CHAPTER 6

FROM TREES TO TURPENTINE: HISTORIC PRACTICES IN THE COLLECTION AND DISTILLATION OF PINE GUM 1528 to 1940

In reading naval stores documents and folklife accounts, material culture scholars and historians have misinterpreted the colorful argot and technical jargon of the turpentine orchards and camp distilleries. In writing about naval stores production, authors have committed technical errors in describing the collection and distillation of pine gum (oleoresin) into turpentine and rosin. During 1989, the Florida Agricultural Museum staff began gathering scientific literature and folklore to supplement specimens and artifacts representing Florida's naval stores history. This effort resulted in the "Peoples in the Pines" exhibit depicting turpentine farming from economic, technical, and cultural perspectives.

The author researched historical accounts published in books and journals, and realized the need for a scholarly work that described basic turpentine operations and defined its working terminology and associated slang. The author has provided a glossary to aid the reader.

The use of naval stores predated recorded history. Mariners through the ages have used tar and pitch in the fabrication of wooden boats and for other purposes. Archaeologists have discovered an Etruscan shipwreck, circa 600 B.C., containing naval stores. By 315 B.C., the ancient civilizations of Greece, Macedonia, Asia Minor, and Egypt carried on a pitch trade. Roman records referred to the Gauls as *Piccos* (Resin Producers) whose industry was destroyed by invading Vandals in A. D. 407.[156] By the Middle Ages, tar and pitch production had moved to the vast coniferous forests of the Baltic region. During the seventeenth century, the Stockholm Tar Company's monopolistic control of Scandanavian naval stores encouraged England to exploit its American colonies' pine forests. On the North American continent, the Eastern white pine (*Pinus strobus* Linnaeus) of New England and Appalachia, the Pitch pine (*Pinus rigida* Miller) of the Northern Coastal Plain and Upper South, and the Longleaf (*Pinus palustris* Miller) and Slash (*Pinus elliottii* Englem) pines in the Southeastern

Coastal Plain provided the largest quantities of raw materials for shipbuilding.[157]

Forestry historians have written that the first European use of naval stores occurred in Nova Scotia in 1606, Virginia in 1608, and in New England after 1620. However, the de Vaca account of the Narváez expedition has placed the first instance of European tar production 78 years earlier in the Florida region, circa 1528.[158] In any event, the Virginia Colony first exported naval stores in 1608. The English government, much interested in this war material, provided Captain John Smith with the following instructions:

> "Pyne trees, or ffir trees, are to be wounded within a yarde of the grounde, or boare a hoal with an agar the third pte into the tree, and lett yt runne into anye thinge that may receyve the same, and that such issues owte will be Turpentyne worthe 18 pounds per Tonne. when the tree beginneth to runne softelye it is to be stopped up agayne for preserveinge the tree."[159]

The British government appreciated the value of forest conservation, but its colonists did not. Among the early colonial practices for collecting naval stores, woodsmen set a "large blaze on the tree." Under the conditions of slow combustion, the tree exuded oleoresin that carbonized on the bark. Collectors scraped this crude tar from the tree trunk and moved the fire father up the pine. As the flames traveled

higher, the pine dripped its gum from ax wounds chopped below the fire line and collected in a hole dug in the ground for that purpose. The practice of cutting gum collection cavities (boxes) into tree bases began at about the same time, and continued well into the twentieth century. However, collection of raw gum for distilling did not become an important part of the naval stores industry until after the introduction of the copper distillery in 1834.[160]

Tar burning in kilns, an ancient practice originating in Macedonia and Syria, remained the primary method of obtaining naval stores during the first two centuries of European occupation in North America. The pine forests of the continent contained plentiful quantities of "pitchy" (resinous) dead wood. (Southerners have called this "lighter pine" or simply "lighter.") North Carolinians were the most prolific practitioners of reduction burning dead pine boughs and trunks to obtain naval stores. After 1650, these "tar heel" settlers used the traditional charcoaling method to produce pine tar for local use and export.[161]

