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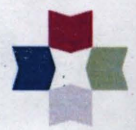
Soy-sauce manufacturing in Kwangtung, China

Elizabeth Howry Groff

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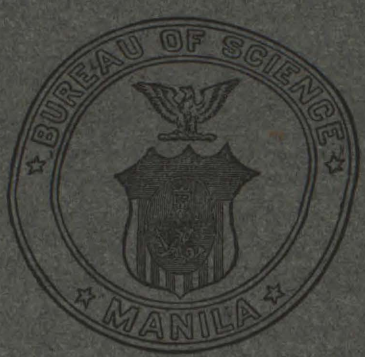

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SOY-SAUCE MANUFACTURING IN KWANGTUNG, CHINA[1]

By ELIZABETH H. GROFF

Of Canton, China

SEVEN PLATES

After a Chinese provides himself with rice, a little meat, and some vegetables, nothing is probably more important to him than the sauces which he eats with his food. In the book of Chau Lai (周禮),[2] the ceremonial rites of the Chau Dynasty (周朝), written before 1000 B. C., we read that the king's cook used one hundred twenty jars of sauces. Thus the written records of the Chinese show that they have been using these sauces for over three thousand years.

Soy sauce, known among the Chinese as *Ch'au yau* (抽油), "drawing oil," or *pāk yau* (白油), "white oil," is without question the best liked and most widely used. Kwangtung Province is famous all over China for the soy sauce which it produces. Canton as its capital is naturally the center of all this trade. Wholesale shops can be found in great numbers, and practically every food shop sells soy sauce. Each neighborhood also has its peddler who goes from door to door selling soy and other sauces. In Canton, jars of soy can always be seen in the making, as much of it is placed on the roofs to sun.

Sainam (西南), "southwest," a city of about 30,000 inhabitants, 50 miles southwest of Canton on the Samshui (冰三), "Three Waters," Railway, is famous for the excellent quality of soy that it produces. The first-class shops in Canton all have signs advertising Sainam *Ch'au yau* (西南抽油), "Sainam soy sauce," although most of this soy is made locally in their own establishments.

The process of securing information on the making of soy sauce is lengthy and difficult, and accurate data can only be obtained after months of experiment carried on with the help of a workman who has grown up in one of these establishments.

[1] All Chinese characters in the Cantonese are romanized according to the Eitel-Genaho Dictionary, but some of the diacritical marks are omitted.

[2] Chau Lai is one of the thirteen classics of Confucius.

Frequently a soy-sauce manufacturer will smile at the questions asked him and answer: "We pay workmen to tell us those things. Why don't you do the same?"

The methods of approaching Chinese with regard to the process of manufacture are intricate. Unlimited time, knowledge of Chinese customs, and courtesy are all important factors to success. It is often necessary to work through three or four Chinese before the man can be secured who will properly introduce one to the manufacturer from whom accurate data are to be obtained. Many hours of friendly chatting over tea and cakes must be spent with these men before the business in hand can be approached. But when the final introduction takes place, one is treated as an old friend and every courtesy is tendered.

The manager of a large sauce-manufacturing plant, On Shing Lung (安盛隆), at "West Gate" (西門) Sai Mun, was approached with this method. He has given full access to his books, allowed his head workmen to spend hours talking and answering questions, and has shown a keen interest in the investigations.

THE EQUIPMENT OF A SOY BEAN MANUFACTURING PLANT

Grounds and buildings.—The equipment in the largest establishments is very meager and differs from the small establishments only in capacity. In the average factory about one-third of the ground is covered with one-story buildings, which are usually built of gray brick and roofed with Canton tile. They are divided into storerooms, boiling shed, workmen's quarters, and mold room. The buildings usually surround the four sides of the plot, with a large court in the center for the sunning of the soy sauce.

