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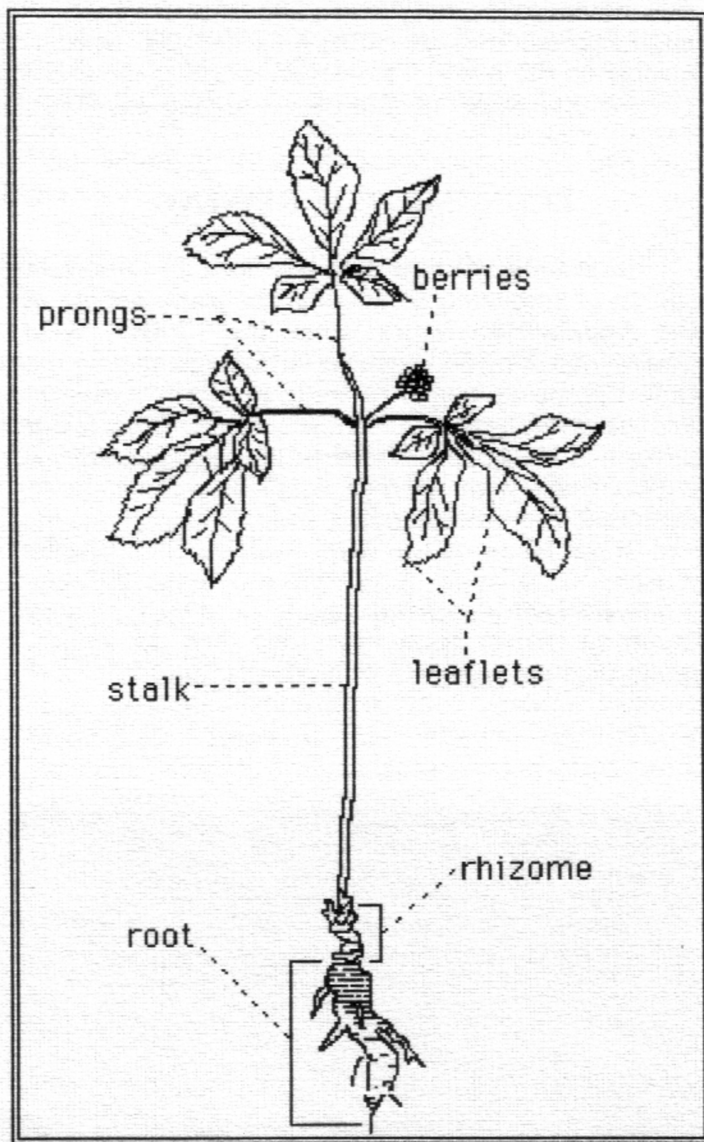
GINSENG IN APPALACHIA

American ginseng (*Panax quinquefolium*) is a long-lived perennial plant, native to cool woodland regions in the Eastern United States and Southern Canada. A close relative of Asian ginseng (*Panax ginseng*), it is found throughout the Appalachian region. Though it was once a relatively common wild herb, excessive harvesting of the root and poor conservation practices have made it scarce.

Biological Description

The ginseng plant has a distinctive appearance. During the growing season it has a slender stalk that reaches a height between eight and sixteen inches. Near the top of the plant the stalk diverges into prongs, each bearing five egg-shaped leaflets with irregular saw-toothed edges. In the first year of growth, the plant typically has only one prong. In succeeding years the plant develops additional prongs until, at full maturity, it has between three and five prongs.



AMERICAN GINSENG (*Panax quinquefolium*)

In the spring the stalk of the ginseng plant sprouts from a gnarled stem (rhizome) that lies above ground at the top of the root. Early in the spring a cluster of tiny yellow-white flowers appears with the leaves at the top of the stalk. Later these flowers give way to small green kidney-shaped berries. Through the summer and fall the ginseng berries ripen to a bright red. These berries are a favorite food of birds and rodents who help propagate wild ginseng by spreading undigested seeds in their droppings. In the late fall, typically after the first heavy frost, the ginseng plant sheds its stalk. When the stalk is shed, a ring-shaped residual scar is left on the rhizome. Since each ringed scar on the rhizome corresponds to one year of growth, the age of a plant can be estimated by counting the rings. After the stalk is shed, the ginseng root lies dormant until the next spring when the cycle begins again.