Charcoalers sought out a gently sloped site reasonably close to the area of deadwood accumulation. They built a saucer-shaped mound of clay and placed a funnel in its center. This connected with a drainage cavity leading to the mound's exterior on the downhill side. Here, it emptied into a ditch that joined the

mound with a collection cavity dug into the hillside. After splitting a quantity of pine into approximately three-foot lengths, the tarburners created a chimney in the mound's center directly over the drain. This they accomplished by stacking the cordwood to form a squared vent four to five feet high. Woodsmen covered the mound floor with small logs radiating around the chimney base and extending to the mound's lip. Next, they selected pine poles with three-to-five-inch diameters. These the woodsmen stacked on end by leaning them against the chimney flue on all four sides. At this point the kiln began taking on a "wigwam" like appearance. This process was repeated until the woodpile reached the outside circumference of the mound. Spaces between the palings were tightly stuffed with smaller pine branches, wood chips, and pine needles. Next, the tarburners began heaping dirt onto the timbered mound, taking care to avoid dumping any down the chimney flue. This they covered with a flat-sided pine shingle. After building up the soil cap to approximately a four-inch depth, the woodsmen added a covering of leaves and sod to insure, to the greatest extent possible, the air-tightness of the mound's sides. After digging equally-spaced intake vents around the mound's circumference, the kiln was prepared for firing.

Using a crude ladder fashioned from a pine pole,

a charcoaler carefully ascended the kiln's apex and removed the shingle cap. Into the throat of the chimney flue, he threw lightered wood chips and twigs for fire starter. The woodsman then struck fire to the tender resting on the central drain in the mound. The rest of this somewhat dangerous process required experience, but the hardest physical tasks were completed. Over a period that could extend from days to weeks, charcoalers watched the fire. Through alternately closing and opening the mound's base vents, tarburners caused the fire to evenly burn its way around the wood pile rather than catching all at once. If the fire began burning through the mound's earthen berm, the fire tender had to close up the hole immediately, an inherently dangerous task. In order to reach those unwanted vents higher up, a charcoaler had to climb up his pine ladder onto the mound. Many woodsmen were burned alive, having fallen through the kiln's pine needle and soil exterior.[162]

As the dead pine wood smoldered, it seeped carbonized oleoresin -- pine tar -- that flowed into the central drain and out into the ditch, puddling in the ground cavity. Tarburners dipped the tar into barrels for shipping. Naturally, a certain amount of wood fiber, dirt, and other impurities degraded the product obtained from kiln firing. A second cooking of the tar in open iron kettles rendered pitch, also a

colonial export. The kiln method left charcoal as a valuable residue purchased by blacksmiths and other metal workers.[163]

But, with the depletion of deadwood on the forest floor through charcoaling and woods-burning, naval stores operators turned increasingly to bleeding live trees for crude gum using the boxing method. With a narrow-bladed boxing ax, turpentiners chopped out three-to-four-pint boxes in pine-tree bases. Above the cavities, they used a specialized gouge, a bark hack, to cut V-shaped grooves into the wood. Turpentiners called this wound a catface. Pine gum seeped down the tree trunk and accumulated in the box. An expert hand could chop out 60 to 90 boxes a day. A woodsman finished the box by smoothing, or cornering, its edges. On average, a turpentiner could corner 6-8,000 boxes a day.[164] During the late nineteenth century after North Carolina's pine forests had been cut-over, naval stores producers became increasingly concerned about the loss of pinelands throughout the Southeastern United States. When operators learned of Dr. Charles Herty's successful experiments with his cup-and-gutter method, they quickly accepted the new method of raw gum collection.

After the introduction of the Herty system in 1903, significant changes in woodswork occurred, but the length of the workday did not. It began at dawn

and ended at dusk.[165] Turpentiners expressed it as working from "kin ta caint." The manager compensated woodshands for piecework, allotting each laborer a drift of 2,000 pines that were his or her tract.[166] Such a precinct of labor could have covered 40 to 100 acres, using the economic rule of 20 to 50 producing pines per acre.[167] The woodsrider supervised orchard crews within an area called a "ride," usually containing six to ten crops of 10,000 turpentine cups each and spread over two to three square miles of forest. He received a salary of $75 to $100 a month.[168] On small operations, the woodsrider kept track of how many trees each laborer worked per day. Larger operations employed a tallyman who recorded the number of trees worked by gang members. A sufficiently literate adolescent would often perform this simple accounting.[169] Upon completing a task, each worker called or sang out his tally chant, a word or phrase which he used exclusively, usually the name of a state or railroad.[170]

