Journal of Geography

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rjog20>

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Published online: 20 May 2008.

To cite this article: Frank Carney (1903) The Domestication of Ginseng, Journal of Geography, 2:1, 26-31, DOI: [10.1080/00221340308985912](https://doi.org/10.1080/00221340308985912)

To link to this article: <http://dx.doi.org/10.1080/00221340308985912>

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THE DOMESTICATION OF GINSENG

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THE writer recently visited the Ginseng gardens of Mr. Frank Timmerman, Apulia, N. Y., which are laid out on a slope at the foot of the west wall of Labrador Creek Valley; a kettle lake skirts the slope on the east. This section of the valley is a

FIG. 1. *Mature ginseng plant.*

gorge, accentuated probably by glacial action; three miles long, and less than half a mile wide; its bottom has an altitude of 1,200 feet, and the side walls rise steeply to 1,800 feet. The gardens occupy a narrow strip, partially a talus slope, that had not previously been cultivated.

The American ginseng (*Panax quinquefolium*) is a species allied to the Chinese ginseng; it is a member of the ivy family (*Araliaceæ*); the leaves are palmate; the flowers are umbellate, as may be inferred from the shape of the seed cluster shown in Fig. 1. The plant is a

FIG. 2. *Fresh roots of ginseng from cultivated plant. (A) One year old. (B) Two years old. (C) Three years old. (D) Four years old. (E) Bud. (F) Leaf scar. (I) Seed cluster of plant. (II) Berry from cluster. (III) Seed from berry. (From Bulletin No. 16, Division of Publications, U. S. Department of Agriculture.)*

hardy perennial; it adapts itself to the climate of our southern states, and grows also as far north as Canada; the southern variety, we are told, does not mature seed in this state. Wild roots fifty to sixty years old have been found; the age being determined by counting the leaf scars. (F., Fig. 2.)

A few years ago a large number of people made a living by gathering ginseng root found growing wild over much of the United States and Canada, and the same fact holds true to some extent even to-day. The root is bought by exporters for trade with China, where it is used extensively as a medicine. Some twenty years ago the exportation of the root began to decline, but the demand in China has, at the same time,

increased so rapidly that the price paid for the American export has constantly advanced. Therefore, the gross amount realized from exportations did not fall off till 1896, when the natural supply showed signs of exhaustion, because root-diggers had been collecting all the ginseng they could find for more than a century. The outcome of this continual harvesting, with no seed-time, was apparent. The woodlands yielded so scanty a supply that the gathering of ginseng ceased to be very remunerative, and the question naturally arose as to why the plant should not be domesticated. Our carrots, parsnips, much of our garden truck, first grew wild, and by careful and continual cultivation these succulent vegetables have been greatly improved. The same exertion that has been rewarded in the domesticating of food plants might find remuneration in the home growing of ginseng.

Mr. Timmerman's early efforts at domesticating ginseng, however, were not successful. The seed was gathered in the woods and sown in the garden, but it did not grow. Then the plan was tried of sowing the seed at different seasons, with the same result, for even after being in the earth for weeks there were no signs of germination. At the expiration of a year the plot of ground was turned to other use; but some seed, which had been left by chance, germinated, and the plant appeared during the second year. It was found out in this accidental way that ginseng seed requires eighteen months to germinate; one point, and the most important point, in the cultivation of ginseng had been learned. To keep the plant growing was the next problem; the gardener gave it all possible attention, but it did not thrive; the soil was rich, and every condition seemed favorable so far as the grower could tell. But some condition natural to the plant had not been observed. In its own habitat ginseng is found in shady places; it grows sturdy when trees and bushes shut out direct sunlight. After the experimenter had brought about in his gardens this same condition of shade, his success was more assured. From experience, then, the ginseng gardener has learned two things: that it is better to germinate the seed before placing it in the ground, and that the beds must be protected from strong sunlight. In the gardens visited, about thirty-five per cent of normal sunlight is allowed to reach the plants. As seen from a distance, the gardens appear to be low, flat buildings. The posts shown in the view (Fig. 3) support a roof made either of brush or narrow boards;

FIG. 3. *Ginseng under cultivation.*

with a brush covering the light is not apt to be even; by using boards of one width, accurately spaced, the grower can admit such a percentage of sunlight as he thinks the location of his garden requires. Besides regulating the light, the gardener must also protect his plants from too much moisture, and natural slopes, therefore, are chosen for the location of ginseng beds. Other conditions being equal, a northern slope is selected, since the plants then have an added protection against sunlight.