MEDICINAL AND HERBAL VALUE

The ginseng root has long been prized for its reputed medicinal value. The Chinese variety of ginseng (*Panax ginseng*) has occupied a central place in Asian medicine for centuries. Native Americans and early European

settlers in North America also recognized ginseng as an important medicinal herb. In China many people consume ginseng regularly in the belief that it promotes good health and well-being. It is also believed to have a curative effect. Though ginseng is commonly prescribed by physicians in Asia and Russia for a number of ailments, Western medicine has been very skeptical of the herb. In the United States it is illegal to market ginseng for medical purposes because it has not been tested by the Food and Drug Administration. Instead, it is marketed as a health food or with vitamin supplements.

In the Orient, varieties of ginseng from different regions are believed to have different qualities. Chinese ginseng is thought to have a stimulative effect, while American ginseng is understood to provide a soothing effect. Ginseng from Korea is administered primarily as a curative agent to restore strength after an illness or surgery.

Ginseng contains a host of chemicals and nutrients such as steroidal compounds, vitamins B and C, volatile oils, amino acids, fatty acids, and trace elements. The active chemicals which are believed to give ginseng its medicinal qualities are called ginsenocides. Several ginsenocides have been isolated and proven to have certain effects on the body. However, whether these compounds can be absorbed by the body through consuming ginseng is a subject of controversy among scientists and physicians.

ECONOMICS OF GINSENG

Harvesting wild ginseng has been an important source of supplemental income for many people in the Appalachian region since the 1700s. Wild ginseng in China had become virtually extinct by the time Europeans began to settle in North America. So, the discovery of American ginseng by a Jesuit priest in 1716 opened a tremendous opportunity for export trade with the Far East. Early American explorers and entrepreneurs such as Daniel Boone and John Jacob Astor were heavily involved in ginseng trade with Asia. Today, wild ginseng hunters, still comb the woods of Appalachia in search of the rare root. In addition, many people throughout the United States and Canada are involved in various levels of ginseng cultivation. Cultivated ginseng presently accounts for more than 90% of American ginseng exports.

In 1993 the United States exported almost 1,500,000 pounds of ginseng. North American ginseng production presently accounts for about 16% of the world trade in ginseng root. Because the Chinese economy is presently expanding at a tremendous rate, the demand for ginseng is also expected to grow. The introduction of new ginseng products and a growing interest in the health benefits of ginseng in the United States suggests that there may be a greater domestic market in the future as well.

Ronald Baker examines his cultivated ginseng patch

CULTIVATED GINSENG

The high price paid for ginseng prompted efforts to cultivate ginseng on a large scale in the late 1800s . Ginseng is a difficult plant to cultivate because it requires very specific growing conditions. Many early attempts at cultivation failed but eventually, using artificial shade and soil conditioning, several successful ginseng farms were established. In the early 1900s a fungus disease caused many ginseng farms to fail. Today there are still a few large-scale ginseng farms in North America. The largest operations are in Wisconsin and Canada.

Cultivated ginseng brings a much lower price by weight than wild ginseng. The price paid for field cultivated ginseng typically ranges from $25 to $50 per pound. High quality wild ginseng can bring more than $400 per pound. In the last year, the price paid for wild ginseng has more than doubled.

Field cultivated root is easy to distinguish from wild root. Cultivated roots are generally larger and are straw colored. The wild roots are smaller, have a dark weathered appearance and are banded with dark rings. The huge price gap between wild root and cultivated root has encouraged attempts to cultivate ginseng in more natural settings. By growing ginseng in forest environments, the cultivated root often more closely resembles wild root and brings a higher price. The use of forest environments for cultivating ginseng also has the advantage of lower initial cost since trees, rather than artificial canopies, provide the necessary shade.

"Virtually-Wild" Cultivation

Syl Yunker of Stanton, Kentucky has pioneered a method of cultivation he calls "virtually wild" ginseng. This method has potential for being both profitable and environmentally sound. It has the added benefit of requiring very low overhead and maintenance. Essentially, the "virtually-wild" method involves selecting and preparing a promising location, planting seed and allowing nature to take its course. According to Mr. Yunker, his guiding principle in growing virtually wild ginseng is to foster the plant in conditions as close to wild ginseng as possible. While this method may not return a profit as quickly as more intense cultivation, the minimal set-up cost, the low maintenance required and the higher price paid for wilder looking root make it an appealing alternative.

