

GROUP 87.

VEGETABLE FOOD PRODUCTS—AGRICULTURAL SEEDS.

Miscellaneous Plants and Their Products.

NOTES ON CHINA TEA.

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The tea plant has been cultivated by the Chinese for more than a thousand years—some hold for fifteen hundred—and native tradition says that it was discovered by Chin Nung, who lived 2737 B. C. Whether this latter statement be true or not, the infusion of its dried leaves as a beverage is mentioned by a Chinese writer of the sixth century, and in 793 A. D., a tax was levied on tea by the government, (Enclo. Brit.) The early travelers from the West—Portuguese, Dutch and English—mention it as forming a feature of Chinese social and commercial life; and during the last century and a half, tea has won for itself a place in the economy of all civilized nations, nearly half the inhabitants of the globe now using it in one form or another. Its English name is derived from a word in the Amoy dialect, "tay" (ch'a in Mandarin); and the term is applied to the plant itself, and also to the infusion of its leaves.

The tea plant (*Ternströmiaceae*, *Thea sinensis*), found in two varieties in China, is a bushy, hardy evergreen, closely allied to the *Camellia*, that can grow over a wide range of climate, and is indigenous to South and Mid-China, Southern Japan and Northern India. In cultivation it is allowed to reach a height of about three feet, but rarely five; it is stated, however, that wild in Assam it attains to thirty or forty feet, with leaves nine inches long, and a stem about one foot in diameter. The flowers are single and white, appearing in great numbers in winter and spring. The leaves are elliptical, serrated and veined. In China they are very seldom more than four inches long; and those used in commerce do not, as a rule, exceed two inches long by one inch broad. During the progressive stages of development, the veins and cellular structure are characteristic, so that an expert can tell with fair accuracy the age of a particular leaf. The cultivator, however, does not aim at greatness of size, but at goodness of quality and flavor.

Practical experiments have been made in the West Indies, South Carolina, some of the Southern States of South America and Brazil, in South Africa and also in Australia, with more or less success; while of recent years the enormous development of the tea industry in India and Ceylon forms quite a feature of international commerce.

In order to flourish and bear leaves worthy of being preserved—the tea plant requires a tropical moist climate where copious rains fall, and a soil suited to its peculiar needs—moderately rich, but somewhat sandy and friable, well drained, yet not lacking in

moisture, particularly the subsoil. These favorable conditions are found on the hill slopes and in the valleys of the provinces of Kuangtung, Fukien and Chekiang; but especially does tea grow to perfection in the Yangtze Valley—Kiangsu, Anhui, Kiangsi, and in Hupeh and Hunan, the regions of China in which black tea is now principally produced.

The tea of commerce is of two kinds, **black and green**, which at one time were thought to be the products of two different plants; but it has been established that the difference depends entirely upon the various processes employed in their preparation.

The Tea Season. The tender leaves and leaf-buds are gathered at three of four periods during the season, each crop gradually decreasing in fragrance and value; but only the first and part of the second are sent abroad, the balance being converted into the coarser grades consumed by the poor classes in China. The first crop begins early in April, the second a month later, the third in July, and the fourth extends over August, into September; the exact dates vary a little according to latitude, and as to whether the season be late or early.

Preparation. The different operations of withering, squeezing, fermenting, rolling and firing are not followed with unvarying observance either of order or of duration of time, each district having evolved the details of its own special method; still, in order to secure the maximum combination of uniformity and fineness of quality in the final product, each step in the curing of a special picking has to be performed with regularity and great watchfulness; delay in finishing one operation or hastiness in another may utterly spoil the whole picking.

Green Tea. The newly gathered leaves are spread out thinly on bamboo trays, and exposed for two or three hours in order to dry and partially wither. They are then thrown in handfuls on to a hot iron pan, where they are kept in rapid motion for four or five minutes. As the heat acts on the sap, the leaves become soft and flaccid, they crackle and give off vapor. They are then transferred to a rolling table of rattan or bamboo, where the workmen each seize a handful and make it up into a ball of a size convenient to manipulate, which is rolled and squeezed to get rid of some of the juice, and to twist the leaves. The balls pass from one workman to another who repeat the operation till at last careful examination shows that the squeezing and curling are finished, and the color of the proper shade. The leaves are now opened out and fired a second time by roasting in iron pans under which burns a charcoal fire. If necessary the leaves are rolled and fired again. The final roasting is done at a temperature which completely dries them. "And all is conducted as quickly as possible in order to conserve the green color and prevent fermentation." For the finest qualities firing and rolling may be repeated a fourth time. When finished the leaves are carefully sifted and picked, and then winnowed free from dust; thus they pass into the market as "lü cha" or green tea.

