NAVAL STORES: THE INDUSTRY

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Naval stores are the derivatives of the crude gum—oleoresin—that comes from living pine trees, pine stumps, and dead lightwood. Some are byproducts from sulfate pulp mills. The term is limited generally to turpentine and rosin, but it can be said to cover pine tar, pine oil, and rosin oils. In the trade, the product from living pine trees is known as gum naval stores; the product from stumps, lightwood, and pulp mills is called wood naval stores. In Colonial days, gum was cooked down to a thick tar and used to preserve the ropes and caulk the seams of the ships—and from that we got the name “naval stores” for the products used now in a hundred ways unconnected with ships.

The gum naval stores industry, at its peak in 1908-9, produced 750,000 barrels (50 gallons each) of gum spirits of turpentine and 1,998,400 drums of gum rosin (520 pounds net weight each). The United States in normal times supplies the world with one-half its needs for turpentine and rosin. Since 1938, the production of gum naval stores has fallen off considerably. The industry in 1947-48 produced 294,028 barrels of turpentine and 828,128 drums of rosin, bringing a total return to the South of 39 million dollars.

The naval stores industry is rooted in antiquity. It antedates the Christian era in the Mediterranean countries. Early historians wrote of the process then used: How the natives gathered the resins or gums of the trees in that region and cooked them in open pots until a thick pitch was left in the bottom; how they stretched fleecy sheepskins over the tops of the pots to catch the oily vapors that arose from the boiling gum, and then wrung out the wet fleece to recover the oils; and how the oils were used in many products, one of which was for varnish for mummies. Genesis records that Noah was commanded by the Lord: “Make thee an ark of gopher wood; rooms shalt thou make in the ark, and shalt pitch it within and without with pitch.”

When Columbus discovered America, the center of production in Europe extended from Scandinavia through the Baltic countries. From them came quantities of tar and pitch for use by the fleets of wooden sailing vessels of all the European nations. King Phillip of Spain drew from this source for his Spanish Armada. Queen Elizabeth drew from it for her British fleet. One of the basic commodities sought by the Europeans in the New World was a source of naval stores for their ships.

Turpentining is one of the oldest and most picturesque of American industries. The production of tar, pitch, rosin, and turpentine started when the first settlers landed on the Atlantic coast. The report of Sir Walter Raleigh’s first expedition to America in 1584 referred to “the great forests of pine of species unknown to Europe until found in the New World.” The report of the second expedition mentioned once again “the trees that yielded pitch, tar, rosin, and turpentine in great store.”

In 1608 eight Dutchmen were sent to Virginia to make pitch, tar, soap, and rosin. Two years earlier, in 1606, the French were drawing turpentine gum from the trees of Nova Scotia. In The Maine Woods, Thoreau told about the tar burners of New England. One of the earliest acts of the Pilgrim Fathers was to request in 1628 that “men skylful in the making of pitch” be sent to them from England. The Plymouth and Massachusetts Bay Colonies produced great quantities of tar and pitch from their beginning as colonies, as did all the other North Atlantic colonies from Maine to New Jersey. The first tar burners in New England and later on in North Carolina used the dead and down wood, or,
the dead down lightwood, which they found in large quantities in the virgin forests all about them.

Colonists began coming in large numbers to North Carolina about 1665, and tar burning, a practice which until then had been a New England monopoly, began to take hold quickly. The new settlers in North Carolina, moreover, soon discovered that the abundant growth of southern yellow, or longleaf, pine was a more prolific source of gum than the pitch pine of New England. By 1700 the production of naval stores was an important part of the economy of North Carolina. As in New England, gum, tar, and pitch became established as accepted media of exchange in the payment of rent and public dues.

So important did England consider her source of naval stores in the Colonies that bounties and premiums were paid to producers to stimulate production and improve the quality of the products. The bounties, which were designed to equalize the heavy freight costs across the Atlantic in competition with the Scandinavian and other European producers, continued to be paid until the beginning of the Revolutionary War. In 1728 the British Navigation Acts prohibited the Colonies from shipping direct to any foreign country pitch, tar, and the crude gum, along with other specified commodities. The laws required the routing of such commodities through English ports. Measures for the regulation of the industry and for the payment of bounties were introduced by the Royal Governor of North Carolina: In 1735, providing for inspection of the operations; in 1736, prohibiting the encroachment of tar burners on crown lands; and in 1764, regulating the quality and quantity of all tar, pitch, and turpentine barrelled and sold, even requiring the producer’s brand on all barrels.