One of the environmental cautions in using the "virtually-wild" method is that, if at all possible, regional seed should be used. Ginseng exhibits great genetic diversity from region to region. Regional varieties are adapted to local climate and soil conditions. Seed stock from outside the region may not produce as successfully as native stock. In addition, there is a slight potential that native wild genetic stock may be damaged through cross pollination with cultivated out-of-region varieties. While ginseng is primarily a self-pollinating plant, some cross pollination is provided by sweat bees and hover flies. Cross-pollination could result in mixing between native and cultivated varieties and, consequently, genetic depression.

GROWING GINSENG

Site Selection and Preparation

The most important consideration in selecting a good site for cultivating ginseng is shade. Ginseng requires a site that has at least 75% shade. It is best to select an area shaded by hardwood trees, since softwoods, like pine, have shallow roots that can make digging and planting ginseng difficult.

Ginseng tends to perform best on gentle well drained slopes with light soil and good air circulation. The plant should be exposed to as little direct afternoon sunlight as possible. Slopes that face northeast are ideal. While ginseng will grow in a variety of soil types, it grows best in wood loam with a slightly acidic pH (5.5 - 6.0). Soil of largely clay composition should be avoided.

It is recommended that first-time growers start on a small scale the first year (two or three dozen seedlings) to assess the success of their site. If the site works well, it can be extended and additional plants added the following year. Mr. Yunker advises arranging dead fallen limbs to retain organic matter on the hillside. This helps foster ginseng growth. It also prevents and corrects soil erosion.

It is best not to use fertilizers on forest cultivated ginseng. The addition of fertilizers can cause rapid growth, making the plant more prone to disease and the root less wild in appearance. *Never use manure to fertilize ginseng.* It gives the root a bad flavor and will devalue the crop. Inorganic fertilizers are also not advised.

Germination

Untreated ginseng seed requires 18 to 24 months to germinate. This means, with the three to five years required for the plant to mature, it may be as many as seven years before the crop is ready for harvest if untreated seeds are used. Artificial methods of accelerating the germination process (referred to as "stratification"), can be employed to reduce germination to as little as eight months. Such methods include allowing the seed to germinate in sphagnum moss or sand or soaking the seed in an acid solution.

In developing his "virtually-wild" ginseng, Mr. Yunker has used stratified Canadian seed purchased from a dealer in Kentucky. However, in subsequent reseeding, he has chosen to directly plant the berries from his plants without removing the pulp or stratifying the seed.

Purchasing Seed

If seed is purchased from a dealer, inspect it before planting. If seeds are soft or damaged, they should be returned to the dealer for replacement. If seeds have cracked and begun to sprout, this is not a sign of damage. Seeds can be purchased either stratified or unstratified. Unstratified seeds are commonly referred to as "green seeds". Seeds that are stratified will yield the following spring. Green seeds will require an extra year to sprout.

Seeds are normally sold by weight. There are usually between 6,000 and 9,000 seeds per pound depending on the regional variety. Seeds from Canada and other Northern regions are larger than Southern seeds and so there are fewer per pound. Seeds should be planted as soon as possible after they are received. If immediate planting is not feasible, the seeds should be allowed to air out for a short period. The seeds should then be moistened and refrigerated. Check the seeds every few days to ensure that they remain moist but not damp. It is important that the seeds be kept moist and cool before planting.

Harvesting Seed

Once the ginseng garden is producing, seeds can be harvested from the plants and either used to expand the garden or sold. Each berry contains two seeds (on average). During the first two years of growth, the plant will usually not produce fertile seed. The berries should only be harvested from mature plants in the late summer and fall when they are fully ripe (bright red). Seeds taken from unripe berries will not grow. Each plant usually produces between twenty-five and fifty berries per season.

Planting the Seed

Once the ginseng site has been selected, the seed should be planted at a depth of about 1/2 inch. Since each berry has two seeds, when using purchased seeds, Mr. Yunker advises planting two seeds together to enhance simulation of wild conditions. After the plants are producing seed, he recommends planting the whole berries. After the seeds or berries are planted they should then be covered over with leaves or other mulching material. The best time for planting ginseng is in the fall.