Boiling shed.—The shed in which the beans are boiled is large enough to store sufficient raw materials for one boiling and for the board on which the beans and flour are mixed. The iron pan *t'it wok* (鐵鑊), in which the beans are boiled is semi-spherical, varies in size and price, and is sold by weight at about 14 dollars local silver[3] for 100 catties.[4] A pan large enough to boil 700 catties of beans can be purchased for about 100 dollars local silver. Its diameter is 52 inches, and its depth

[3] Local silver, at the present rate (1918), is worth about 1.05 dollars for 1 dollar Hongkong currency; 1.30 dollars Hongkong currency are worth 1 dollar United States gold.

[4] One catty is equal to one and one-third pounds.

is 32 inches. The brick oven constructed around this pan costs about 100 dollars local silver additional (Plate I).

Mold room.—The mold room is usually placed to the north so that the doors which control the light and ventilation, very essential to good mold, can be opened to the south and plenty of sunlight allowed to enter. This room can be made almost completely dark by the closing of these doors. It contains wooden racks on which the trays of beans and flour are placed to mold (Plate II, fig. 1).

Jars.—Brown earthenware cylindrical jars known as Shiuhing *kong* (肇慶缸)—now no longer manufactured—are the ones preferably used to sun the beans, salt, and water (Plate V, fig. 2). The Tsinguen *kong* (清遠缸), a brown earthenware jar of inferior quality but with the same contour as the Shiuhing jar, is now the only jar obtainable on the market. These jars are so named because they are manufactured in Shiuhing and Tsinguen, cities of Kwangtung. The Tsinguen jar leaks very easily, and the manufacturers prefer repaired Shiuhing jars to this inferior Tsinguen jar. The latter jar, 19.5 inches in diameter and 18.5 inches deep, with a capacity of 180 catties, can be purchased for 1.70 dollars local silver. About one thousand of these jars are kept in the sunning yard at one time, although at times only about two-thirds of them are in use. The Chinese believe that the jars are greatly improved by long sunning, and when space permits the jars are allowed to sun in the court yard for months at a time.

Racks.—The mold room is filled with crudely constructed wooden racks with horizontal partitions every 5 inches, on which are placed the trays of beans for molding (Plate II, fig. 2).

Trays.—Two types of trays are used, the commonest being the circular bamboo tray, *wo* (篢), made in Canton (Plate VII, fig. 1). This tray can be purchased in any size, but the most commonly used for soy making is about 3 feet in diameter with a rim of 1.5 inches. This tray is in general use in Canton for the making of many different sauces and the drying of vegetables. In order to save space many manufacturers construct light wooden frames with horizontal strips of bamboo placed close enough to support a very inferior quality of matting (Plate IV, fig. 1). These trays are made so as to fit the racks snugly. They are usually about 5 feet 2 inches long and 3 feet 9 inches wide. The matting for this size of tray can be purchased for 60 cents local silver. This seems to be an excellent method, for the matting can be replaced when worn out.

Baskets.—The bamboo baskets, *lo* (籮), used to drain the beans after they are boiled are round at the top and narrow toward the bottom, which is flat and more square than round. Various sizes can be purchased, but the commonest are 15 inches deep. They cost about 65 cents local silver each (Plate IV, fig. 2).

Covers.—Nothing is more important than a good cover with which to protect the sauce at night and when it rains (Plate V, fig. 1). A standard conical bamboo cover, 21 inches in diameter and 12 inches high, is used. These fit snugly over the top of the cylindrical jars and can be purchased for 35 cents each. This cover is called *tsim teng chuk lap* (尖頂竹笠), "pointed top bamboo."

Raw materials.—The raw materials used in the making of soy sauce are soy beans (Plate VI, fig. 1), flour, salt, and water. All of these are available in great quantity on the Canton market. The *wong kam tau* (黃金豆), "yellow bean," grown in Manchuria and known as coming from Ngau Chong (牛莊), is recognized as the best variety of soy bean to be used. This bean is yellow and is slightly smaller than the American soup bean; the outside coat is thick and tough and does not break apart easily after the bean is boiled. The Chinese consider this characteristic to be very important, for they wish to keep the bean as much intact as possible for the molding process. *T'o fui min* (土灰麵), local third wheat flour," comes from Kwangtung. The *shaang im* (生鹽), "raw salt," comes from Tientsin.