When the Colonies became a Nation that was trying to establish itself in world affairs and build up trade with other nations, naval stores had a significant role in merchant shipping. Naval stores served as a tribute with which we bought partial safety for our vessels on the seas, especially in the Barbary States of North Africa. In 1815 the States, with force, overcame the pirates of Tripoli, Tunis, and Algiers, and ceased paying the tribute.

The area of production of gum naval stores has shifted through the years. The first change from New England southward came about when it was found that the longleaf pine trees were better yielders than the pitch pine of New England. In 1850, North Carolina and South Carolina accounted for more than 95 percent of the total American production. The Carolinas did not keep up this yield, and in 1947 they accounted for less than half of 1 percent of the total production. The shift was brought about by the clear cutting of the virgin stands in those States without leaving enough seed trees for reproduction. Such exploitation of the virgin forests continued southward and westward through all the South Atlantic and Gulf States into eastern Texas.

As late as 1920, it was generally thought and officially predicted that within another 10 years gum production in this country would be practically at an end. That belief, probably more than anything else, gave rise to the development of the wood naval stores industry. Nature, however, has confounded the experts; instead of the failure of reforestation in the deep South, second-growth longleaf and slash pines have abounded to an extent that indicates that the production of gum naval stores can continue indefinitely. The major part of our production the past several years has come from about 150 counties in South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana. Southern Georgia and northern Florida produce more than 90 percent of the total.

During the seventeenth and eighteenth centuries, the crude gum was gathered in the woods, shipped to the
eastern seaports of Wilmington, Philadelphia, and New York, and forwarded to England for distillation. The technique in the woods consisted in what is known as the “boxing” system. By that system, a cavity or “box” was cut into the base of the tree to catch and hold the crude gum as it flowed down the trunk of the tree after scarification or “chipping,” which, then as now, was performed with a chipping tool or hack on each tree or “face” weekly from about March 15 until October or November. The boxing type of operation continued until the early part of the twentieth century. It was then found that, because of the smaller diameter of the second-growth pines, some improvements would have to be made.

Experiments conducted in 1901 and 1902 by Dr. Charles H. Herty led to the adoption of the cup and gutter system, which is still being used. Antedating the work of Dr. Herty, W. W. Ashe conducted experiments at Bladenboro, N. C., in 1894 in an effort to demonstrate the advantages of using cups and gutters over the practice of boxing the trees.

The crude cast-iron retorts that were used in the early distillation process gave a poor quality of product because of the reaction from the iron and because no water was added to the gum. About 1834 copper-pot stills were introduced. They were partly enclosed by brick work and the heat was applied directly from wood fires. Water was added to the gum; when heat was applied a separation of the gum took place. The condensed vapors produced the turpentine, and the residue in the still produced rosin. The turpentine, combined with water, was drawn off from the still and was passed through a simple dehydrator that contained rock salt. After this separation, the turpentine was run into barrels or tank cars for shipment, or into large tanks for storage. The melted rosin was then drawn off from the base of the still and passed through the wire strainers and layers of cotton batting attached to the wire screen. The rosin, still hot, was packed in barrels or drums, or in thick paper bags for marketing.

A naval stores experiment station under the supervision of the Department of Agriculture was established at Olustee, Fla., in 1932. The station has developed better gum-distillation methods and has done much to foster the establishment of large central distillation plants, an idea that originated with McGarvey Cline, a former director of the Forest Products Laboratory. The first central plant was completed by the Glidden Co., in 1934, in Jacksonville, Fla. In 1948 about 30 such plants, strategically located through the naval stores belt, processed more than 80 percent of all the gum. They have displaced all but about 100 of the small old-time backwoods fire stills, about 1,300 of which were scattered throughout the piney woods in 1933.

