smiling Hara.

"Smiling Hara made its unpasteurized tempeh using starter culture contaminated with Salmonella Paratyphi B from Maryland online retailer Tempeh Online. Public health officials in Buncombe County named Smiling Hara tempeh as the source of the outbreak on May 4."

1549. Andrews, James. 2012. Tempeh Salmonella case highlights illnesses that fall through the cracks. *Food Safety News* (*Online*). June 28.
• ***Summary:*** Smiling Hara, a tempeh manufacturer in North Carolina, made unsafe tempeh, which sickened 89 people in 5 states with *Salmonella Paratyphi* B.

It took one month for Health officials to trace the cause of the outbreak back to Smiling Hara. The Salmonella food poisoning was traumatic. For example Mary Ann Hurtado, a registered nurse, who purchased a tempeh sandwich at a café in Asheville on March 19, began feeling ill about two days after eating the tempeh. She had to spend two nights in a hospital, was so sick she could not walk across the room, had a painful potassium I.V. drip, and had severe chills. She was shaking so hard in the bed that she had to move to the couch so she wouldn't wake up her husband.

Yet even though she was so ill, she was "not included among the 89 victim case count and likely never will be. That's because of technicalities surrounding the identification of her infection.

"The bacterial isolate that confirmed her Salmonella infection was never serotyped, meaning that the specific strain was never identified and Hurtado's infection will never be genetically linked to the strain found in samples of Smiling Hara's tempeh. In short, she's in a sort of classification limbo, neither officially confirmed as part of the outbreak nor confirmed to be excluded from it–and she's likely not alone."

The "U.S. Centers for Disease Control and Prevention estimates that 29 out of 30 Salmonella infections go unreported." That is because many states do not serotype–it's too expensive.

"Hurtado recently filed the first lawsuit against Smiling Hara and Tempeh Online, the retailer that sold Smiling Hara the Salmonella-contaminated spore culture used to make their tempeh."

Note: In addition, Smiling Hara did not pasteurize their tempeh.

1550. Hymowitz, Theodore. 2013. Illinois has storied history with soybeans: From the Auckland to Lincolnland. *Illinois Field and Bean* (*Illinois Soybean Assoc.*). Nov. p. 5-6. Special issue.
• ***Summary:*** This excellent overview of the history of the soybean in Illinois begins: "On Christmas Day in 1850, the U.S. merchant ship *Auckland* sailed from Hong Kong for San Francisco, California, carrying a shipment of sugar. About 500 miles off the coast of Japan the *Auckland* came across the *Eiriki maru,* a Japanese vessel drifting helplessly on the sea. The crew of 17 was removed from the ship and taken aboard the *Auckland.* The Japanese took aboard some of their belongings, including navigational equipment and agricultural foodstuffs.

"On March 4, 1851, the *Auckland* arrived at the port of San Francisco. The Japanese were not permitted to leave the ship and were kept in quarantine until March 16. The youngest member of the Japanese crew was a 14-year-old boy named Hizoko. Subsequently, Hizoko changed his name to Joseph Heco and was the first Japanese to become a naturalized U.S. citizen."

Also discusses Dr. Benjamin Franklin Edwards of Alton, Illinois, John H. Lea of Alton, Osborne and Mendel (1917), Garner and Allard (1920), North Carolina, University of Illinois professors William I. Burlison (administration), J.C. Hackleman (extension) and Clyde M. Woodworth (plant breeding). Funk Bros. Seed Co., A.E. Staley Mfg. Co., ADM, Richard Bernard, wild perennial soybeans.

Includes a brief biography and portrait photo of Prof. Hymowitz. Address: Prof. Emeritus, Univ. of Illinois. Phone: 1-800-525-0177.

1551. United States Department of Interior, National Park Service. 2014. National register of historic places registration form: Adrian A. Parsons Farmstead. House and Gardens (Continued–Document part II). Avon, Hendricks County, Indiana. 34 p. 28 cm. [4 ref]
• ***Summary:*** Continued (p. 19): "Parsons' interest in and championing of soybeans, though earlier than anyone in Indiana, had other proponents of the bean in the early 1890s. Experimental agricultural stations in Kansas, Iowa, and Massachusetts were studying potential gains achieved through selective breeding and improving various varieties of soybeans. Parsons and the experimental stations were both attempting to employ the soybean as a means of increasing weight gain in pigs, cows, and sheep, judge the value of the bean as a soil improvement rotation with nitrogen-depleting crops, and maximize benefits while minimizing costs. Parsons' methods of conducting these evaluations may have been more trial and error than those of the stations but his results, his success, proved that he was a diligent applier of sound breeding techniques. His appetite for reading the agricultural literature of the day no doubt opened avenues

of discovery uncommon to many farmers of the period. He discovered early on that pigs fed a combination of corn and soybeans achieved a weight gain in lean mass not just gross weight compared other feeding combinations. An article in a 1916 periodical, *The County Gentleman,* supported his early findings that feeding corn and soybeans was an economical method of achieving lean mass in hogs. He recognized early on that the soybean is an excellent hay plant. By 1900, Parsons entered the market selling soybeans (footnote 9).

"Adrian Parsons, Civil war veteran, educated farmer, and inquisitive breeder of plants, particularly soybeans, changed the agricultural face of Hendricks County, Indiana, forever. His introduction of soybeans into the county in the late 1880s initiated discoveries of the benefits of the soybean to livestock feeding and eventually created a Midwest market that survives today. Indiana's agricultural community, except for Adrian Parsons, did not involve itself with the soybean to any great degree until the early 1900s. Parsons pioneered the bean's acceptance and its use in livestock finishing. He 'spread the word' about soybeans to anyone that would listen and in spite of some level of derision from his peers, he persevered. He developed a working farm during Indiana's agricultural maturation, built functional buildings with an eye to efficiency and progress, and left an example of a farmstead of the period. The numbers tell the tale. In 1920, only 23,110 bushels of soybeans were harvested in Indiana; by 1930, a year after Parsons's death, Indiana farmers harvested nearly 1.4 million bushels (footnote 10). The bean's popularity surely increased due jointly to the efforts of Indiana state agencies and other market forces but in Hendricks County, Indiana, it started with Adrian Parsons."