Turpentine farming had the economic advantage of providing year around employment for hands. In December and January, "hanging crews" began working the turpentine orchards.[171] The woodsrider used labor management techniques that represented a combination of the antebellum gang and task systems which evolved on cotton and rice plantations. Each worker performed

a specialized job with specific tools. For instance, the chipping crews solely cut streaks on trees, and the dip crews only dipped resin. But, each laborer on the six-man cup hanging crew performed a different task.

On virgin timber tracts, the axeman first prepared the trees by wounding them six inches from the ground. Using either a club ax or a straight-edged broadax with a 30-inch handle, he hewed off each trunk a short, flat slab of bark, severing it with a glancing blow. Stepping forward or backward, he split away a second, identical chunk adjoining the first in a clean and sharply-defined vertical angle. Turpentiners called this gash a catface. Against its bottom edge, the axeman held his broadax, and the mauler tapped it with a wooden maul to make an approximately eight-inch incision. An identical cut completed a pair of upwardly angled slits, nearly intersecting, for placement of the Herty metal gutters. On a crew where the hogal replaced the broadax, the gutterman slit these incisions with a Pringle ax, or gutter chisel, whacked in with a wood mallet. After smoothing the tree base with a claw hatchet, the gutterman inserted the tins. Developed in 1950 at the Southern Forest Experiment Station at Olustee, Florida, the Ball system of zinc apron and McCoy cup provided an alternative to using Herty

gutters and cups.[172] The gutterman nailed the metal "apron" below the catface, instead. However, lumber companies did not like to purchase tracts where nails had been used due to the potential for damaging expensive milling machines and saws.[173] To assuage this concern, turpentiners used double-headed scaffolding nails to facilitate their removal prior to selling the timber to a sawmill.

Throughout the drifts, the cup hanger drove a steeply inclined "eight penning flooring nail" just below the gutters to suspend the Herty cup, a clay pot for resin collection. Some operators preferred using wooden pegs for cup supports. If the rectangular McCoy trough was used, the hanger hammered two nails in parallel to support the metal vessel. (Herty Turpentine Cup Company also sold conically-shaped metal resin containers referred to as Birdeye cups.) Some crews included chippers who cut the season's first "healing" grooves on pines before implanting metal gutters. But, where operators used more specialized tools, the hogal men chipped these advance streaks. These wounds, made before the air temperature warmed enough to stimulate resin flow, produced greater volumes of gum earlier in the 28 to 32 week harvesting season. A six-man cupping team could hang 650 to 1,000 turpentine pots a day.[174] For this labor, the turpentine farmer paid hands $0.75 to

$1.25 daily, or about ten dollars per thousand cups.[175] On previously worked pines, the hanging crew moved gum accumulation vessels and gutters about two feet farther up the tree each year.[176] This cup and gutter system marked a major innovation over the injurious box-cutting method in America. Historians have often confused the word "box" (used both as a noun and a verb) with the turpentine cup. (Possibly, they have been mislead by photographs depicting the scraping of congealed resin, or scrape, into scrape boxes.) Patterned on a similar French practice, circa 1850 to 1855, Dr. Charles Herty refined and, in 1903, patented this procedure.[177] In later years, metal or plastic aprons conveniently nailed or stapled to catfaces replaced gutters. Galvanized troughs (McCoy cups) and plastic containers substituted for easily broken clay pots. Experiments with other materials including aluminum, wood, glass, paper, and even surplus army helmet liners proved too expensive or inappropriate.[178]

When the spring air warmed enough for resin to flow through tube-like ducts just below the pine bark, arduous woodswork began and continued until the first frosts of autumn. In late February or early March, chipping crews incised advance streaks on trees. Each laborer could cover 1500 to 2,000 faces a day.[179] For this the chipper earned approximately a $1.90 to

