

by the mixture of two cups of corn meal, a half teaspoonful of baking powder and a little butter. The meal and soda are mixed thoroughly, and enough butter is added to hold the meal together in little balls. These balls are then dropped in boiling water and allowed to remain there for five minutes. This is all that is required for the making of the blue dumpling and those who have tasted them seem to acquire an appetite for more. Hot blue dumplings and a mug of sofka is sufficient to make a Creek Indian spend his last penny for a mere morsel of the two.

GINSENG: ITS CHARACTER, HISTORY, COMMERCE, AND MEDICINAL VALUE.*

By CHARLES H. COE.

THE antiquity of ginseng in medicine; the universal faith of millions of people in its virtues, and the oppo-



LEAF FROM AN OLD PLANT.

site belief among other millions; the marvelous cures it is said to have wrought; the fabulous prices it often commands; and its fixed place in commerce, have possessed this plant with an interest that make it conspicuous among the flora of the world.

Although our own physicians consider ginseng of little medicinal value, it is nevertheless the most prized remedy in the pharmacopœia of the Celestial Empire. The inhabitants of China, Japan, and Korea have gathered it in its wild state, and cultivated it more or less, for centuries. In the new world it has been an article of commerce for nearly two hundred years, and for some time has been successfully cultivated.

In view of the above facts, this little plant deserves more extended notice than it has heretofore received in this country.

The valuable part of ginseng (*Panax quinquefolium*¹, Linnæus, 1753; order, *Araliaceæ*) is the root, which resembles a small parsnip (indeed, it is closely related to the latter), being spindle-shaped and in color creamy white. When from one to six years old it ranges from three to ten inches in length and one-eighth to one and one-half inches in diameter. The weight of the dried wild root varies from one-eighth of an ounce to seven ounces, five-year-old roots averaging about two and one-half ounces. Roots weighing five ounces or more are rare. Cultivated roots generally weigh more than wild ones. Some are forked, especially in the wild state, bearing a slight resemblance to the human form. As will be seen later, the common name of the plant was derived from this peculiarity.

An erect stem from 12 to 24 inches in height rises perpendicularly from the root, terminating in three, sometimes four or five, leaf-stalks. Compound leaves appear on the latter in palmately-arranged clusters of five leaflets, as a rule, although three on young plants and seven on old ones are common. They are abruptly-pointed, parallel-veined, and deeply serrate. Their outer or upper ends are broader, and the lower two are comparatively small. Sometimes two stems are produced on the older plants, especially under cultivation.

Flowers appear in the second or third year. The flower-stalk is one to nine inches in length, rising from the apex of the leaf-stalks, seemingly being a continuation of the stem. An umbel of small, yellowish-green flowers appears about the first of July, developing small, berry-like fruit, which turns scarlet in the early fall. The berries contain two seeds each, and the whole umbel from thirty to fifty. They require about eighteen months to germinate.

The stem dies in the autumn, and finally falls to the ground, leaving a scar on the perennial root-stalk, by which the age of the plant may be ascertained. As many as sixty-five of these scars have been counted on a single root-stalk.²

Ginseng is used at nearly all stages of its growth, but it is not in its prime until about ten years of age. It has an agreeable aromatic taste and slight odor, resembling licorice.

The following is a partial analysis of the dried root,

according to Dr. A. M. Peter, of the Kentucky Agricultural Experiment Station:

Substance.	Root.	Ash.
Crude ash	5.278	
Nitrogen	1.660	
Lime856	16.22
Phosphoric acid535	10.14
Potash776	14.70