Developmental History/Additional historic context information Adrian A. Parsons began life in 1846 in Guildford County, North Carolina. He came to Indiana in 1852, along with his parents and other Quaker migrants who eventually settled in Hendricks County, Indiana. His father took up farming in the vicinity of Avon, Indiana and Parsons spent his formative years on that farm. For some unknown reason, Parsons joined up with the Union Army in 1864 at the age of 17 years. Looking back, especially in the context of his Quaker upbringing, it is difficult to reason why he signed up but this contrarian frame of mind would resurface throughout his life and partially explain his internal drive to succeed in any endeavor that challenged him.11

"During his assignment with Company I, 9th Indiana Cavalry Parsons campaigned in Tennessee and North Alabama. His unit participated in the defense of Nashville, against the troops of Confederate General John Bell Hood. In this battle in 1864, Parsons received a nearly mortal wound that plagued him for years to come. According to notes from Parsons's personal note book, '... in the line of duty a Minnie ball passed through my body' and he lay with other wounded and dying soldiers 'in a long narrow cotton shed' for five days. Medical attention arrived on the fourth day and shortly after, Parsons and others found themselves moved into Nashville proper and according to his words they 'were treated royally' (footnote 12).

"Parsons summarized the years immediately after the end of the war thusly, 'Well I pulled through that [his wounding], came home, and married the girl I left behind me...' What he didn't mention in his note book are the years he spent increasing his education at the Danville Academy in Danville, Indiana (a few miles west of the family farm) and the short time he spent at Earlham College in Richmond, Indiana. Somewhere in the early years of his life, Parsons developed a real love and appreciation for the written word. He was a regular recipient of various publications dealing with agricultural issues of the day and later in life, after his developed interest in soybeans became notable, he provided articles to several of these publications on that subject and other farm-related questions/practices (footnote 13).

"Using his advanced education as the means to earn a living, Parsons obtained a teacher's license in 1870 and taught school during the winter months. To augment his small teacher's salary, he farmed during the growing season at a farm south of the present-day town of Avon, Indiana. His first crops were the traditional menu of corn, oats, wheat and husbandry of hogs, poultry and, of course, the primary power source of the day, horses. He began bee-keeping in 1876 and pursued a growing interest in horticulture in general and the necessity for crop rotation in the specific. It's obvious that his reading habits were introducing him to the rapidly growing bank of knowledge about the science of crops. 14

"In 1882, while farming for a living, Parsons ran on the Republican ticket as a candidate for the county recorder's position and won. After winning the elected position, he moved the family to Danville and served out his four-year term there. With an eye to the future and no doubt motivated by his interest in horticulture, Parsons purchased an 82-acre farm along the east bank of White Lick Creek in 1884. Situated in the southern portion of Washington Township, the farm became the focal point for not only a means to support his family but also became the site of his future work in the cultivation of soybeans. Known locally as Wa-Pa-Ka-Way Farm, a name Parsons gave the new purchase in recognition of the Native American identification of the creek that bounded the farm. 15 After Parsons became firmly established in the world of soybean experimentation and propagation, he became active in growing soybean seed for sale and providing inoculated soil to other farmers around the Midwest. As the acreage sowed in soybeans increased over the early years of the twentieth century, Parsons established contact with Joseph E. Wing of Mechanicsburg, Ohio, the owner of the Wing Seed Company. Accurate records of the actual amounts sold to Wing Seed are not available but an account states, 'He [Parsons] sold seed by the carload to the Wing Seed Company of Ohio.' As an understanding for the need to use inoculated soil grew in the

agricultural community 1910s, Parsons developed a business shipping inoculating soil to farmers in Iowa, Ohio, Kentucky, West Virginia, and Illinois. A little bit of Hendricks County, Indiana, went a long way to bring in a good crop of soybeans. 16

"Parsons' reputation as a soybean pioneer in the state of Indiana is a matter of record. His introduction of the plant in the late 1880s and subsequent propagation of interest in the plant set the stage for its acceptance by even his most vocal of critics. As one article from 1931 stated, 'Soy beans were a joke in former years,' and he [Parsons] 'practiced the theory of inoculation while most men scoffed at it.' To say he was ahead of his time is an understatement. The experiment station of Purdue University began seriously studying soybeans in 1898, some years after Parsons began his homegrown breeding activities. His work with soybeans and hog fattening mirrored the work being done at the Kansas Experiment Station where they found that 'hogs fattened with soybean meal' went to market four to five weeks earlier than those fed other fodder (footnote 17)

"Under Parsons's management soybeans and soil were not the only items for sale to other folks. His dairy operation provided butter and milk to the local community. He sold milk to a local manufacturer of ice cream (Ballard Ice Cream), bred and sold livestock, sold chickens and eggs, and, late in life, he took an interest in raising bees. Parsons made presentations to the Indiana State Horticultural Society on occasion. He kept records about almost everything on the farm, including a home recipe spray for aphids, the purchase of land for investment, what he paid for groceries in town, a sugar cure for pork, and a recipe for a corrosive liniment for treating all manners of ailments in horses. A note included with the recipe mentions its use on humans but the list of ingredients would scare most people (footnote 18).

Lee Parsons writes (29 June 2014): "This application is NOT predicated on the erroneous contention that Adrian Parsons was the first person to introduce soybeans to the state of Indiana. It is instead predicated first on the antiquity and exceptional physical integrity of the farmstead as an example of a typical small self-sufficient Indiana farmstead of over a hundred years ago, and second on the connection of this farmstead to a person who made unique and lasting contributions to the development of Indiana agriculture, as Indiana's acknowledged soybean pioneer. Whether Adrian Parsons was or was not the 'first' soybean grower in Indiana (and we all agree he likely was not) is irrelevant to the qualifications of this property for the National Register." Address: Hendricks Co., Indiana.