Method of mixing.—Soy sauce can be made in almost any quantity, but the beans mold much better and faster in large quantities. It is very difficult to obtain figures on the amounts of materials that are used. Each maker will tell you that he fills his iron sauce pan with beans and buys sufficient flour to mix with it and adds the salt solution at the proper time. In order to secure satisfactory data on the quantity of material used, it is necessary to be present when each process takes place.

Boiling of beans.—One Canton manufacturer [5] purchases 1,400 catties of beans at one time, dividing them into two boilings. This amount of beans, together with 1,200 catties of flour, provides sufficient molded beans to stock thirty-six jars. The beans are placed in a large iron pan (Plate I) and covered with about 1,100 catties of water. They are then boiled until soft. Care must be taken that the outside coat does not break.

[5] The establishment referred to on page 308.

The length of time required to soften the beans depends entirely upon the amount of heat applied. Another satisfactory process is to drop the beans into boiling water. The makers use both methods. If the beans are boiled constantly, three to four hours are sufficient for the softening process. However, in order to save time, many of the shops boil the beans at night, allowing the fire to die out and then removing the beans at about 4 o'clock in the morning. They are then placed in bamboo baskets, allowed to drain, and become almost cold before being mixed with the flour (Plate IV, fig. 2).

Mixing of beans and flour.—The beans are then poured upon the mixing board, two baskets at a time. Two men stand, one on either side of the board, and thoroughly mix the beans and flour with their hands. Care must be taken that each bean is covered with flour. This mixture of flour and beans is then placed on the trays to a thickness of about 1.5 inches, and the hand is used to furrow them so that they get proper ventilation (Plate II, fig. 2). The mixture remains in the mold room from one to two weeks, depending entirely upon the time of year and the weather. Much less time is needed in the hot rainy season. After the middle of November the manufacturing plants stop boiling beans and do not begin again until the spring season opens in February, as the weather during this period is unfavorable to produce the mold. After the beans are placed on the trays, they begin to mold in about three days.

Mold.—The natural yellow mold is probably a species of *Aspergillus*, and the undesirable black is a *Mucor*.[6] Care must be taken that only the yellow mold is used in the making of soy, and all black mold should be removed before placing in the jars of salt water (Plate VI, fig. 2).

Method of sunning beans and flour.—The mold from 1,400 catties of beans and 1,200 catties of flour is divided into thirty-six jars. A salt solution, of 150 catties of water to 40 catties of salt, is then poured into the jars until they are full. The salt solution is thoroughly cleaned before using by allowing the dirt to settle and then pouring off the solution. The jars of bean-flour mold and salt water are then placed in the yard to sun where they remain from two to six months (Plate V, fig. 2). The longer the period of time the better. Most of the shops,

[6] These general determinations were made by Prof. C. W. Howard, biologist at the Canton Christian College, who is making cultures for further study.

however, make the first drawing in from three to four months. At night or when it rains, the jars must be covered with bamboo covers. This sunning process results in an evaporation of the liquid in the jars; and three days before the drawing off of the soy, salt solution is used again to fill the jars. The first drawing is then made by siphon, *kwo kong lung* (過缸嚨) (Plate III, fig. 1). About 60 catties of the liquid are drawn off. This liquid is allowed to settle and is again drawn off, reducing the quantity to about 50 catties. It is then placed in clean jars and allowed to sun again for from one to six months. Some of this soy is at times allowed to sun for three years, but this is too expensive and is rarely done commercially.