It will be noted that green tea retains nearly all its original oil and sap, and it is consequently more bitter than black tea.

Black Tea. Strictly speaking we may take it that the leaves for green and black tea both undergo fermentation; for as soon as the leaf is picked it begins to wither, and chemical changes must result; but the degree to which fermentation is allowed to proceed in the case of green tea is very slight; while with black tea it is induced, and forms an essential element in its preparation.

The fresh leaves to be converted into black tea are exposed in large bamboo trays to the air, and sometimes to sunlight, for several hours; or it may be they are kept over night. During this withering process they are tossed about and beaten at intervals till they are soft. They are then heaped up and allowed to stand for an hour or more, during which time they change to a darker color. They are now transferred to a hot iron pan on which they are moved, and shaken about for five minutes, till soft and pliable, and then rolled, as above described in the making of green tea, but in this case with the purpose of expressing as much as possible of the juice.

Sometimes, however, the sap is expressed before firing by putting the partially dried leaves into cotton bags, which are placed in wooden boxes the sides of which are pierced with numerous holes. Here they are pressed and kneaded in order to extract the juice, which "flows out through the holes as a semi-vicid greenish fluid, and the amount expressed is considerable." The object of this is to remove some of the tannin, which if left in would render the infusion too bitter. (I. M. Customs, Yellow Book. "Tea.") After rolling, the leaves are transferred to baskets and covered up in order to favor the fermentative action. The temperature rises sensibly, and is sustained till the chemical changes have gone far enough, after which the leaves are shaken out and spread on trays.

The tea is next thrown on to hot iron pans and rapidly shaken about for four or five minutes, as already noted. It is at this stage that the characteristic aroma of tea comes out. The operations of roasting and rolling are repeated as often as juice can be expressed, but the number of times depends on the custom of the locality, the quality of leaf manipulated, and the demands of the market. Congou tea which is one of the well known names, means "skillfully worked." As a rule the final firing—usually the second or third—is performed by the tea-man, that is the wholesale buyer, who establishes himself at a convenient center where he purchases from the growers, and classifies and blends the various pickings that go to make up the "chops." These he selects from the tea of a district that yields a uniform product. He it is who gives the tea its final sifting and sorting, and packs it in lead-lined boxes ready for export.

Teas are commonly named after the districts that produce them, and they are further denoted by a "chop," which in a somewhat indefinite manner, indicates their peculiar flavor. This, however, changes from year to year, and the watching and valuing of

it, is the special province of the "ch'asee," or tea-taster, who is an expert, not only in testing the fineness and value of tea, but also in knowing what chops suit, for the time being, the taste of the different markets of the world.

The following are the names of the chief districts that produce the black tea exported from Hankow:

Kiangsi. Ping Hsiang, Kiukiang, Man Kiang, Keemun, Wen Kai, Liu Ting, Liu Chow-Chi-an, Ho Kow.

Hupeh. Ichang, Onfa, Nieh Chia Szu, T'ao Yüen, Yang Lou Tung, Kao Chi'ao, Tung Shan, Yang Lou Ssu, Li Ling, Hsiang Tan, Hsiang Yin, Yung Feng, Tsung Yang.

Hunan. Chang Shou Kai, Li Lin, Liu Yang.

The cultivation and preparation of tea have nowhere in the world yet reached the highest possible state of perfection. Mr. Bredon (now Sir Robert) said in 1887: "All (foreign tea merchants) seem to make light of the question of chemical composition, the knowledge of which I personally consider is an absolute necessity if one wants a really correct idea of where-in the difference between Indian and Chinese Teas consists, and how much of that difference is traceable to original quality of leaf, and how much is due to the diverse processes of preparation to which each variety is particularly subjected." Exact quantitative knowledge regarding the organic substances present in tea leaves at the time of picking and throughout the various stages of preparation, is not available. Not much even is recorded about the quantities of the constituents of aqueous infusions, such as are ordinarily drunk. Still, there is good reason to believe that the important therapeutic and agreeable properties of tea depend chiefly upon three substances, viz: Theine, Tannin and Oil of Tea.