In starting a ginseng bed, great care is taken to have the soil free of stones that might obstruct the growth of the roots. In September or October the seed previously germinated is sown six times thicker than the plant is cultivated; it comes up about the middle of May. At the end of the second year the plants are thinned out to six inches each way, and those taken up are re-set in other beds. During the first year the plant produces a short stem with three leaflets. The second year the stem has two branches, five leaves on each branch; it also matures two to ten seeds. The stem has three branches the third year, and twenty to thirty seeds. So at the end of four and one-half years the gardener has an income from each plant, for he has succeeded in growing twelve to forty seeds. The plant should be five or six years old before the root is ready for market. A six-year green root weighs from five to eight ounces, but in drying preparatory to marketing, two-thirds of this weight is lost. The dry cultivated root is worth from \$6 to \$10 a pound.

At present very few ginseng growers are selling roots, for so many agriculturists are starting gardens that the seed is in such great demand that it sells for \$100 per pound, there being about 8,000 seeds in a pound. Many of the seed clusters seen in the photograph of Mr. Timmerman's gardens are worth seventy-five cents each, and the writer was shown a bushel basket of recently gathered seed clusters valued at \$800. After harvesting, the seed berries, each containing one to three seeds, are stripped from the clusters and placed in sand or in leaf mold; here they are left for a year to germinate. All seeds, however, do not germinate, and the skill of the gardener is measured in part by the percentage he can make grow. This fact has led to much individual experimentation, and competition among gardeners is rife enough to prevent any publication of the methods by which they get the best results.

Perhaps but a small number of the men who are trying the culti-

vation of ginseng will succeed. Patience, care, industry, and good judgment are qualities found in the successful grower. Furthermore, he must for a few years carry on his ginseng cultivation as a "side line"; immediate returns are out of the question.

TRAVEL AND TRAFFIC IN CHINA

OUTSIDE of the foreign settlements, with their macadamized streets, there is scarcely a road in the whole Empire that deserves to be called a road. Exception must be made of a drive some five miles in length recently built at Nanking, and a few miles of roadway built some years ago at Tientsin, under the direction of Li Hung Chang, the beginning of a highway to Peking. The road through the pass from Nan-kou to the Great Wall is also fairly well built and kept in tolerably good condition.

The ordinary road is a mere path, generally undefined by ditches or hedges, winding through the paddy fields or over the uplands, wherever the traveler can find the fewest obstacles to his progress. In the north, where carts are used, it is a common thing to see a new track cut right across a field of growing wheat, in spite of the efforts of the owner to prevent it. The road from Nanking to Fungyang, 120 miles in length, was built by the founder of the Ming dynasty, who made Nanking his capital. It was a creditable piece of engineering. The roadway is some 25 feet wide, and in some places built up to 12 to 15 feet above the surrounding country. There are remains in many places of ancient pavement, but this has almost wholly disappeared, and the road is simply a bank of earth which in rainy weather becomes altogether impassable. There are three splendid bridges on the road, built of stone, one of five, one of seven, and another of ten arches. Bridge building is regarded as a virtue in China, and there are some fine specimens in all parts of the country. In the neighborhood of the cities in central China the roads are partially covered with a pavement about five feet wide, composed of old bricks set on edge, with sometimes a line of cut stone in the middle for wheelbarrow-trade traffic. On the larger rivers, which Chinese engineering skill has not been equal to bridging,