First drawing.—This soy is called *teng ch'au* (頂抽), "first drawing." The material that remains in the jar is called *teng shi* (原鼓), "first salted," and is sold as a separate sauce, used as the base of a number of different sauces or as the base for the "second drawing," *i ch'au* (二抽).

Second drawing.—A salt solution of 150 catties of water and 30 catties of salt is now poured on the *teng shi,* or the beans which remain in the jar from the first drawing. The jars are again placed in the sun for from one to two months. Salt water is again added three days before the drawing, after which the soy is drawn off, about 50 catties, after it is cleaned, and placed in the sun from one to two months. This is called *i ch'au* (二抽), "second drawing." The material which remains in the jar is called *ün shi* (原鼓), "beginning salted," and is sold as a sauce for 4 cents per catty, used as the base of a number of other sauces and as the base for *sām ch'au* (三抽), "third drawing."

Third drawing.—The same method is used in the making of *sām ch'au* as in *i ch'au* and the material which remains is called *chung shi* (中鼓), "middle salted." This is sold as a sauce at 2 cents per catty, used as the base of a number of different sauces and as the base for *sz ch'au* (四抽), fourth drawing."

Fourth drawing.—This is made the same as *i ch'au, sām ch'au,* and *sz ch'au,* and the material left in the jars is also called *chung shi* (中鼓) and is sold as a sauce at 1 cent per catty; it is used as the base of a number of very cheap sauces.

Boiling method.—The sunning method takes so much time that many of the manufacturers boil the second, third, and fourth drawings instead of sunning them. This makes a decidedly

inferior quality of soy, but it can be sold very cheaply. After the soy is drawn from the beans, it is placed in an iron pan and boiled from two to four hours. The longer the better, but it must be boiled at the least two hours or it will not keep. It is then taken off and allowed to cool and is ready for salt. The manufacturers never boil the first drawing. They always sun this and sell it for their finest grade.

Mixing of soy.—It is interesting to note that of the four drawings of soy the only drawing that is sold as it is drawn is the *teng ch'au* (頂 抽), "first drawing." The others are all mixed together and are sold under the names of the price they cost per catty. This mixing process is shown in the list of samples submitted.

Prices of raw materials.—The prices of beans and flour vary considerably, but the soy beans, *wong kam tau* (黃 金 豆), can be bought for about 6 cents per catty wholesale; the flour, *t'o fui min* (土 灰 麵), for about 6.5 cents per catty; and the salt, *shāng im* (生 鹽), for about 4 cents per catty. The retail price is 8 cents per catty for the beans, 10 cents per catty for the flour, and 5 cents per catty for the salt. The manufacturers figure that the materials for one jar cost about 8.50 dollars. They expect to sell the different grades of soy and the beans left for about 14 dollars. This does not include labor, equipment, rent, etc. Candied molasses, *kat shui* (桔 水), which is added to the very cheapest soy as a coloring and to sweeten it, costs about 8 cents per catty.

Sainam soy.—Sainam, 50 miles distant from Canton on the Samshui Railway, is famous for its soy. The establishments there are much larger than in Canton, and a superior quality of soy is produced. There are eight factories, all of about the same capacity, doing a business of over 100,000 dollars a year. The methods used in Sainam appear to be the same as those used in Canton, the only noticeable difference being in the quality of materials used. The Sainam soy makers advise buying the very best quality of raw materials, while the Canton manufacturers are content with materials of inferior grade. They believe that these inferior materials make just as good soy. The yards in Sainam also are very spacious, allowing the manufacturers to sun their product to better advantage. Ground is much less costly, and hence the sunning process is not so expensive. In one yard it was also noted that there were about five hundred jars not in use which were being sunned. Both

Canton and Sainam makers believe it is an excellent plan to sun jars. Limited space in Canton makes this impossible except on a small scale.