1552. Parsons, Lee. 2014. Genealogy of the Parsons family of Indiana: Three family group records showing the ancestors of Adrian Parsons. Indianapolis, Indiana. 4 p. 28 cm.
• ***Summary:*** These three family group records were filled out by Lee Parsons for William Shurtleff of Soyfoods Center. Chart 1 shows the family of Adrian Alkanh Parsons (born 7 Nov. 1848 in Guilford Co., North Carolina; died 1 Aug. 1929 in Hendricks Co, Indiana; buried in Maple Hill Cemetery, Plainfield, Indiana) and Mary Mariah Fox (1850-1922), plus their nine children–the second of whom was Norman Edgar.

Chart 2 shows parents of Adrian Alkanh Parsons who were Nelson Yancy Parsons (1826-1875) and Elvira C. Swain (1828-1893), plus their two children: (1) Adrian Alkanh Parsons, and (2) Oliver E. Parsons (born 12 Jan. 1854 in Indiana; died 23 Dec. 1926 in Brownsburg, Indiana).

Chart 3 shows Adrian Parson's grandparents (his father's father and mother), James Parsons (1771-1857) and Mary Bernard (1791-1876). They had seven children: (1) Benjamin Franklin Parsons (1822-1870). (2) Polly Parsons (1824-1828). (3) Nelson Yancy Parsons (1826-1875). (4) Martha Ann Parsons (1928-). (5) Elihu Coleman Parsons (1831-1831). (6) Reuben Fitch Parsons (1833-1862). (7) Amy Eliza Parsons (1836-1911). Address: 5846 Scott Ian Court, Indianapolis, Indiana 46254. Phone: 317-290-9446.

1553. Avis, Nancy E.; Crawford, S.L.; Greendale, G.; Bromberger, J.T.; Everson-Rose, S.A.; Gold, E.B.; Hess, R.; Joffe, H.; Kravitz, H.M.; Tepper, P.G.; et al. 2015. Duration of menopausal vasomotor symptoms over the menopause transition. *JAMA Internal Medicine* 175(4):531-39. April. [49 ref]
• ***Summary:*** "Results: The median total vasomotor symptoms (VMS) duration was 7.4 years. Among 881 women who experienced an observable final menstrual period (FMP), the median post-FMP persistence was 4.5 years. Women who were premenopausal or early perimenopausal when they first reported frequent VMS had the longest total VMS duration (median, >11.8 years) and post-FMP persistence (median, 9.4 years). Women who were postmenopausal at the onset of VMS had the shortest total VMS duration (median, 3.4 years). Compared with women of other racial/ethnic groups, African American women reported the longest total VMS duration (median, 10.1 years). Additional factors related to longer duration of VMS (total VMS duration or post-FMP persistence) were younger age, lower educational level, greater perceived stress and symptom sensitivity, and higher depressive symptoms and anxiety at first report of VMS.

"Conclusions and Relevance: Frequent VMS lasted more than 7 years during the menopausal transition for more than half of the women and persisted for 4.5 years after the FMP. Individual characteristics (e.g., being premenopausal and having greater negative affective factors when first experiencing VMS) were related to longer-lasting VMS. Health care professionals should counsel women to expect that frequent VMS could last more than 7 years, and they may last longer for African American women." Address: 1. Dep. of Social Sciences and Health Policy, Div. of Public Health Sciences, Wake Forest School of Medicine, Winston-

Salem, North Carolina.

1554. Sorensen, Lee. ed. 2015. John Rewald (Web article). *www.dictionaryofarthistorians.org.* Sept. 26. Retrieved. [30 ref]
• ***Summary:*** One of the best biographies seen to date of John Rewald "[nee Gustav, changed to John 1932]." It begins: "Scholar of Impressionism and Cézanne; wrote first scholarly synthesis of Impressionism in the English language. Rewald's father was Bruno Albert Rewald (b. 1885), a chemist, and mother Paula Feinstein (Rewald) (1880-1964) a dentist."

The last lines before the bibliography are: "A street in Aix-en-Provence, where Cézanne lived and worked, is named after him. His son, Paul Rewald, who was a vice president of Sotheby Parke Bernet, died of cancer at age 32 in 1976. His daughter-in-law, Sabine Rewald, is a curator at the Metropolitan Museum of Art."

The full title of this work is "Dictionary of art historians: a biographical dictionary of historians, museum directors and scholars of art."

This entry contains an excellent bibliography of works by and about John Rewald. The work is continually updated. Address: Duke Univ., Nurham, North Carolina.

1555. Gillen, Anne M.; Shelton, Gary W. comps. 2016. Uniform Soybean Tests: Southern States–2015. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/2015SoyBook.pdf
• ***Summary:*** This is the most recent of the Uniform Soybean Tests–Southern States that were started by the U.S. Regional Soybean Lab in 1943 during World War II and are still being continued by the USDA's Agricultural Research Service. An archive is maintained. This document is "coordinated and edited by: Anne M. Gillen and Gary W. Shelton."

Contents: Introduction. Policy on evaluation and release of strains. Uniform test participants. Strain designation. Soybean nursery information: Location contact and tests, planting dates, harvest dates, agronomic characteristics of locations, weather station information.

Methods: Cultural practices, maturity, harvest, and yield, pest assessment, statistical analyses.

Maturity Group IV-S: Uniform, preliminary early, preliminary late. Maturity Group V: Uniform, preliminary early, preliminary late. Maturity Group VI: Uniform, preliminary early, preliminary late. Maturity Group VII: Uniform, preliminary early, preliminary late. Maturity Group VIII: Uniform, preliminary early, preliminary late.

