

STORAX FROM RED GUM

Red or star-leaved gum trees produce, when wounded, a grayish-brown, sticky, semiliquid substance containing oil of storax, cinnamic acid, etc. This balsam-like or resinous exudation is known locally as sweet gum, and commercially as storax or styrax. The geographical distribution of red gum (*Liquidambar styraciflua* Linnaeus) in the United States extends from Connecticut to southeastern Missouri, Arkansas, Oklahoma; south to Florida and Texas.

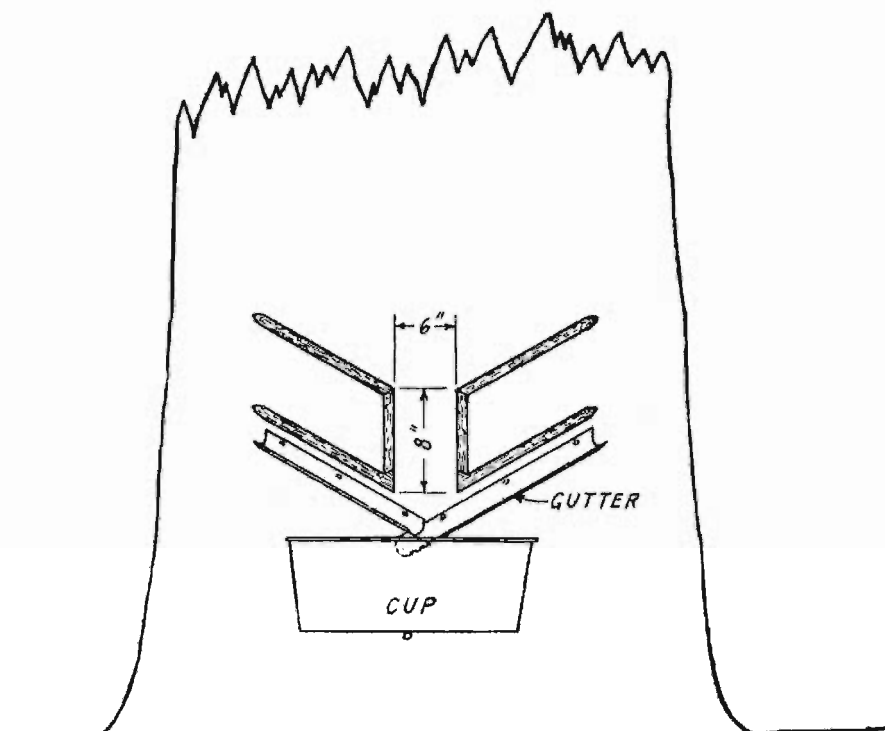
Storax is valued for use in mildly medicinal and pharmaceutical preparations and adhesives, as well as for incense, for perfuming such products as soap and glove powder, and for flavoring tobacco.

The storax from the red gum grown in the United States appears to be as satisfactory for all purposes as the more widely known and used storax from Asia Minor, which is a product of a different species, *Liquidambar orientalis* Miller.

Storax, unlike the oleoresin of pines, is not present in significant amounts in the normal wood. Its formation is induced by cuts or wounds that expose the surface of the wood beneath the bark. The storax is developed in the new wood that grows after the wound has been made. It exudes from wound resin passages, coating the wood and often soaking the bark.

Preliminary experiments made by the Forest Products Laboratory indicate that comparatively small wounds yield more storax than severe ones. For instance, girdling a tree yielded less storax than four horizontal cuts approximately $\frac{1}{2}$ inch wide spaced 4 inches apart and exposing about 12 feet of cut surface.

A microscopical study of specimens taken from the wood surrounding the horizontal cuts, however, indicated that the cuts nearer the ground were less productive than those higher on the tree. This difference in yield is not due to the height on the tree but to the fact that the supply of nutritive material from the leaves is hindered from reaching the lower cuts by those above them. It is therefore recommended that not more than two cuts be placed above each other and particularly that a vertical bar of bark be left between pairs of cuts to insure a good opportunity for the circulation of the sap (see sketch).



SUGGESTED METHOD OF CHIPPING RED GUM FOR STORAX.

This type of scarring might be further modified by adding vertical cuts, although these are known to

be less productive than horizontal cuts of the same length. The storax would tend to move down the more or less horizontal cuts into the vertical ones and some of it could be caught in a tin can or in a cup, such as is used in turpentine. It is possible that metal turpentine aprons or gutters, such as are shown in the sketch, carefully tacked on to the bark below each cut would also reduce the waste which results from the storax soaking into the bark.

Hacks, or "hogals," such as those used in the turpentine industry, would probably serve best to make the cuts or wounds. Deep cuts are apparently both unnecessary and harmful. All that is needed appears to be a clean cut exposing the outermost layer or the last year's growth of the wood. This should probably be freshened about every four weeks by removing a thin shaving (about $\frac{1}{8}$ inch thick) on the upper side of the cut, when the storax is collected. This shaving of wood more or less soaked and coated with storax may in many cases be worth extracting. Such shavings, however, should probably be kept separate from the cleaner storax, and perhaps sold with the trash that is strained out of the gum when it is cleaned. The producer usually accomplishes the cleaning of the gum by heating it in a double boiler and filtering it through cheese cloth before it is shipped.

Care should be used in selecting the trees to be wounded for storax production. Cuts should be made low on the butts or on the large branches. Inferior trees with decayed hearts or crooked trunks, which will not make good lumber, will, however, often serve well for storax production. Where possible the collection of storax should be made in advance of a lumbering operation so that the scarred trees need not stand for any great length of time exposed to insect or fungus attack. Where trees are scattered and not highly valued for lumber, farmers, high school boys, or other workers may be able to carry on small-scale operations during their spare time, for storax is purchased in lots as small as 4 pounds each. The collected gum should be kept as

cool as possible to prevent or reduce fermentation. Shipments can be made in friction-top tin cans.

Among the hardwood species cut in the South, red gum ranks second only to the oaks. About 25 per cent of the total annual cut of hardwoods in the United States, and 2 per cent of the total cut of all species, is red gum. It should, therefore, be possible to combine storax production with the cutting of some of the large tracts where red gum comprises 15 to 50 per cent of the cut.

The yield obtained in Louisiana from the horizontal wounds previously described averaged 2.5 ounces a year from each tree. The highest yields are said to be obtained in the warmer regions and seasons. Total girdling of trees gave a yield of only 1.5 ounces for each tree, which shows that normal tree health and vigor play an important part in securing a sustained yield.

More experiments to determine optimum conditions for storax production are needed and until more is known about all angles of the problem great care should be taken not to damage valuable timber. With due precautions taken, however, additional revenue can be gained from red gum forests through storax production, especially since over 40,000 pounds of storax has been imported annually for the past 2 years. The import prices for storax have ranged from \$0.40 to \$3.00 per pound for material of widely varying quality.