Analysis. Dr. Bell, in his "Chemistry of Foods," gives the following analysis of two China teas:

| | Congou (Black.) | Young Hyson (Green.) |
|-----------------------------------------------------------------|--------------------|-------------------------|
| Moisture | 8.20 | 5.96 |
| Theine | 3.24 | 2.33 |
| Albumen, insoluble | 17.20 | 16.83 |
| Albumen, soluble | .70 | .80 |
| Extractive by alcohol, containing nitro- genous matter | 6.79 | 7.05 |
| Dextrin or Gum | | .50 |
| Pectin and Pectic Acid | 2.60 | 3.22 |
| Tannin | 16.40 | 27.14 |
| Chlorophyll and Resin | 4.60 | 4.20 |
| Cellulose | 34.00 | 25.90 |
| Ash | 6.27 | 6.07 |
| | 100.00 | 100.00 |

The following results obtained by Professor Dittmar, F. R. S., from two samples of tea, one India and the other China, each at $\frac{1}{2}$ d a pound, may be of some interest in comparing the amounts of Theine and Tannin in each case:

| I. | Indian. Per cent. | China. Per cent. |
|--------------|----------------------|---------------------|
| Theine | 3.78 | 4.10 |
| Tannin | 9.68 | 6.16 |

II. Number of grains of Theine and Tannin present in the infusion derived from 100 grains of tea leaves:

| | Indian. | | China. | |
|--------------------|---------|---------|---------|---------|
| | 10 min. | 20 min. | 10 min. | 20 min. |
| Theine found | 3.01 | 2.96 | 3.32 | 3.37 |
| Tannin found | 5.96 | 6.53 | 5.50 | 3.86 |

III. Quantities of Theine and Tannin in the infusion per respectively 100 parts of total Theine and 100 parts of total Tannin in the tea leaves infused.

| | Indian. | | China. | |
|--------------|---------|---------|---------|---------|
| | 10 min. | 20 min. | 10 min. | 20 min. |
| Theine | 79.00 | 79.00 | 81.60 | 81.60 |
| Tannin | 61.60 | 67.50 | 58.20 | 64.20 |

Theine is an alkaloid ($C_8H_{10}N_4O_2$) rich in nitrogen, readily soluble in hot water, and to it is due the beneficial and stimulating properties of tea, which contains up to 4% of it.

Tannin has a bitter, pungent taste; its presence in large quantities is certainly deleterious, and being the most abundant of the soluble substances in the leaf, it is very important to get rid of as much of it as possible; this is what extraction of the juice and fermentation tend greatly to effect.

Oil of Tea is a volatile stimulating substance to which the characteristic odor of tea is principally due.

We must now note the all important and complicated quality called flavor, which although, from the commercial point of view, it takes the first place, does not lend itself to detailed scientific analysis. It is governed by the presence of substances that affect the senses of taste and smell—the most prominent of which is oil of tea—yet the amounts of these delicate ingredients in tea are so small as to be quite beyond quantitative determination and individual separation. The high class black teas of China, however, unquestionably possess to a greater degree than any others the properties that contribute to fineness of flavor and excellence of quality. They yield a refreshing, wholesome beverage that invigorates both mind and body; it produces activity of thought and restores energy to the weary muscles, soothing while gently ex-

hilarating, and differing from most other stimulants in that it leaves behind neither exhaustion nor collapse.

How to make tea. Heat the tea pot by pouring into it some hot water, and then decant. For every pint of water that the tea-pot holds, use an ordinary teaspoonful of leaves, and pour over them boiling hot water to the required amount. Cover the pot with a cosey and allow infusion to proceed for five minutes (as tea tasters do). The leaves should be placed loosely in some contrivance whereby they can be removed, such as a clean linen or cotton bag, a tea-egg, of silver or nickel gauze or a perforated cylinder suspended in the inside of the pot from its mouth. For good tea ten minutes' infusion is too long; if extra strength is desired, use more leaves, do not prolong infusion; sugar and cream may be added according to taste, and instead of cream a piece of lemon as is done in Russia.

Exhibit
Number.

396-397 I. Cheong Chop.
398-399 Hsien Pin Chop.

Tea—Ichang District—yields the finest teas for quality and flavor. They are produced only in limited quantity, and are mostly exported to Russia.

400-401 Kee Hing Chop.
402-403 Teen Hing Chop.
404-405 Foo Cheong Chop.

Tea—Ningchow District. These teas are grown on the high hills of the district, and are undoubtedly among the very finest and most delicate flavored Congou teas produced in China.

406-407 Mut Wha Chop.
408-409 Shing Kee Chop.

Tea—Onfar (or Onfa) District is a very large one that produces teas noted for their strength and aromatic flavor, both of which qualities vary somewhat according to the elevation.

410-411 Sin Chun Chop.
412-413 Hoey Yoey Chop.
414-415 Ming Gua Chop.

Tea—Kee Mun District producing black teas of high quality that yield a strong liquor.

457-458 Tea Oil, expressed from tea seeds, is an excellent lamp
oil.
466 Rice, glutinous.
467-68 " white; 2 qualities.