$2.50.[180] Using a hack, each chipper debarked a new catface or reopened an old one.[181] The operators purchased implements from the Council Tool Company or made their own. In the early 1900s, chippers preferred a #2 hack with a one-inch blade, or bill. But, experiments at the Powell and Samson turpentine tracts demonstrated that a smaller, #1 bill removed much less wood and stimulated resin flow equally well.[182] By the 1930s, hackbill sizes had narrowed to the #0 and #00 as the width and depth of streaks chipped on catfaces decreased in better practice. If the face extended up a tree above the turpentiner's head, he used a puller to groove the face. Chipping squads pulled fresh streaks on pine trunks weekly, covering Herty cups with chip paddles made of wood or cloth stretched on wire frames to prevent wood slivers from contaminating the collected resin. A properly wounded face resembled a series of symmetrical "V"s from which gum flowed, guided by tin gutters into Herty cup or zinc apron into galvanized collection trough.[183]

Depending on the pine stand's productivity, dipping gangs collected resin on a biweekly or monthly basis. Men, women, and boys dip-paddled the raw gum from cups into wooden buckets hand-carried or wheelbarrowed through the drifts. When filled, these buckets weighed approximately 50 pounds.

Turpentiners preferred tupelo wood for hand-carved dip spoons, and manufacturers offered iron resin scrapers, as well. The dippers emptied these five- to eight-gallon containers, often former nail kegs, into blue whistler barrels nearby or on mule-drawn wagons.[184] An able-bodied man could collect 30 buckets of gum a day which filled four 50-gallon drums or seven 31-gallon barrels. For dipping, the operator paid $3.00 to $4.00 a day.[185]

Table 1[186]

1929 Monthly Earnings of Six Naval Stores Employees

Month	No. 1 Chipper	No. 2 Chipper	No. 3 Chipper	No. 4 Dipper	No. 5 Dipper	No. 6 Dipper
Jan.	$30.00	$45.85	$10.18	$29.65	$ 5.72	$43.96
Feb.	27.82	20.31	15.00	34.68	10.65	33.85
March	39.00	32.50	23.61	26.31	15.82	14.00
April	28.91	31.72	25.16	35.00	14.53	26.72
May	23.59	22.60	28.33	36.50	21.98	31.63
June	00.00	48.17	36.30	54.75	31.06	32.13
July	00.00	34.40	29.04	41.75	27.19	17.63
Aug.	9.03	52.85	38.64	60.00	19.98	33.64
Sept.	21.35	41.85	22.43	41.12	18.07	36.47
Oct.	18.50	40.83	14.75	35.01	20.40	23.21
Nov.	20.00	30.24	17.00	20.21	15.00	31.47
Dec.	20.67	40.31	18.34	27.00	16.62	20.61
Total	$238.87	$441.63	$278.78	$441.98	$217.02	$345.32

Average for the six laborers, $327.27

No. 1 is white with 2 dependents.
No. 2 is black with 6 dependents.
No. 3 is black with 3 dependents.
No. 4 is black with 0 dependents.
No. 5 is black with 5 dependents.
No. 6 is black with 5 dependents.

Teamsters delivered the 500-pound, resin-filled casks to the camp fire still for cooking or to a rail depot or boat landing for shipment to a processor.[187] They earned approximately $1.80 a day.[188] Prior to the advent of the automobile, turpentine haulers used wooden-wheeled farm wagons. But, by the 1930s, many operators had fabricated wagon beds on the frames of junked cars and trucks. These rubber-tired "Hoover wagons" required only a single mule for power instead of the two-mule teams used to haul the heavier farm conveyances.[189]

At the end of the harvest in late October or early November, woodsmen went through orchards with tin-pullers, pairs of long handled pliers with nail claws.[190] Hands yanked out nails and removed cups and gutters, leaving them inverted near the tree base after cleaning.[191] This operation completed, scrape crews, using long-handled pull down scrapers, gouged crystallized resin from catfaces into wooden scrape collection boxes on small wheels.[192] Naval stores suppliers sold many manufactured tools,[193] and turpentiners fashioned specialty devices such as yoyos to remove scrape from high faces.[194] Women and adolescent children helped chisel scrape from low faces with flat-bladed, shove down irons and packed it into barrels which brought a dollar per 300 pounds at the still.[195] Seasonal jobs such as cleaning

collection pots during winter or raking pine straw from tree bases to prevent fire damage provided year-round employment.[196]