The Introduction states: "The Uniform Soybean Testing Program has been directed toward the testing of elite breeding lines that ultimately leads to the release of varieties. Breeding lines are developed and evaluated in several participating federal and state research programs. As breeding lines demonstrate specific qualities in the individual programs, they are advanced to the preliminary and uniform regional tests conducted in cooperation with research workers in the southern states. This testing program enables breeders to evaluate new strains under a wide variety of conditions, and permits new strains to be put into production in a minimum amount of time. Lines are usually entered only once in the Preliminary Test and then are either dropped or advanced to the Uniform Test for a maximum of three years if performance warrants further testing.

"Eleven uniform test groups have been established to evaluate the best strains developed in the breeding programs. The groups 00 through IV are adapted in the northern part of the United States, and the groups IV-S through VIII are grown in the southern part. Within their area of adaptation, there is a maturity range of 12 to 18 days within each maturity class. The best varieties available in each maturity class are used as check varieties with which to compare new strains as to seed yield, chemical composition, maturity, height, lodging, seed quality, and reaction to diseases and nematodes. For the groups grown in the southern area, the check varieties are: AG4232RR2Y, AG4632RR2Y, LD06-7620, AG3934(RR2), AG4835(RR2), Ellis, AG4933(RR2), Osage, JTN-5203, UA5612, AG5332RR2Y, AG5534(RR2), AG5335(RR2), NC-Roy, NCC06-1090, AG6534, NCC07-8138, AGS738RR, AG7733, N7003CN, NCC06-899, AGS828RR, AG7934, N05-7432, and N8001.

"A wide range of soil and climatic conditions exists in the regions. As an aid in recognizing regional adaptation, the region has been subdivided into five rather broad areas which still represent a wide range of soil types. These are: (1) the East Coast, consisting of the Coastal Plain and Tidewater areas of the eastern shore of Maryland, Virginia, North Carolina, and the upper half of South Carolina; (2) the Southeast, consisting primarily of the Coastal Plain soils of the Gulf Coast area, but also including similar soil from South Carolina, southward; (3) the Upper and Central South, including the Piedmont and loessial hill soils east of the Mississippi River; (4) the Delta area, composed of the alluvial soils along the Mississippi River from southern Missouri, southward; and (5) the West, comprising Arkansas and Louisiana (outside the Delta), Kansas, Oklahoma, and Texas. In the West, the potential soybean-growing areas would include alluvial soils, and the Gulf Coast of Louisiana." Address: USDA Agricultural Research Service, Crop Genetics Unit, P.O. Box 345, Stoneville, Mississippi 38776.

1556. 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.

1557. 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.

1558. Vincent, Paul. 2017. Early soybean harvesters quickly found buyers. *Daily Advance* (*The*) (*Elizabeth City, North Carolina*). Jan. 29.

• ***Summary:*** "Elizabeth City was no doubt at the forefront of a budding agricultural industry when its cotton oil mills began crushing soybeans on a commercial scale by the winter of 1915. The N.C. Department of Agriculture estimated some 200,000 bushels of beans were crushed that year alone. The rapid growth of soybean production in the following years necessitated the capability to harvest the crop at an equally accelerated rate. As a result, Elizabeth City became the base of operations for three prominent and profitable soybean harvester manufacturers.

"The Gordon Bean and Pea Harvester Company, once located at 314 East Matthews St., is considered the earliest of the three harvester manufacturers in the city. Owner LeRoy S. Gordon started producing harvesters in 1909 and was labeled in the agricultural extension service's September 1917 circular as being the 'first machine made in the state for harvesting beans.' By 1916, business was booming and his $120 Gordon Harvester was in high demand across much of northeastern North Carolina. The *Elizabeth City Advance* reported on May 2 of that year how, 'orders for these harvesters are coming in at a rate never before attained.' The article went on to state that an order was placed for 40 harvesters from the company's Hyde County distribution agent.

"George E. Pritchard was another well-known soybean harvester manufacturer in town at this time. This Camden County native moved to Elizabeth City around 1913 and began production of his machine soon after, setting up shop for a time at 604 North Road St. Pritchard's harvester was touted in a 1915 publication, promoting the natural as well as commercial offerings of the city as being, 'the finest on the market and has completely revolutionized the pea harvesting industry.' Popular among farmers and frequently advertised in local newspapers, such as W.O. Saunder's Independent, his Big Jumbo harvester models retailed upwards of $135. Remaining ever competitive in the market, Pritchard patented many improvements on his designs, a handful of which are held in MOA's collection.

"The third soybean harvester manufactured in Elizabeth City was the Scott Machine produced by the Pasquotank Pea Picker Company. Selling for $140, the 600-pound Scott Machine was named for Frank V. Scott who would later head up the Scott Sales Company, which was once headquartered in the former Hinton-Carolina Building. Scott marketed his one- and two-man bean harvesters in the many flourishing soybean growing regions throughout the country. A Nov. 3, 1922 article in The Independent reported his machines were worked on farms in 12 states, including Illinois, South Carolina, Ohio, and Mississippi. One harvester even shipped, 'express to Locust Ridge in Louisiana right near the Texas border.'

"We invite you to learn more about these harvester manufacturers and their impact on the Albemarle region's soybean industry at MOA's next History for Lunch event on Feb. 1 at 12:15 p.m. Al Wood, agricultural extension agent for Pasquotank County, will present a talk entitled 'The Story of Soybeans.' Additionally, come see an authentic Gordon soybean harvester now on display at the Museum.

"Paul Vincent is an artifact collections assistant here at Museum of the Albemarle."

Note: The North Carolina Bureau of Labor Statistics annual report for 1916 lists the Gordon Bean Harvester Company as having been incorporated in 1909 and Leroy S. Gordon as its president. This information is printed on pp. 158-59 under "Miscellaneous Factories," item no. "1257." Address: Collections Assistant, Museum of the Albemarle.