Plants should be well spaced, at least six to nine inches apart. Overcrowding can result in poor air circulation and consequently, fungal diseases. In addition, ginseng grown in very overcrowded conditions causes pathogens to build up in the soil that prevent growing healthy ginseng in the same field again.

MAINTAINING THE GINSENG CROP

Once the ginseng garden is planted, it should not require much maintenance. Plants should be monitored occasionally to ensure the soil beneath the mulch is moist and that plants are disease free. The

tops should be removed from plants that show signs of disease. The greatest concern for the ginseng grower is the security of the crop, both against forest animals and people. Forest animals, such as moles and mice, will occasionally nibble at the rhizome or root of the ginseng causing damage to the plant. Mice and chipmunks like to eat the ginseng berries. Constructing a small fence around the ginseng bed with 24 inch wide aluminum sheeting may be somewhat effective in keeping small rodents out. Be sure that the supporting posts are placed inside rather than outside the fence, or mice will be able to climb them. The use of mechanical traps can also be effective in keeping damage from rodents to a minimum.

Security

Guarding a crop against thieves can be a difficult task. Besides keeping a close eye on the crop at all times, there are few low-cost options for security. Mr. Yunker suggests that one of the best security resources is cooperation between fellow ginseng growers. Having fellow growers check on your crop when you are not around can deter thieves. Growers should also work together with local law enforcement officials to help secure their crops.

It is important to know the law regarding ginseng theft in your state. In some states, such as North Carolina, theft of ginseng is a felony offense. Other states, such as Kentucky, have very weak laws to protect ginseng growers. Also, be aware that *trespassing and suspicion of theft do not legally justify the use of deadly force* against an intruder. If you shoot or otherwise injure someone you catch trespassing in your garden or stealing your crop, you could be in a lot of legal trouble.

The use of dead-fall devices -- trip devices that can kill or injure an intruder -- are against the law in every state. Violation of these laws typically carries a very heavy penalty. DEAD-FALL DEVICES SHOULD **NEVER** BE USED to protect your garden. Consult local law enforcement officials for advice for what to do if you catch someone trespassing or stealing your ginseng.

Harvesting Wild and Cultivated Ginseng

Ginseng must grow a very long time before the root is marketable. Typically, a plant must grow at least three to five years before it is ready for harvest. Harvesting immature roots is big problem in the wild where inexperienced hunters senselessly contribute to the scarcity of the already endangered wild plant. If ginseng is harvested before it is fully mature, the roots are almost worthless. Mr. Yunker, in cultivating "virtually wild" ginseng, allows his ginseng to mature for a very long time, harvesting only 10% of his most mature plants in any given year.

Because of the endangered status of wild ginseng, the U.S. Fish and Wildlife Service has mandated that states allowing ginseng exports must have protective regulations in place. The legal requirements for harvesting ginseng in the wild vary from state to state. Most states have a designated harvesting season in the late summer and fall and some require a permit to dig ginseng. State wildlife authorities should be contacted to verify the requirements before attempting to hunt wild ginseng.

Harvesting in National Forests

Harvesting wild ginseng in National Forests is currently permitted according to U.S.D.A. Forest Service policy. To hunt ginseng in a National Forest, first seek permission from the local federal forest ranger. A permit will be issued that allows the hunter to harvest in a particular forest. There is a nominal fee that must be paid to the Forest Service based on the weight of the ginseng harvested. Typically the fee is very small. The Forest Service also requires that certain digging and conservation practices be followed. Check with the U.S. Forest Service for current harvesting regulations.

Hunting Wild Ginseng

Wild ginseng hunting is an art that is jealously protected by those who practice it. Success tends to come only with experience and persistence. In looking for ginseng one should seek well shaded hardwood areas. Ginseng is often found growing among hickory, beech, and poplar trees. It is seldom found in thick stands of oak or mountain laurel. Seasoned ginseng hunters look for certain plants as a signal that they are in a potential ginseng spot. These include wild sarsaparilla, jack-in-the-pulpit, and golden-seal.

For those unfamiliar with local wild plants, there are a number of helpful pocket-sized field guides that provide information, descriptions, illustrations, and often photographs of regional wild plants. Most can be purchased at bookstores for less than $15.