Making soy from rice.—Many of the village people make their own soy from the rice that has stuck to the bottom of the vessel in which it is boiled. A handful of rice is pressed into a ball and sprinkled with hot water. These balls are placed in a covered jar and allowed to mold. In about two weeks these balls are placed in salt solution, using one part of salt to five of water. Two parts of rice are used to three parts of salt solution. The more rice used the stronger the sauce will be. This is then sunned as the regular soy and produces a very inferior grade of rice soy, which is used by the poorer classes of Chinese as a substitute for the soy-bean sauce.

Soy samples and prices gathered on the Canton market.—There is no soy standard, but the different grades of soy are known in most of the shops as follows:

T' in teng ch'au yau (天頂抽油), "best selected drawn oil." Retailed at 40 cents local silver per catty. Made of *teng ch'au* (頂抽), "first drawing," which has been sunned four months after "drawing off."

Tsin pat ch'au yau (錢八抽油), "fourteen cents per catty drawing oil." This is made of the "first drawing" which has been sunned two months after "drawing off."

Kau luk ch'au yau (九六抽油), "eleven cents per catty *ch'au yau.*" Made of 50 per cent of the "first drawing" and 50 per cent of the "second drawing."

Sz pat ch'au yau (西八抽油), "eight cents per catty drawing oil." Made of 25 per cent each of "first drawing," "second drawing," "third drawing," and "fourth drawing."

Sam luk chung ch'au (三六抽油), "six cents per catty middle drawing." Made of 50 per cent salt solution, 50 per cent "third drawing" and "fourth drawing," and colored with candied molasses, *kat shui.*

Sheung pāk yau (上白油), "upper white oil." This is sold at 4 cents per catty and is made of 50 per cent salt and water and 50 per cent *sz ch'au,* "fourth drawing," and colored and sweetened with candied molasses, *kat shui.*

Pāt sin shāng ch'au (八仙生抽), "eight cents raw drawing." This is made of equal parts of "first drawing" and "second drawing," but after it has been drawn off the beans it is not boiled or sunned. This soy is used for soup and does not keep longer than about a week.

ILLUSTRATIONS

PLATE I

The iron pan in which the soy beans for the making of soy sauce are boiled is used extensively in all sauce-manufacturing establishments; it varies greatly in size and is sold by weight. Note the bamboo basket fastened to a bamboo pole, by which the beans are removed from the pan.

PLATE II

FIG. 1. The dark room in which the beans and flour used in the making of soy sauce are allowed to mold. The light and the ventilation, very essential to good mold, are controlled by doors, which open to the south. Trays of beans and flour now in the process of molding. The man in the picture is the head soy maker in this establishment.

2. The beans and flour, used in the making of soy, are thoroughly mixed and placed in rudely constructed wooden racks in the dark room for the molding process.

PLATE III

FIG. 1. Soy sauce being drawn from the beans by means of a siphon. Great care must be taken not to stir the beans. The material which remains in the jar is called *teng shi*, and is sold as a separate sauce or is used as the base of the second drawing of soy.

2. The first drawing of soy, *t'in teng chau yau*, which is placed in clean jars and again sunned from two to six months.

PLATE IV

FIG. 1. This light wooden frame, with horizontal strips of bamboo placed close enough to support the matting on which the soy beans and flour are placed for molding, is frequently used in place of the circular bamboo tray in order to conserve space.

2. The bamboo baskets, in which the boiled soy beans are placed to cool and drain, are round at the top and narrower toward the bottom, which is flat and almost square.

PLATE V

FIG. 1. The conical bamboo covers, which are used to protect the jars at night and when it rains.

2. Rows of the standard-sized soy-sauce jars filled with the molded beans and flour and salt water. These remain in this position from two to six months. Note the conical bamboo covers in position for the quick covering of the jars in case of rain.

PLATE VI

FIG. 1. The soy beans shown here are natural size; they are yellow and have a thick outer coat. Great care is taken that the beans do not become mashed.

2. Beans and flour, which have been in the mold room for five days. The natural yellow mold is probably a species of *Aspergillus*, and the undesirable black mold is *Mucor*.