1559. Bakkum, Leila. 2017. Update on American Miso Co. (Interview). *SoyaScan Notes.* June 6. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** In 2016 Great Eastern Sun (GES) sold about 807,500 lbs of organic, non-GMO Miso Master miso made by American Miso Co.–based on GES's internal computerized records.

GES has six SKUs (stock keeping units, or varieties) of miso. Leila calls the first three short-term, light misos and the last three long-term dark misos.

(1) Sweet white miso, aged for 15 days. Accounted for 16.3% of the total in 2016.

(2) Mellow white miso, aged for 30 days. 31.1% of the total.

(3) Chickpea miso, aged for 30 days. 17.8% of the total. Contains no soy.

(4) Red miso, aged for 1 year (365 days). 28.1% of the total. Contains mainly rice, soybeans and salt.

(5) Brown rice miso, aged for 2 years. 3.2% of the total. Contains mainly brown rice, soybeans and salt.

(6) Barley miso, aged for 2 years. 3.4% of the total. Contains mainly barley, soybeans and salt.

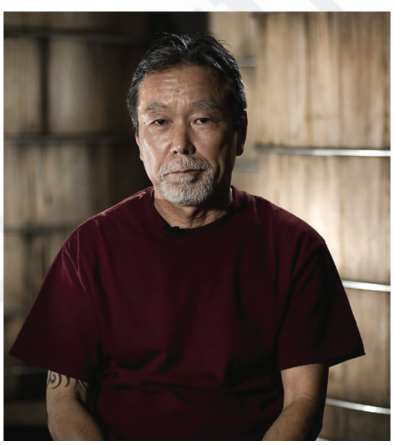
Mellow white miso is the #1 best seller, red miso is #2 (it sells almost the same amount as #1), and chickpea miso is #3.

American Miso Co. is a separate company from Great Eastern Sun (each has its own books) and each is owned by Barry Evans, who now lives in Thailand but he travels throughout East Asia. He visits each of the 4-6 GES suppliers every 9-18 months to ensure their integrity, to get to know the owner and his family, and to develop their personal and business relationship. These suppliers make sea vegetables (3 types), pasta, wasabi, shiitake mushrooms, etc. Barry Evans has real integrity when it comes to the sourcing of the products.

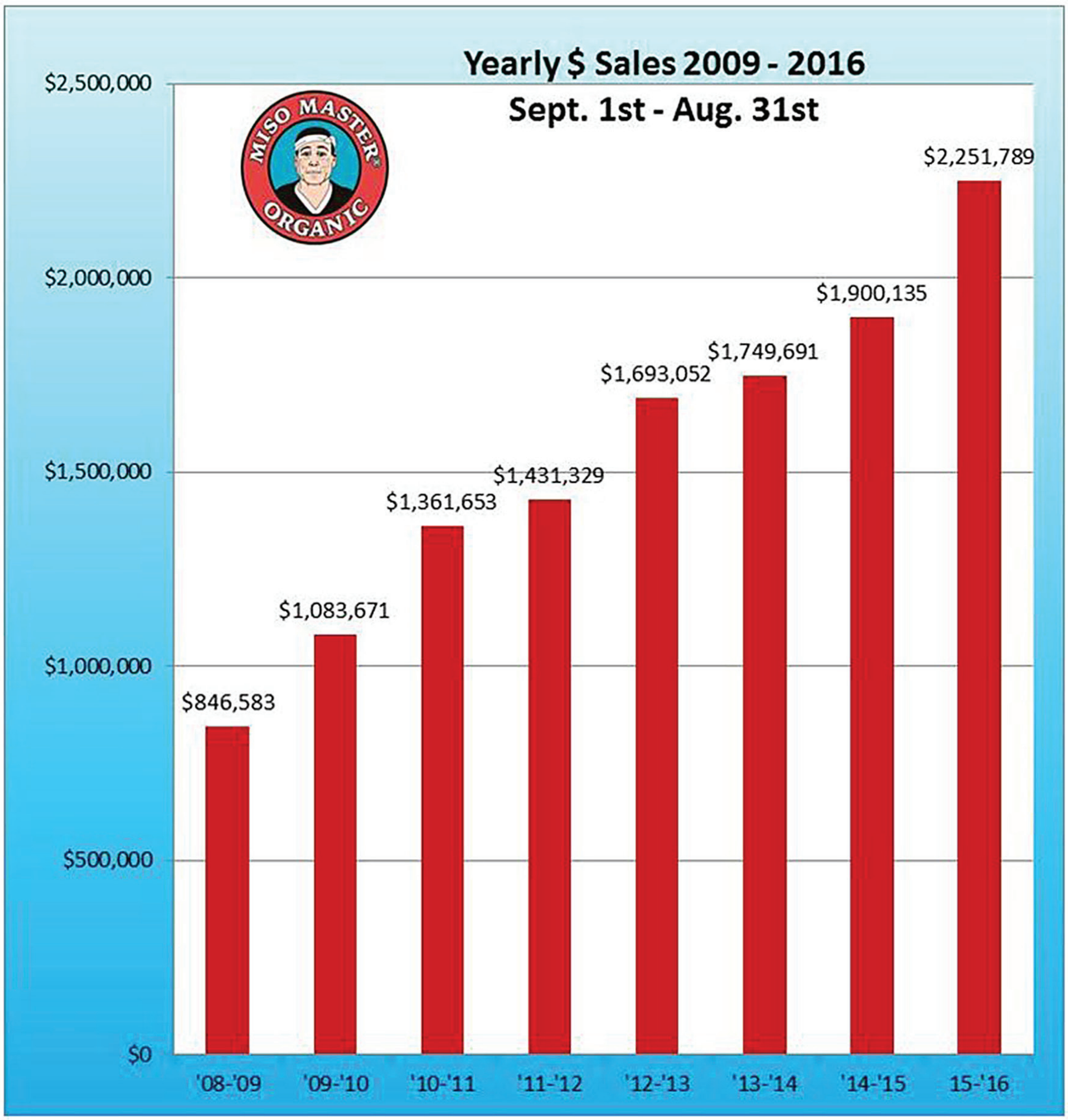
GES is a natural foods company; its products are organic and certified non-GMO. They had the first non-GMO miso in the world and the first non-GMO sea vegetables.