The best time for hunting ginseng is September. By September the leaves of the plant have usually turned golden-yellow and stand out well against the forest floor. Roots will also be heaviest at this time and they will lose only about 65% of their weight in the drying process. Roots dug earlier in the spring and summer can lose up to 80% of their weight when dried.

Digging Ginseng

Before digging ginseng, one should ensure that the root is healthy and mature. With cultivated plants, roots should be not be harvested before the plants are three years old. If using the "virtually wild" method it is advised to wait even longer before harvesting.

Wild ginseng requires the harvester use some judgment in determining the age and health of the plant. One of the first and easiest indications of the age of a wild plant is the number of prongs it has. A healthy mature ginseng plant will have at least three prongs. Older plants can have as many as five prongs. Plants with less than three prongs should not be harvested. Another indication of a good root is the plant's stalk. If the plant has a strong substantial stalk, it is likely that the root is ready for harvest. However, if the stalk is thin and weak, even if the plant has three prongs, the root is probably too small to harvest.

Harvesting ginseng does not require much equipment. Usually a large screwdriver or a small gardening fork will suffice as a digging tool. In addition, a small sack will be needed to collect the roots. Good off-trail hiking equipment (walking stick, good boots, first aid kit, etc.) is advised for hunting wild ginseng.

It is important to exercise caution when digging ginseng roots. Roots that have been cut or broken bring a much lower price than whole roots. In selecting a digging tool, pick one that is not likely to cut the root. Also, when digging the root in the wild, the ripe berries from the plant should be planted close to the site of harvest.

Cleaning and Drying

Care should be taken in cleaning ginseng roots after harvesting. The roots may be rinsed off with water but should never be scrubbed or scraped. Scrubbing or scraping can damage and devalue the root. It is best to allow the soil to dry on the root for a few days and then shake it off. If there is still soil on the root, it can then be removed by swishing the root in a bucket of water. Remove only the loose soil from the root. Soil in the grooves of the root enhance its color and make it more desirable to buyers.

After roots have been harvested and cleaned, they must be dried. While some dealers will accept green roots, green roots do not bring the same premium prices as dry roots. Drying roots is not complex but it does require patience, care and attention. If roots are dried too quickly or at too high a temperature, they can crack or discolor. If they remain too damp they can mold.

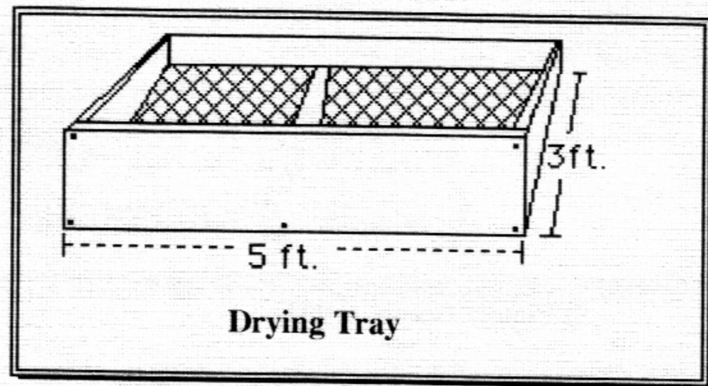
The first step in preparation for drying roots is acquiring or constructing drying trays. A drying tray is easily constructed by building a frame of 1" x 3" boards, five feet long by three feet wide. One board should be nailed on the bottom-center of the frame for support. After the frame is built, the bottom should be covered with 1/4 inch mesh hardware cloth.

Roots should be arranged in the trays in a single layer. There should be ample space between the roots to allow for drying. The trays should be propped up against a wall or set on saw horses to provide maximum air circulation around the ginseng. The best drying results are achieved if the temperature can be maintained between 90 and 100 degrees for at least the first twelve hours of drying. After this initial drying period, most of the moisture is gone from the roots and the temperature can be allowed to drop as low as 70 degrees. Using this method, the roots should be sufficiently dried within two weeks.

An attic or storage shed can be an ideal place for drying ginseng, provided it is warm enough and the humidity is kept low. Use of a dehumidifier and fans may be necessary. Ginseng should not be dried

in direct sunlight because sun drying can cause spots on the root.

Once dried, ginseng roots can be kept for a very long time without spoiling, provided they are kept free of excessive moisture. People sometimes hold their dried ginseng several years to wait for a higher market price.