PLATE VII

FIG. 1. The circular bamboo tray that is commonly used in the making of soy and many other sauces and in drying vegetables. The trays have been stacked and are ready for removal to a storage shed.

2. Soy sauce ready for shipment to northern China. It is placed in sealed earthenware jars, which are incased in bamboo holders.

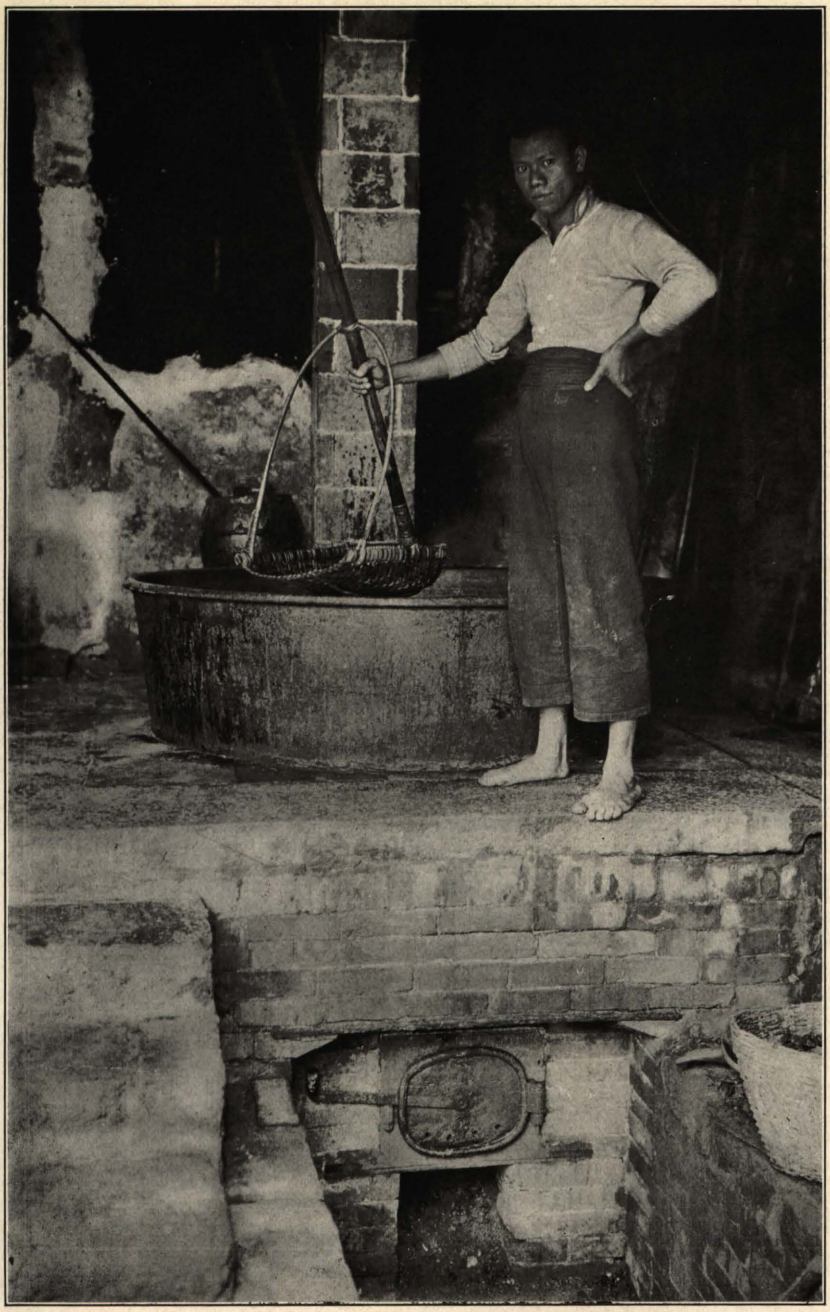

PLATE I. THE IRON PAN IN WHICH THE SOY BEANS ARE BOILED.