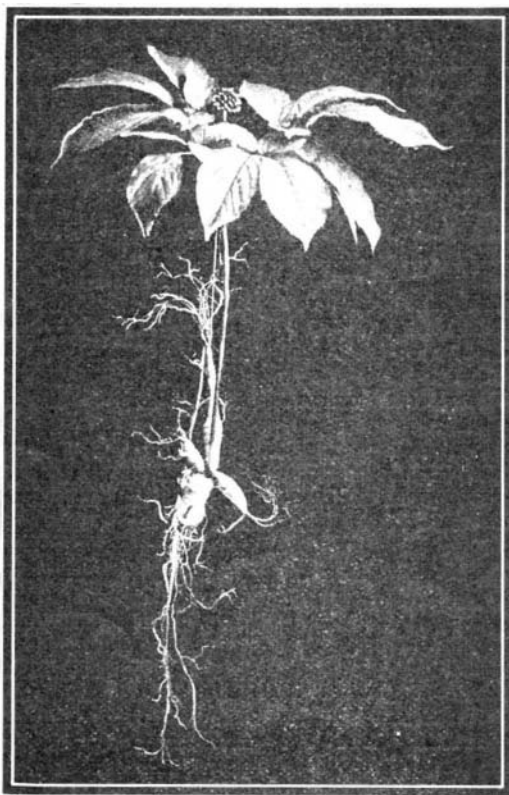
Some years since, Mr. S. S. Garrigues, a Philadelphia chemist, discovered a peculiar substance in the root, which he called *panaquilon*.³

The first description of ginseng reached English-speaking people through the correspondence of Father Jartoux (1711), and in a work by Kaempfer, the celebrated traveler and physician, describing the plants cultivated in Japan.⁴

Various names have been applied to the plant, nearly all of which seem to have been derived from the same source. A writer in the year 1680 calls it "nean or ninsing."⁵ Six years later a description in Latin (accompanied by another in Chinese characters, with a page of curious illustrations) refers to the plant as the "curious root gin-sén, commonly called gensing; by the Japanese, Nis'."⁶

In the year 1711, Father Jartoux, a Jesuit missionary in China, who was employed by the Emperor to map the country, sent home a "Description of a Tartarian Plant Called Ginseng." Regarding its name, he says:

"I know not for what reason the Chinese call it gin-seng, which signifies the representation or form of man. Neither I myself nor others who have searched and inquired into it on purpose, could ever find it had any resemblance to the signification of its



CULTIVATED PLANT THREE YEARS OLD

name, though among other roots [specimens] there may now and then be found some which by accident have very odd figures. The Tartars, with more reason, call it Orhota, which signifies the Chief of Plants."⁷

It is interesting to note that when ginseng was discovered in America (Canada, 1704) the plant was known among the Iroquois Indians as "garent-oguen," which signifies a representation of man's thighs and legs separated.⁸

According to Peter Osbeck, who wrote in 1771, the Chinese name was "Yan-sam or Yan-som." At that period the root was sold in the apothecary shops in England under the name of "ninsi," every ounce of which was worth thirty or forty ounces of silver.⁹

The original discovery of ginseng and its employment in medicine is unknown. It is mentioned in some of the earlier Chinese works, and has long been styled the fabled root of antiquity. A German author, writing in 1787, believes it is the mandrake of the Bible (*dudaim*, Heb.)¹⁰. Other writers and students of Bible history have taken the same view. The conclusions of the Rev. John McClintock, however, would seem to be more reasonable, viz., that "there is little to guide us in determining what plant is alluded to at such early periods; . . . interpreters have wasted much time and pains in endeavoring to ascertain what is intended by the Hebrew word *dudaim*."¹¹

Many fables are connected with the plant, among the most common being the following:

Some plants are said to have a berry or two situ-

¹ U. S. Disp., 1896.

² *Amoenitatum exoticarum*, 1712.

³ Some observations on the root called Nean or Ninsing. By a Doctor of Physick. London, 1680.

⁴ *Radice Chinesium Gin-Sen*, Christiani Mentzelius. 1686. Contained in *Miscellanea Curiosa*, etc. Vol. 2, 1687.

⁵ *Philosophical Trans.*, Royal Society, London, 1713, Vol. 28.

⁶ *Memoire concernant la precieuse Plante du Ginseng*. Joseph François Lafitau. Paris, 1718.

⁷ *Voyage to China and the East Indies*. Vol. 1.

⁸ *Panax der biblische Wunder-Medicus*. Stuttgart, 1853.

⁹ *Cyclopedia Biblical Literature*. 1887.

ated an inch or more above the regular cluster, which indicate a point of the compass, and which direction, if followed, will seldom fail to locate another root a few paces distant; that the root has the power to travel from place to place underground; that it will restore the circulation and respiration after life has deserted the body; that it has the power of concealing itself to escape capture; and that God has appointed the wolf, tiger, leopard, and snake to watch over and protect it.