Camp operations centered around the distillery complex that included the fire still, the spirit shed and glue pot, the cooperage and blacksmith shop, the rosin yard, cup cleaning vat, barn, and wagon shed.[197] The still shed, was an open two-story structure, its tin roof punctuated by a brick chimney.[198] An elevated platform the height of a wagon bed adjoined one end of the fire still where teamsters and deckhands offloaded barrels of raw gum. The skid pole, a wooden ramp formed by two log beams, inclined upward to the second-story still deck where resin-filled casks stood in readiness for the copper kettle.[199] Sitting atop a wood-burning, brick firebox, a copper kettle, enclosed in a brick oven, held charges of 10 to 15 casks of pine gum.[200] A 50-gallon barrel of raw gum yielded approximately 11 gallons of turpentine and 330 pounds of rosin.[201]

The skillful boilerman cooked a charge for about three hours without the aid of gauges or thermometers, adjusting the distillation rate by listening through the kettle tailpipe to the burbling water and resin mixture.[202] The stiller carefully adjusted the firebox temperature, keeping the charge just below the boiling point of 290 degrees Fahrenheit for two hours and

adding water as necessary.[203] If the charge cooked too slowly at a low temperature, it would not vaporize. If overheated, the volatile blend could explode, badly scalding, even killing, the still's crew.[204] Camp managers hired whites and blacks as stillers. W. F. Clark, who worked on Consolidated-Tomoka turpentine camps beginning in 1919, recounted how stillers learned their craft:

> "It had to be somebody who knew what he was doing. The old rule was, that the old stiller, if he liked a young man who wanted to learn to still, would teach him for $15.00. The young man would work there, the old stiller would tell him what certain sounds meant, and what to do. Some mighty good stillers were trained that way."[205]

Turpentenes evaporated from the kettle charge and collected in a large cooper worm (coil) immersed in a cypress still tub, a two-story, water-filled cooling tank. Here, vapors condensed into turpentine and water, flowing into a separator barrel outside the tank or in a spirit room located in an adjacent shed. Turpentine, having a lower specific gravity than water, floated to the top of the barrel. An outlet pipe siphoned the spirits into a dehydrator cask where they filtered through rock salt to absorb any remaining water and out into a collection tank or barrel. Stillhands dipped the distilled turpentine from the collector into oak barrels or transferred it to railway tank car or tanker truck, using a hand

pump.[206]

With turpentine distillation completed, the boilerman "pulled" (raked) the fire from the firebox to prevent scorching the rosin, a byproduct remaining in the kettle. Opening the tailgate (the kettle outlet valve) allowed molten rosin to pass through several wooden frames covered with wire hardware cloth and cotton batting. The rosin strained through this apparatus, leaving behind fine particles of impurities that made up the dross. Filtration completed, four deckhands removed the strainer frames, exposing a long rosin trough from which they dipped the fluid into barrels where it cooled until solidified for shipping.[207]

The stiller and/or the camp manager judged the quality of the rosin in each barrel against 13 traditional color standards. Factors paid more for the lighter colored products. The Savannah, Georgia Naval Stores Market established the daily prices of turpentine and rosin. Inspectors quoted rosin values based on these thirteen grades which became progressively darker in color. The naval stores folk story associated with rosin grading claimed that an antebellum turpentine farmer used the names of slaves to distinguish between grades. With the improved rosin product obtained through steam distillation, the industry added three superior grades -- X-extra,

WW-water white, and WG-window glass -- to the nine traditional names: N-Nancy, M-Mary, K-Katy, I-Isaac, H-Harry, G-George, F-Frank, E-Edward, D-Dollie, and B-Betsy.