Fig. 1. The dark room.

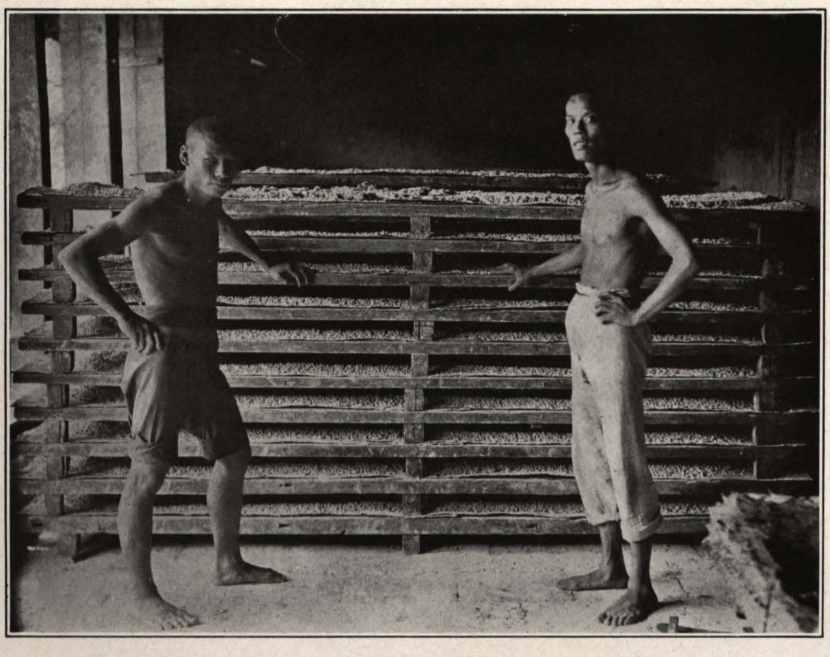

Fig. 2. Racks in the dark room.

PLATE II.

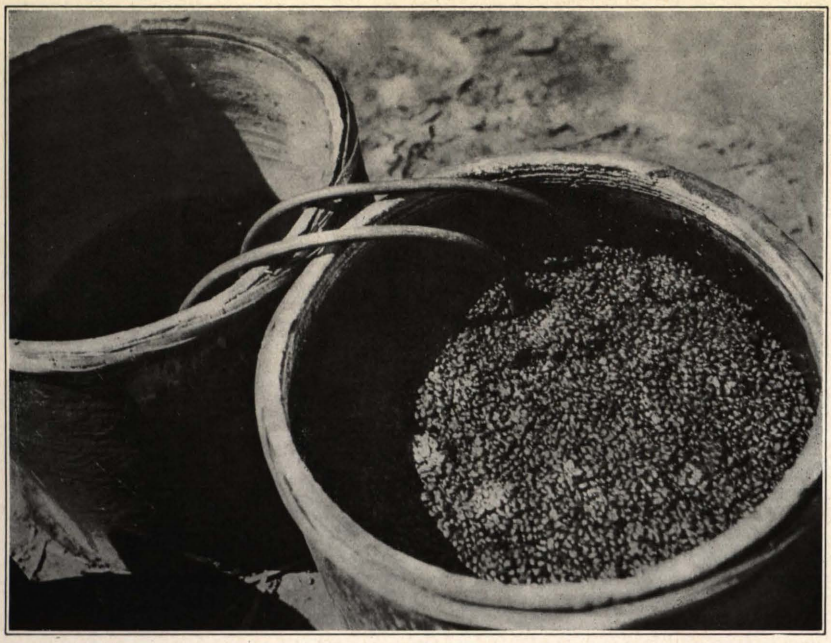

Fig. 1. Soy sauce being drawn by means of a siphon.

Fig. 2. The first drawing of soy.

PLATE III.