Ginseng was formerly supposed to be confined to the Chinese Empire, but it was finally discovered in North America and in the Himalayan Mountains of Nepal (at an altitude of 10,000 feet above the plains of Bengal).¹² Father Jartoux, in his description of the Tartarian plant, thus forecasts the discovery of ginseng in America:

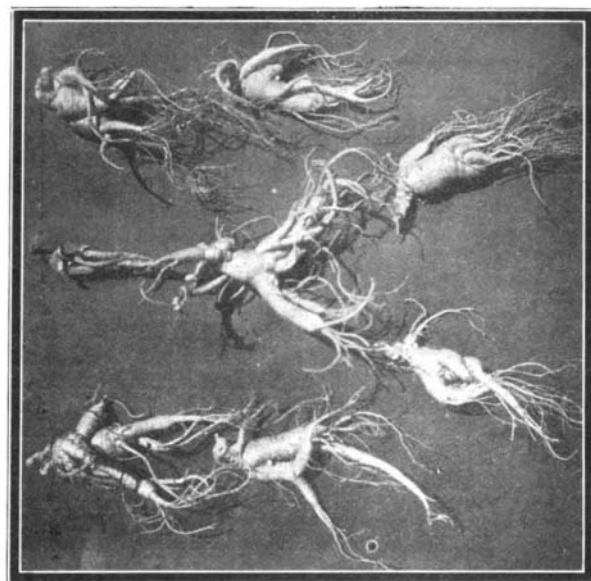
"If it is to be found in any other country in the world, it may be particularly in Canada, where the forests and mountains, according to the relation of those that have lived there, very much resemble those here."

This was seen by a missionary among the Iroquois Indians of Canada, Father Lafitau, who refers (in his work previously quoted) to his supposed first discovery of the plant, as follows:

"It was by accident that I first learned of ginseng. I had stopped in Quebec on business connected with our mission in the month of October, 1715. They have a custom of sending us every year a copy of the edifying letters of the missionaries of our company who labor in every part of the world. . . . The tenth parcel of these letters fell into my hands, and I read with pleasure one from Father Jartoux. In it I found an exact description of the ginseng plant. . . . After spending three months in looking for the ginseng, by accident I found it, when I was not thinking of it, near a house I was having built (at Sault St. Louis). It was then ripe, and the color of the fruit attracted my attention. I pulled it up, and with joy took it to an Indian I had engaged to help me hunt for it. She recognized it at once as one of those the Indians used."

Father Lafitau returned to France in 1717¹³ and his book was published in the following year. The honor of first discovery in America, however, does not, as stated by other writers, belong to him. Twelve years before (1704) the Jesuit found the plant, Michael Sarrazin (Sarrasin) King's Physician for Canada, discovered it [near Quebec] and sent specimens to Paris.¹⁴ It was through Father Lafitau's efforts, nevertheless, that the public first learned of the American plant.

Botanists have not agreed upon a specific difference between the Chinese and the American plants. Few authorities, however, regard them as different species; many believe them to be identical, or with only slight variation. Prof. C. S. Sargent, of Harvard College, one of our most reliable authorities, who has traveled extensively in Japan and China, regards the plants as one and the same.¹⁵ His opinion is corroborated by the Royal Botanical Gardens, Kew, England,¹⁶ also by Mr. A. J. Pieters, Division of Botany, United States Department of Agriculture. The latter made a careful microscopical study of the two roots, Japanese (imported for the purpose), and American and found their characters identical. The reader has already learned that Father Lafitau was enabled to find the plant in Canada from the "exact description" given by Jartoux.



CULTIVATED ROOTS, FOURTH YEAR.

A few years after the discovery by Father Lafitau, a company was formed in Quebec to gather and ship the root to China. It was one of the first articles exported from Canada after the treaty of Utrecht (1713), and for several years commerce in ginseng was almost as important as the fur trade.

When Peter Kalm, the Swedish botanist, traveled through Canada in 1749, the trade in ginseng was still very active. Regarding this, and the extermination of the plant, he tells us:

"During my stay in Canada, all the merchants at

¹² *An Account of the Nepal Ginseng*. Wallach. Trans. Med. and Phys. Soc., Calcutta, Vol. 4, 1829.

¹³ *Jesuit Relations*, etc. Thwaites. Vol. 67.

¹⁴ *History of the Vegetable Kingdom*. Rhind. London, 1855.