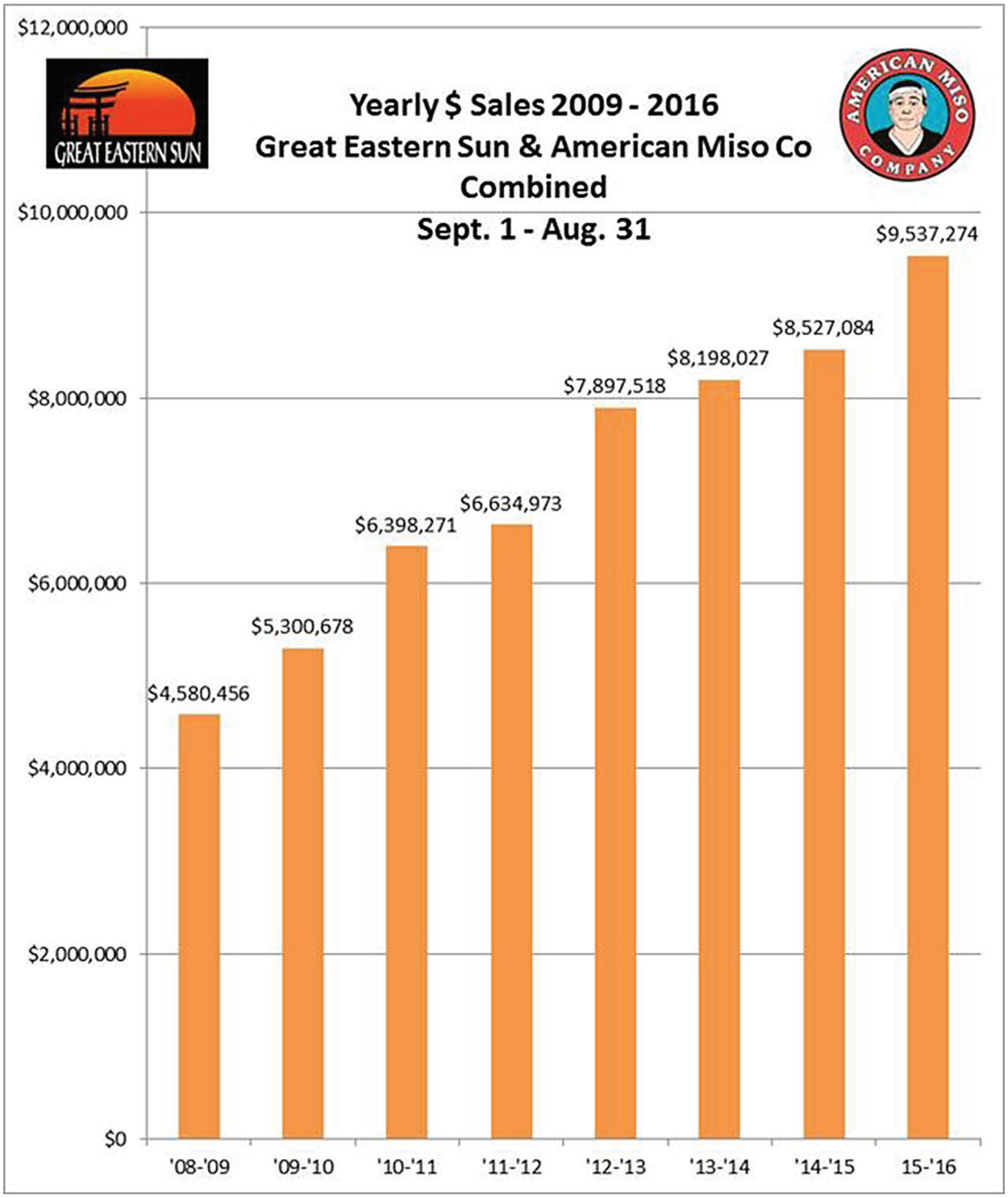
The miso master at American Miso Co. is Joe "Yoshiharu" Kato, who loves his work and speak good


MISO MASTER ORGANIC
PREMIUM ORGANIC
TRADITIONAL RED MISO
Net Wt. 40 lb. (18 kg)
American-Made Using Traditional Japanese Techniques
High Levels of Lactobacillus Probiotic Bacteria
PREMIUM ORGANIC
MELLOW WHITE MISO
Net Wt. 15 lb. (6.8 kg)
American-Made Using Traditional Japanese Techniques
Premium Organic Soy-Free Miso
PREMIUM ORGANIC
CHICKPEA MISO
Net Wt. 4 lb. (1.8 kg)
Unpasteurized • Please Refrigerate
Certified Organic by Quality Assurance International




AMERICAN MADE ORGANIC MISO SINCE 1979
CERTIFIED GLUTEN-FREE
BROWN RICE
MISO MASTER ORGANIC
USDA ORGANIC
NON GMO Project VERIFIED nongmoproject.org
CERTIFIED NSF GLUTEN-FREE
PREMIUM MISO- AGED 2 YEARS
Crafted Using Traditional Japanese Techniques
and Artisanal Hand-Made Koji.
Naturally Aged in Wood through 4 Seasons.
Organic Yesterday, Organic Today, Organic Tomorrow!