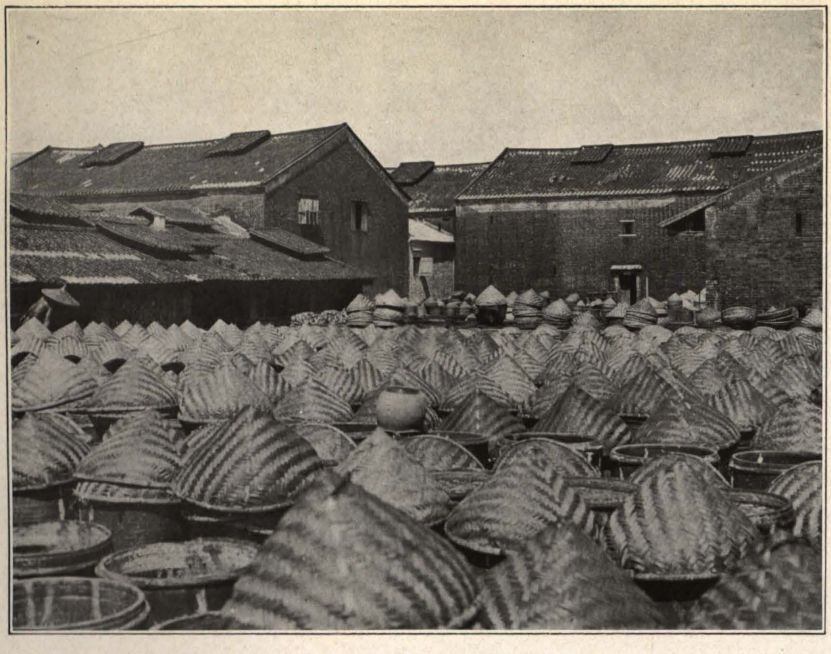

Fig. 1. Conical bamboo covers.

Fig. 2. Soy-sauce jars.

PLATE V.

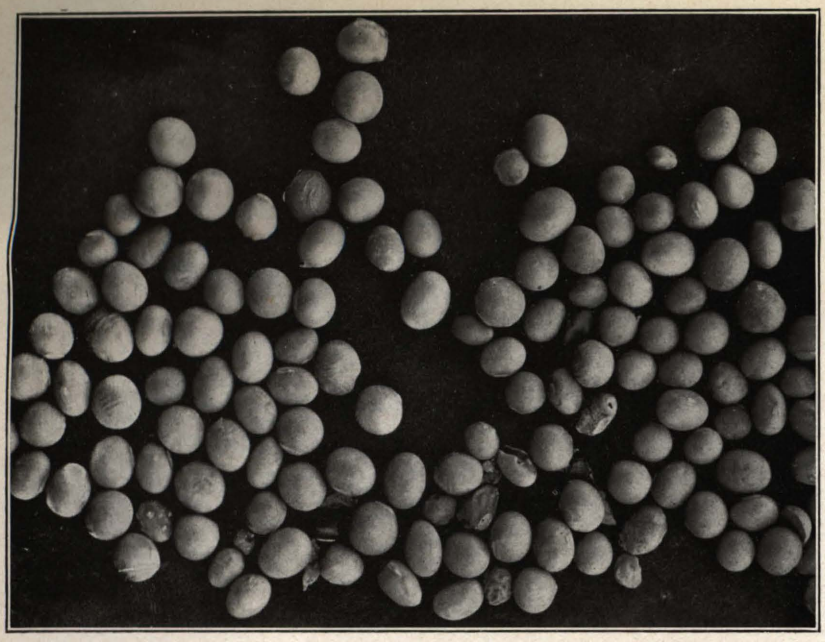

Fig. 1. Soy beans, natural size.

Fig. 2. Soy beans and flour, five days in the mold room.

PLATE VI.

Fig. 1. Circular bamboo trays.

Fig. 2. Soy sauce ready for shipment.

PLATE VII.

Date Due

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