¹⁵ *Flora of Japan*. Boston, 1894.

¹⁶ *Official Guide, Museums of Economic Botany*, 2d ed. London, 1886.

*Specially prepared for the SCIENTIFIC AMERICAN SUPPLEMENT.

¹ *Panax americanum*, Rafinesque. 1836; *Panax ginseng*, Meyer, 1843; *Aralia quinquefolia*, Decaisne and Planchon, 1854.

² This root is in the possession of George Stanton, Summit Station, N. Y.

Quebec and Montreal received orders from their correspondents in France to send over a quantity of ginseng, there being an uncommon demand for it in this summer. The roots were accordingly collected in Canada with all possible diligence; the Indians especially traveled about the country in order to collect as much as they could, and to sell it to the merchants at Montreal. The Indians in the neighborhood of this town were likewise so much taken up with this business that the French farmers were not able during that time to hire a single Indian, as they commonly do, to help them in the harvest. Many people feared lest by continuing, for several successive years, to collect these plants without leaving one or two in each place to propagate their species, there would soon be very few of them left, which I think is very likely to happen, for by all accounts they formerly grew in abundance round Montreal; but at present there is not a single plant of it to be found, so effectually have they been rooted up. This obliged the Indians, this summer, to go far within the English boundaries to collect these roots."¹⁷

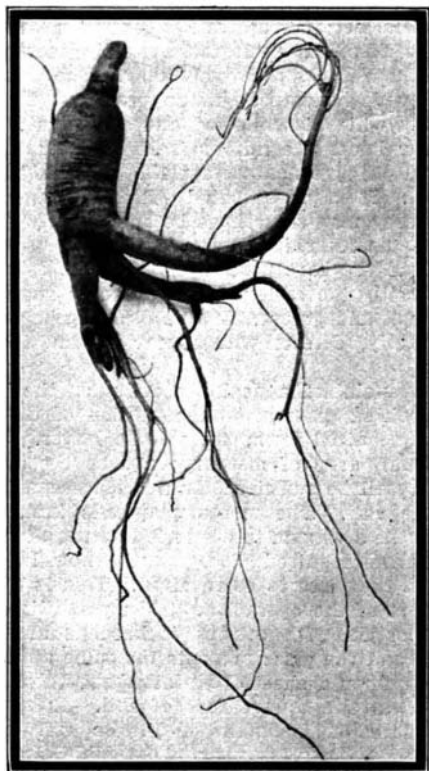
The price paid in Quebec ranged from two to thirty-three francs per pound. The latter sum prevailed in the year 1752, at which time a quantity was shipped to France amounting to 500,000 francs. Owing to carelessness in gathering and curing, the Canadian product finally acquired a bad reputation, and the trade was a few years later nearly destroyed.¹⁸

In 1750 ginseng was found growing plentifully in the western parts of New England, says Williams, and in 1751 about Stockbridge, Mass., and in central New York.¹⁹ In Vermont it was for many years the only medicinal plant gathered and exported. Collectors received thirty-four cents per pound in its crude state. It was a profitable industry, the root being purchased by nearly every retail store in the State, until it became scarce through exportation and the clearing up of the country.²⁰

Ginseng formerly grew more or less abundantly in every State except two (Florida and Louisiana) east of the Mississippi River, and in four States (Minnesota, Iowa, Missouri, and Arkansas) west of it. In the high altitudes and heavy forests of the Appalachian system, it flourished everywhere, reaching its highest development. But it is now comparatively scarce; indeed, in many localities where it formerly grew in abundance, it is entirely extinct. The gradually diminishing supply and the increased price furnish proof that unless steps are taken to prevent it, the complete extermination of the wild plant will soon become an accomplished fact.

Michaux, writing in 1804, mentions the custom of gathering the roots at all seasons of the year.²¹ This ruinous practice still prevails; roots are taken up before the seeds have a chance to ripen and fall, thus preventing a succession à la nature. The author of the *Western Gazetteer*, published in 1816, unwittingly refers, as follows, to another possible cause of its extinction in some localities:

"Ginseng grows in the bottoms [Franklin County, Indiana] to a perfection and size I never before wit-



TWO-YEAR-OLD CULTIVATED ROOT.

nessed, and so thick, where the hogs have not thinned it, that one could dig a bushel in a very short time."