Yearly $ Sales 2009 - 2016
Sept. 1st - Aug. 31st
MISO MASTER
ORGANIC
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
$846,583
$1,083,671
$1,361,653
$1,431,329
$1,693,052
$1,749,691
$1,900,135
$2,251,789
'08-'09
'09-'10
'10-'11
'11-'12
'12-'13
'13-'14
'14-'15
15-'16



English but with a distinct Japanese accent. The two all-natural brands of miso in America are Miso Master (American Miso Co.) and South River Miso; each is given a great deal of attention, love and care. They are the only miso companies in America (so far as Leila knows) that do not heat-treat their misos to accelerate the aging process. Other companies also use yeast as an ingredient to speed up the fermentation. On their 3 long-term misos they state on the package how long the miso is aged. Only in the last few years have Americans woken up to the importance of fermented products, unpasteurized products, and living foods. Most people relate to yogurt as the first cultured product.

When Leila goes to trade shows, she never ever serves miso soup. She makes a miso pesto (with sweet white miso) to be served on pasta, a miso barbecue sauce, miso mixed with maple syrup (nice on ice cream), miso salad dressing, miso marinade; everyone at trade shows associates miso with miso soup.

Great Eastern Sun deserves a lot of credit for the advent and rise in popularity of miso because they go to so many trade shows and expos (including fancy food shows) where they introduce people to miso; Leila attends each of these herself and its exhausting. At every one she is proselytizing

and preaching about miso. Rarely does she talk about the health benefits of miso. They want to know, “How do I use this as an ingredient outside of miso soup.” She wants to get people excited about other ways of using miso. “When they taste that miso pesto, you can just see their eyes light up.”

Leila also has a great idea for a delicious coffee alternative named Miso Sip; here’s the link to her video: www.misosip.com–for a misolicious day,

Dr. Michael Gregor just came out with a study on the effect of fermentation on the salt in miso. Fermentation changes the salt, beneficially. Check out his video: https://tinyurl.com/ya5b98um

On the GES website (www.great-eastern-sun.com) are five professional videos. Click on media. They are: The Miso Master story (6 min.). Making authentic Miso Master miso (3 min.). 3. Whole Foods interviews American Miso (3:24). (4) New uses for Miso Master Miso (0:58; shows how to make miso pesto, served on pasta). (5) American Miso made in Rutherfordton, NC (2:21, featuring Joe Kato. A traditional Japanese seasoning has been made in the mountains of North Carolina for 35 years).

In 2015 the following brands of miso were sold in the United States: Miso Master, South River, Westbrae, Cold Mountain, Eden, Mitoku, Hikari, Hanamaruki, Marukome, Ohsawa, and Muso.

Photos show: (a-b) American Miso Company’s retail and bulk miso products. (c) A lid of one product showing the length of time this long-term miso is aged. (d) Miso Master Joe Kato. (e) Miso aging/maturing in wooden vats. (f) Yearly sales of Miso Master miso from 2008-09 to 2015-16. (g) Yearly sales of Great Eastern Sun and American Miso Co. combined from 2008-09 to 2015-16. Address: National Sales Director, Great Eastern Sun Trading Co., 92 Macintosh Rd., Asheville, North Carolina 28806.

1560. USDA National Agricultural Statistics Service. 2017. 2016 Agricultural Statistics North Carolina. http://www.ncagr.gov/stats/2016AgStat/AgStat2016.pdf 142 p.

• ***Summary:*** Page 61: Annual crop summary, 2015: Soybeans are the leading crop in North Carolina in terms of acres harvested. Soybeans: 1,790,000 acres. Hay (all types) 777,000 acres. Corn for grain: 730,000 Tobacco (all types): 173,000 acres.

Soybeans are the #2 leading crop, after tobacco, in terms of value to North Carolina farmers. Tobacco (all types): $703,648. Soybeans: $486,880,000. Corn for grain: $354,707,000.

The leading soybean producing counties in North Carolina in 2015 are (in bushels):

Beaufort 2,780,000
Sampson 2,435,000
Robeson 2,425,000
Wayne 2,219,000
Pitt 2,200,000
Duplin 2,080,000
Union 1,985,000
Perquimans 1,828,000
Washington 1,759,000
Columbus 1,730,000 Address: Raleigh, North Carolina.

1561. Spots at front of book: History of soybeans and soyfoods in North Carolina. 2017.

• ***Summary:*** (a) Map of North Carolina showing major cities and waterways, plus surrounding states. (b) Physical map of North Carolina. (c) Green and white map of North Carolina showing recent production and ranking of soybean producing counties (2017). (d) Sign announcing that in 1915 domestically-grown soybeans were first processed commercially at a plant near here. (e) Map of soybean production in North Carolina (1944). (f) Graph of soybean production in North Carolina (1924-2014). (g) Map of North Carolina showing the three main divisions of the state in 1917. (h) Mechanical drawing of a 1917 Pritchard Bean Harvester. (m & n) Data on value of soybeans in North Carolina from 1924 to 2016.

1562. *SoyaScan Notes.* 2017. Chronology of miso and soybean chiang. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1st century B.C.–Soybean chiang is first mentioned in China in the *Shih chi* [*Historical records*] by Ssu-ma Ch’ien, and in the *Chi chiu p’ien* [*Primer on addressing matters*], by Shih Yu.

535 A.D.–The *Ch’i min yao shu* in China gives the first detailed descriptions of making soybean chiang–and other soyfoods.

701–Soybean hishio, miso, and fermented black soybeans start to be made in Japan by the *Hishio Tsukasa,* a government bureau. References to these seasonings are found in documents published between 730 and 748.

901-08–The modern word for *miso* first appears in Japan in the *Sandai Jitsuroku.*

927–The *Engi Shiki* gives the first details about the production of soybean hishio-miso in Japan.

1597–Miso is first mentioned by a Westerner, the Florentine Francesco Carletti; he calls it *misol.*

1712–Englebert Kaempfer, a German who lived in Japan, is the first European to give detailed descriptions of how miso and shoyu are made in Japan. Also mentions koji.