**Central distillation** means a more uniform product, better packaging, and improved facilities for distribution. The central plants, by providing a ready cash market, have opened the way for the smaller owner of timber to work his own timber rather than lease it to the old-time large commercial operators. The owner thus gets a better profit from this byproduct of his forest. Forest conservation is another result.

The change to central distillation has had a part also in breaking down the old factorage system of financing. Because working out a turpentine place took many years, an operator rarely could get credit from the commercial banks. Usually the large amounts of money required to set up and maintain a commercial turpentine operation were supplied by a few large quasi-banking institutions known as factors, who extended credit for the payment of leases on turpentine timber (usually for a minimum of 4 years), for the purchase of livestock, trucks, cups, tins, and for advances to pay wages.

Most of the factors also operated wholesale grocery and supply departments from which food, stock feed, clothing, and other supplies were fur-
nished to the operator. In turn, the operator would set up his own commis-
sary, from which he would dole out rations to his woods and still workers. The factors were protected by a blanket mortgage and usually by an insurance policy on the life of the operator. The operator had to deliver all the turpentine and rosin he produced to the factor as his selling agent. The deliveries were usually made to a storage yard, where the operator would get a warehouse receipt to be turned over to the factor.

Although the factor charged a liberal commission and initial storage and insurance charges, his services as sales agent were often simply paper transactions. Under this system the factors had a controlling influence on the entire gum naval stores industry. Their profits were large, but the risks they took were great and many bad-debt losses were incurred. This feudalistic pattern of financing was bitterly criticized, but it seemed to be the only system that could be devised under the circumstances; without it, the industry hardly could have survived.

Tar burning, which was practiced in New England, prevails in a few places in South Carolina, Florida, and Louisiana, the methods there being much the same as in Colonial times. Lightwood is stacked and covered with dirt (and sometimes with sheet iron) to make a kiln. A hole is dug in the firm ground, or, sometimes, a concrete base is provided for catching the pine tar that flows from the slowly burning timbers. A residue of charcoal is left. The process has an improved, modern counterpart in destructive distillation, in which the wood—pine stumps and dead down lightwood—is placed in a retort. Heat applied to the retort gives both a light oil distillate and a heavy oil or pine tar oil distillate. The light oil distillate is refined to make DD wood turpentine, dipentene, and pine oil; the heavy oil distillate is refined to produce various types of oils to meet specific needs for insecticides, plasticizers, soaps, pharmaceuticals.

In the steam-solvent process, the stumps are hogged, or ground, and placed in heated digesters. Live steam is introduced and the more volatile components are carried off and condensed. Later they are refined by fractional distillation into steam-distilled wood turpentine and pine oil. The remaining shredded resinous wood is treated with a mineral-oil solvent, which dissolves the rosin and the high-boiling liquid products. The solution is clarified and the solvent is evaporated, leaving a residue of wood rosin. The extracted wood is used for fuel or paper pulp. A variation of the steam-solvent process consists of first extracting the turpentine, rosin, and pine oil with a suitable solvent, and then separating those products by fractional distillation with steam.

Sulfate wood turpentine is recovered by condensing the vapors that are released from the pulping digesters in the production of pulp from pine wood by the sulfate process of making paper. The crude byproduct is heavily contaminated with sulfur compounds, which are removed by chemical treatment and fractional distillation. The refined byproduct is marketed as sulfate wood turpentine. The spent cooking liquor obtained in this method of making paper pulp, commonly called black liquor, is treated to recover a mixture of fatty and resin acids known as tall oil or liquid rosin.

Of 10,000-odd producers of gum, more than 7,000 are small gum farmers who work less than one crop of turpen-tine faces on farm wood lots (a crop consists of 10,000 faces). Fewer than 2 percent are commercial operators who work more than 10 crops. In 1947 only 55 operated more than 20 crops. The old-time commercial operator worked leased timber almost exclusively; sometimes in the past a turpen-
tining operation would be made up of leased timber from as many as 300 or 400 separate owners. Most of these larger producers' operations are now confined to large corporately owned
tracts. One of the largest of these tracts in the naval stores belt, for instance, is the Suwannee Forest of the Superior Pine Products Co., at Fargo, Ga. The tract contains 209,000 acres of timber, which has been efficiently managed for more than 20 years. The naval stores operations on the tract have been conducted by Harley Langdale, of Valdosta, Ga. Besides this acreage, Judge Langdale works other leased lands and fee-owned lands, and is regarded as the largest producer of gum naval stores.