Ginseng has been included among the principal exports of the country for nearly two hundred years. The following statistics, compiled from the records of the Department of Commerce and Labor, will enable the reader to form an idea of its commercial importance:

Years (inclusive).	Exports. Pounds.	Average value.	Total value.
1820 to 1845.....	1,977,355	\$0.60	\$4,680,470
1858 to 1868.....	4,343,519	0.88	3,862,095
1869 to 1878.....	3,932,868	1.10	4,359,451
1879 to 1888.....	3,577,330	1.84	6,603,350
1889 to 1896.....	1,884,698	3.18	6,012,273
1897 to 1903.....	1,165,850	4.85	5,549,582
Totals	16,881,620	\$31,167,221

Practically all exports go to China, entering that country *via* Hongkong, and consist almost entirely of the wild root. The largest shipments formerly came from New York, Pennsylvania, Wisconsin, and Minnesota.

The commercial value of ginseng in this country at the present time varies with the locality of its growth, although the distance from market no doubt has more influence on prices than quality. Roots gathered in the Northern States command from \$2.50 to \$4.75 per pound, dried; Southern States, \$2 to \$3.75.

There are three principal grades of the foreign product. The most valuable is known as Imperial or Manchurian. This is the wild root under imperial protection. It goes through a process of clarification which renders it translucent. The price ranges from \$40 to \$200 per pound. It is consumed among the wealthy classes in Peking and other cities. The next in value comes from Korea, and includes both wild and cultivated roots. Its value is from \$15 to \$25 per pound. The third grade is grown in China and Japan, and is valued at \$1 to \$10 per pound. The American product ranges between \$2 and \$8 per pound, the best clarified selling for the latter sum.

The cultivation of ginseng is in its experimental stage with us. Many have tried to raise it, but few have succeeded. And yet, under proper conditions of soil and shade its cultivation is not difficult. As far back as 1877 "hundreds of dollars" were spent by one man in Wisconsin in trying to raise the plant from the seed, but he failed utterly.²² A few growers in New York State and elsewhere have been successful, but only after years of careful experiment and culture.

About fifteen years since the cultivation of ginseng



A ROOT OF GINSENG FROM NORTHERN OHIO.

was attempted by the Botanical Gardens, Jamaica, W. I. Plants were set out in the forests of her highest mountains, but without successful results.²³

Very little cultivated ginseng is exported, our growers finding a better market at home in selling to others for transplanting. Whether the cultivated root will ever be grown in this country in sufficient quantities to replace the wild plant, is a question of time and patience.

The scarcity of the wild root caused the legislatures of West Virginia (1872-3), and Virginia (1875), also of Ontario, Canada (1890), to enact protective measures. The time of gathering is limited, and fines are imposed for violations of the law. It is an easy matter, however, for the "sang hunters," as they are called, to gather roots in the sparsely-settled regions without detection, and it is doubtful if the above laws prove effective. So far as can be learned, no other States have taken action in the matter.

As stated in the beginning of this article, ginseng is considered of little medicinal value in this country. It has never been used here in practice, however, and for this reason, perhaps, its true worth has been underestimated. It has been stated that its action is too mild to prove effective. The reply is that mild-power medicines, even in infinitesimal doses, often perform wonders where harsher measures only aggravate.

Ginseng is the panacea for most of the diseases of the Chinese and Koreans. It is not only taken in sickness, but by well persons to make them more vigorous, or as a precautionary measure. It is especially recommended for all weakness of the body, general debility, nervous disorders, and for the prolongation of life in old age. It is used in four forms: As pills, ointment, confection, and infusion, the latter being the most common.

²² U. S. Agr. Rept., 1877.