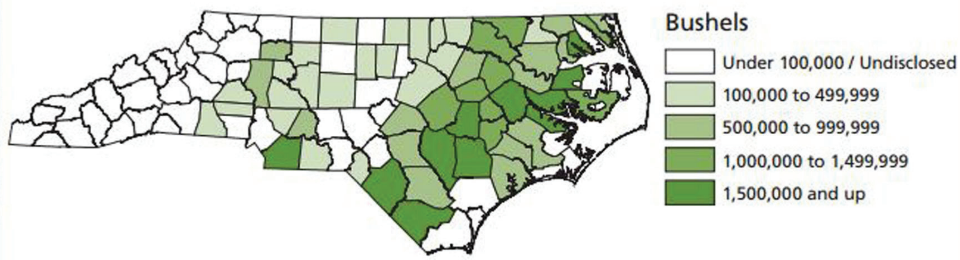
1727–Miso is first mentioned in an English-language publications, *The History of Japan,* by E. Kaempfer. He spells it *“Midsu,* a mealy Pap, which they dress their Victuals withal, as we do butter.”

1779–The word “miso” (“that is used as butter”) first appears in an English-language publication, the *Encyclopaedia Britannica.* 1847–The word “miso” first appears in print in the United States, in a letter from T.W.H. of Cambridge, Massachusetts, to the *Farmers’ Cabinet and*

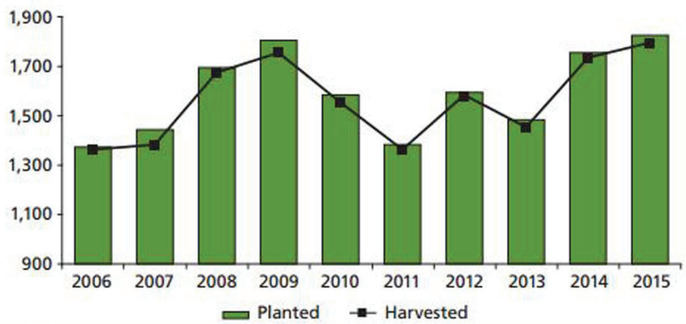
SOYBEANS
2015 Production

Leading Counties [1]	*Bushels*
Beaufort	2,780,000
Sampson	2,435,000
Robeson	2,425,000
Wayne	2,219,000
Pitt	2,200,000
Duplin	2,080,000
Union	1,985,000
Perquimans	1,828,000
Washington	1,759,000
Columbus	1,730,000

[1] *Ranking of published counties only.*



SOYBEANS
Planted and Harvested *(Thousand Acres)*



Herd Book.

1908–Miso is first made commercially in the continental United States by the Fujimoto Co. of San Francisco, California. Brand name: Kanemasa Miso.

1921–The term "bean paste" is first used to refer to miso by J.L. North of England in the *Illustrated London News.*

1929–Amano Brothers, Canada's first commercial miso maker, starts in Vancouver, British Columbia. Founder: Mr. Teiichi Amano. 1960–Dr. C.W. Hesseltine and K. Shibasaki, of the Northern Regional Research Laboratory in Peoria, Illinois, publish the first of many important scientific articles on miso.

1963–Michio and Aveline Kushi, teachers of macrobiotics in Boston, start to teach Americans about miso.

1966 April–Aveline Kushi (with Evan Root) starts Erewhon, a pioneering retailer in Boston, that soon starts selling miso.

1968–Erewhon expands to become an importer and distributor of natural and macrobiotic food. Their first two misos, Mugi Miso and Hacho Miso, are imported from Japan.

1976 June–Miyako Oriental Foods, a division of Yamajirushi Miso Co. in Japan, starts making miso in Los Angeles. Owned by Noritoshi Kanai. Brands: Yamajirushi, Kanemasa, Yamaizumi.

1976 Sept.–*The Book of Miso,* by Shurtleff and Aoyagi, is published by Autumn Press of Hayama, Japan. This is the first book about miso in the Western world.

1978 Oct.–The Ohio Miso Co., the first Caucasian-run miso company in the Western world, is founded by Thom Leonard and Richard Kluding. They begin miso production on 13 March 1979.

1978 Nov.–Joel Dee of Edward & Sons (New Jersey) launches Natural Instant Miso Cup, an instant miso soup made with freeze-dried miso from Japan.

1978 Dec.–Miyako Oriental Foods of Los Angeles introduces Cold Mountain Firm Granular Rice Koji, the first koji sold commercially in the USA. In 1979 they start selling Cold Mountain Miso, the first miso with an American-style brand.

1979 Oct.–John and Jan Belleme arrive in Japan to study traditional miso–and koji-making with the Onozaki family in Yaita, Japan. They are the first Caucasians to do this, and then to return to the West to start making miso commercially. From 1981 on they write many superb articles about miso, published in America.

1979 April–Shin-Mei-Do Miso is founded by Lulu and Yasuo Yoshihara in British Columbia, Canada.

1981 April–John Troy of Elf Works, Ltd. in Chapel Hill, North Carolina, launches Hot Stuff, an early and very successful American miso product. He first learned about miso from Joel Dee.

1981 Aug.–John and Jan Belleme begin full-time, large-scale production of miso and koji at Erewhon Miso Co. in Rutherfordton, North Carolina. By early 1982 their company is renamed American Miso Co. with Barry Evans as the new

owner.

1982 Oct. 25–Christian and Gaella Elwell start making miso and koji at South River Miso Co. in Conway, Massachusetts. Earlier that year they purchased The Ohio Miso Co. Address: Lafayette, California. Phone: 925-283-2991.

An asterisk (*) at the end of the record means that SOYINFO CENTER does not own that document.3000A plus after eng (eng+) means that SOYINFO CENTER has done a partial or complete translation into English of that document.3000An asterisk in a listing of number of references [23* ref] means that most of these references are not about soybeans or soyfoods.

SUBJECT/GEOGRAPHICAL INDEX BY RECORD NUMBERS

Zea mays. *See* Corn / Maize