Drying Tray

Marketing Harvested Ginseng

There are a number of avenues available for marketing ginseng. For small quantities of root it may be best to sell to a local dealer. Typically local dealers can be trusted to pay a fair price based on their judgment of the quality of the roots. As with any business dealings, it is a good idea to shop around for the best price.

For larger quantities of roots, it may be more prudent to deal with a large ginseng exporter. Large exporters have staff that are trained to adeptly gauge the various grades of ginseng quality. This can mean a higher price to the seller. To deal with large exporters it is usually necessary first to contact them and then mail a two or three-pound sample of the batch to be sold. Based on the sample, the exporter will quote a price and, provided the batch is similar to the sample, will pay on delivery .

A third option being explored by Syl Yunker and fellow growers around Stanton, Kentucky, is a ginseng co-op. By pooling their resources, the members of the Boone-Sang Cooperative Association hope to eventually deal directly with buyers in Asia, maximizing the price they receive for their roots and improving their responsiveness to the Asian market. A co-op has the added benefit of bringing people together to share tips on growing ginseng, to address security needs, and to provide input to public officials on issues of interest to ginseng growers.

CONSERVATION OF WILD GINSENG

To insure that the wild ginseng population stays healthy and that harvests will be sustainable for years to come, ginseng hunters should exercise good conservation practices. After digging ginseng, the berries from the plant should be planted close to the same spot and covered with leaves. Immature or small roots should not be harvested. Though there is a lot of variation in root shapes, a good root is about an inch in diameter and at least three inches long. If a smaller root is dug by accident, it should be replanted in the same spot and the earth around it tapped down. Harvesters should also take care when digging, not to injure or accidentally unearth adjacent ginseng plants that have not yet matured.

Another key factor in the conservation of wild ginseng is education. Because of the legendary prices paid for ginseng, many novice hunters tramp into the woods in hopes of getting rich quick. In the process, they often destroy immature plants and harvest without regard for future growth. People should be made aware that wild ginseng is classified as an endangered specie and that there are laws regulating its harvest and export. People should also be made aware that, while hunting wild ginseng can provide a substantial supplemental income, getting rich is unlikely. It typically takes from 100 to 200 mature roots to make a pound of dry ginseng. Even at the premium price paid for quality wild ginseng, 100 roots represents a lot of difficult hiking and digging, especially for the novice. It is important that tips on good harvesting and conservation are freely passed on. Conservation benefits everyone.

Importance of Forest Conservation

Intensive logging and clear cutting of forests presently pose a serious threat to wild ginseng populations. Ginseng grows best among stands of old growth hardwood trees. While trees may eventually grow again in

forests that have been cut down, the chances of ginseng returning within a generation are remote. The shade, soil, and drainage requirements of wild ginseng prevent it from growing without thick stands of large hardwood trees and rich forest soil. Exploitative logging practices damage and remove potential sites for the growth of wild and cultivated ginseng as well as other profitable and sustainable woodland crops.

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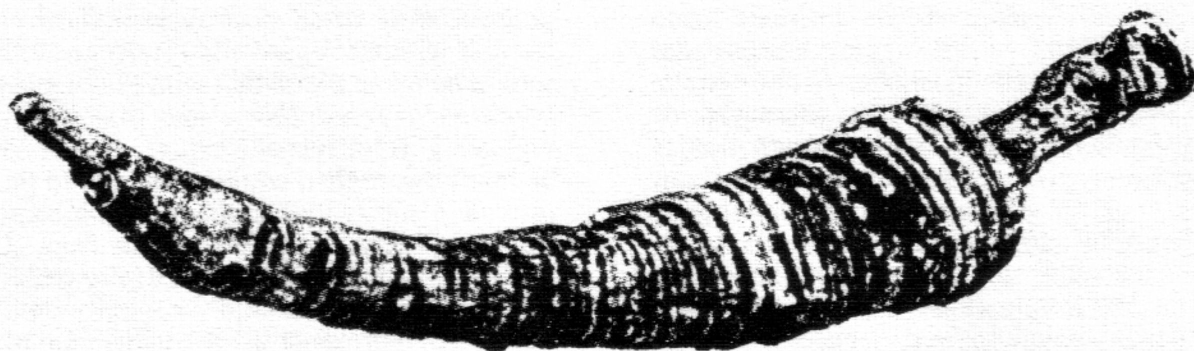

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