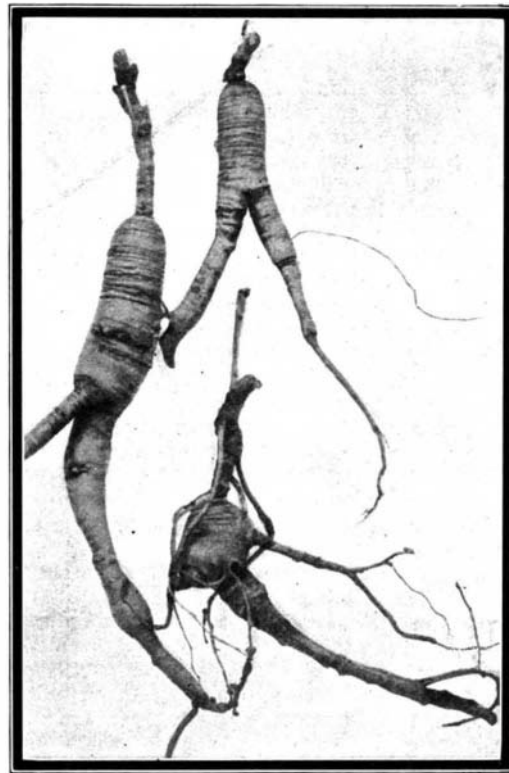
²³ Private letter from the director of the gardens.

It is absolutely believed in by all Chinese, says one of our consuls, from the highest to the lowest, and there would be millions of testimonials as to its efficacy and the wonders it has accomplished for any one who desired them.²⁴ It cannot have attained and preserved this reputation, among these millions of people, says another, without possessing at least some of the virtues attached to it.²⁵

A medical missionary informs us that its effects are apparently those of an alterative tonic, stimulant, carminative, and demulcent nature, and that some positive efficacy of a sustaining character does really exist in the plant.²⁶

A former consul at Seoul, Korea, thus states:

"From personal experience and observation I am assured that Korean ginseng is an active, strongly-heating medicine. . . . Western people appear to regard the virtues of ginseng claimed by Orientals rather



WILD ROOTS, SHOWING ROOT STALKS AND BUD.

contemptuously—as imaginary and based on superstition. The evidences are that the mystic value attached itself to ginseng after its virtues had been practically ascertained."²⁷

Volumes have been written by the most eminent physicians of China on the virtues of ginseng. Over 400,000,000 people have been using it for centuries. As a race these people are our equals in native intelligence, and by far our superiors in natural art. Taking all into consideration, it may be well to suspend judgment regarding the medicinal qualities of their panacea.

A RÉSUMÉ OF SOME RECENT STUDIES OF RADIO-ACTIVITY.

F. C. GATES presented a paper at a recent meeting of the American Physical Society, in which he stated that sulphate of quinine becomes temporarily phosphorescent when heated, and can discharge an electroscope. Unlike the radiations from radio-active substances, which appear to be unaltered either by time or temperature, quinine sulphate radiations are only rendered apparent by great temperature changes, and cease after a short time. They are completely absorbed by a thin sheet of aluminium, and largely by a few mm. of air. The current obtained varies greatly with the direction of the field. Since these effects are accompanied by marked phosphorescence, it is possible that they are caused by very short waves of ultra-violet light, such as Lenard has shown to be active in ionizing gases, and therefore that the ionizing action is altogether different from that of radio-active substances.

From observations made by W. Crookes with his spinthariscopes, Prof. Becquerel (*Comptes Rendus*) was led to resume his former study of the phosphorescence produced by the radiation from radium. He has repeated the experiments carried out by Crookes with screens of hexagonal blende, and agrees with him that the scintillations are produced by the α -rays only. The crystals of the zinc sulphide, under the impact of the α -rays, alter progressively and undergo cleavage unequally, according as they are more or less large. The cleavage of the crystals employed is accompanied by the emission of light, even when the cleavage is produced mechanically. The author has obtained the effect by crushing crystals of hexagonal blende between glass plates. He considers that the facts observed establish a very strong presumption in favor of the hypothesis which attributes the scintillation to cleavage produced irregularly on the crystalline screen by the continuous action, more or less prolonged, of the α -rays.

Referring to Becquerel's paper on the scintillations

²⁴ U. S. Cons. Repts. April, 1898.

²⁵ U. S. Cons. Repts. No. 211.

²⁶ Chinese Materia Medica. F. P. Smith, 1871.

²⁷ U. S. Cons. Repts. No. 65.

¹⁷ En resa til Norra Amerika. Abo, 1753.

¹⁸ Williams' History of Vermont, 1794.

¹⁹ Letter of Rev. Jonathan Edwards, quoted in *Oldest and Newest Empire*. Speer, 1870.

²⁰ Thompson's History of Vermont, 1842.

²¹ Voyage à l'Ouest des Monts Alleghany. Paris.