More than 20 years ago the Sessoms Land & Lumber Co. acquired a tract of about 80,000 acres in Clinch and adjoining counties of Georgia. Among those who joined Alex K. Sessoms, of Cogdell, Ga., in establishing this timber-management unit was Austin Cary of the Department of Agriculture, to whom goes great credit for developing good forestry practices in the naval stores belt. The tract has been operated for naval stores by three brothers, Robert, Gordon, and Clarence Newton, who are the third generation of Newtons to engage in the industry, and who now operate three large units in Georgia and one in Mississippi.

Another large holding is that of the Tennessee Coal & Iron Co. in southern Alabama. For several years it has been operated on a lease basis by the Stallworth family of Mobile.

Another firm that has managed expertly large timber holdings is the Brunswick-Peninsula Corp., of Brunswick, Ga. It was founded by the late R. E. Benedict, a professional forester who had worked for the Forest Service and the Canadian Forestry Commission, and M. L. Rue, who is now the head of the enterprise. They purchased 110,000 acres of timberland 25 years ago in Glynn, Wayne, Brantley, Ware, and Clinch Counties in Georgia with the main aim of producing naval stores.

Among others who also have contributed toward improved conditions in the industry are W. B. Gillican, of Homerville, Ga., who, in a lifetime association with it, has exerted a wholesome influence on practically every phase of the industry; Turpentine and Rosin Factors, Inc., of Jacksonville, Fla., which for many years has been a large factorage house and which has since become a large distributor of turpentine in convenient and attractive containers; the factorage-dealer concerns of Taylor, Lowenstein & Co., of Mobile, Ala., and the Peninsula-Lurton Co., of Pensacola, Fla., which operate central distillation plants; the Columbia Naval Stores Co., of Savannah, Ga., which for many years was a large dealer organization and now operates several central distillation plants; James Fowler, of Soperton, Ga., who started planting forest trees on his 14,000-acre cropland plantation in 1925 and is now a foremost individual planter of tree seedlings; and the Gillis family, also of Soperton and among the pioneers in forest-tree planting.

The gum naval stores industry has always been generally classified as a low-wage industry. In public hearings in 1933 it was brought out that the average worker's income was less than $6 a week. As late as 1940, the average wage of chippers was $7.50 a week; in 1948 it was about $32.

Besides the increase in earnings, improvements have been made in the past several years in the living quarters furnished the turpentine woods workers. Instead of miserable cabins with only clapboard shutters for windows, many workers now live in better cabins that have glass windows and electricity.
TAHAL STORAGE: THE FORESTS
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The naval stores belt extends across the Coastal Plain from the Savannah River to the Mississippi. It is a favored section for growing forest crops. Each acre of pineland can produce wood products, gum naval stores, and forage. Although the soils in most of the area are relatively poor for field crops, the long growing season insures growth of trees. The level topography makes almost every acre of dry land accessible for the easy removal of products. Tree planting is cheaper and easier than elsewhere in the country.

Forests occupy nearly three-fourths of the land area in the belt. Forest activities dominate the lives of scores of counties and towns, especially in the continuous forest areas of the "flatwoods," or lower Coastal Plain near the coast. Rail and road traffic runs heavily to pulpwood, logs, poles, gum barrels, rosin drums, and stump wood. Agricultural crops mostly are of minor importance. A large proportion of the rural people work in the woods, and get much of their fuel and meat from them.

People in the area are especially aware of the importance of forests to the future of the South. Residents who have watched slash pine stands or plantations spring up under protection are convinced of the importance of pine forests to the future of their communities. Nevertheless, it is quite clear that these pine forests are producing less than half as much as they could. It is obvious that doubling the size of the forest industries is the biggest thing that could happen in sections where forests already provide the greatest source of income.

The first steps in doubling the forest production in the naval stores belt are the rather elementary ones of fire protection and tree planting. The size of that task is shown in figures for Florida,