The centralized, industrial steam distillation plant replaced the camp fire still during the late 1930s. This change permitted producers to sell crude gum directly to manufacturers instead of distilled products to factorage houses. About the same time, wide spread introduction of metal drums occurred, replacing wooden barrels as the shipping containers of choice. Manufacturers preferred a standard weight container to determine prices. Wooden rosin barrels greatly varied in weight depending on how thick and how green their staves, heads, and bottoms were. Also, the metal drum had an apparatus on the side that allowed the gum grader to withdraw a sample of the pine gum, an accepted practice by 1935.[208] This inspector tested the oleoresin to determine the grade and number of pounds of rosin and gallons of turpentine the barrel would yield. The price paid to producers was determined by multiplying the potential number of gallons of turpentine in the barrel by the price per gallon and the number of pounds of rosin in the barrel by the price per 100 pounds of that grade. The sum of these two factors rendered the price per barrel paid the turpentine farmer after deducting for

the weight (tare) of his empty container.[209]

Before the acceptance of metal barrels during the Depression, every still employed a barrelmaker, or cooper.[210] He assembled the casks used to ship rosin. Operators purchased wooden spirits barrels for shipping turpentine from the Florida Cooperage Company and other barrel manufacturers throughout the Southeast.[211] In good practice, the cooper assembled 50- to 53-gallon casks using seasoned oak staves and metal bands purchased from naval stores suppliers. However, with the ready availability of worked out timber, many owners cut barrel staves from inferior green pine, instead. (Because the wood had a high moisture content, the barrels weighed more than the dried oak variety, hence more profit for the farmer.) This skilled tradesman placed staves into temporary wooden forming-hoops to get an approximate fit before hooping the cask with permanent metal bands. He inserted a small brazier fueled by oak shavings within the circumference of the staves. Periodic swabbings of the barrel's interior with a water-soaked mop prevented combustion and steamed the staves into shape. Using metal hammers and chisel-like hoop drivers, the cooper and his apprentice punched metal bands down the barrel while alternatively heating and swabbing until the staves took on the familiar mid-bulging contours narrowed at both ends by forming-

hoops. At this point, the cooper pared the stave ends with a croze, a half-moon shaped woodplaner, cutting grooves to accommodate the barrel head and bottom round. As the wood cooled, the cooper and his apprentice removed the forming-hoops, inserted the head (top) and the round (bottom), and hammered on the finishing bands.[212] In completing a rosin barrel, the cooper used a bung auger to drill the filling hole in its side.[213] To make the cask leakproof, the barrelmaker poured several gallons of hot, hide glue into the barrel, coating its interior with a gentle, rocking motion before draining out the excess sealant.[214]

By World War II, the cooperage craft had, for the most part, disappeared. Several factors should be considered in examining the decline of this trade. After the establishment of Consolidated Naval Stores Company in 1902, the seven partners acted to curtail the rising prices charged for spirits shipping barrels ($1.75 each). The factorage's directors established their own cooperage firm. Consolidated bought out a number of existing plants and put them under the management of the Florida Cooperage Company, a wholly-owned subsidiary. These barrel manufacturing facilities had the capacity to fabricate almost 400,000 spirits casks annually. As the cost of manufacturing wooden barrels increased, Consolidated

began supplying its operators with metal drums, replacing wooden barrels at many stills after 1930. Camp operators had the option of purchasing equipment to form metal drums at the camps, as well.[215] The metal containers seemed to have found ready acceptance for use in hauling raw gum from the woods to the still.

A study conducted by the U. S. D. A. Forest Products Laboratory in 1938 concluded that the quality of rosin barrels had decreased. With naval stores selling at their record low in 1938, operators cut corners by using inferior materials to construct rosin barrels. The Forest Service investigator, John Cuno, wrote, "Certainly the inroads being made by metal rosin barrels are the result of dissatisfaction with the present wooden barrel. It is true that the export trade still prefers the wooden barrel, but there is no telling how long this preference will continue..."[216] However, the centralized steam distillery had the greatest impact on the eventual elimination of the cooperage craft. In order for the gum inspector to sample rosin in a wooden barrel, the top had to be removed. Then, he loosened the semi-solid contents by "picking" it to a depth of six inches, a time consuming and, apparently, dusty procedure.[217] The new metal drums had self-samplers that facilitated easy withdrawal of a representative specimen from the

container's center.

The most significant factor in the decline of cooperage and, indeed, all camp distillery work was the change in the way naval stores were marketed. The centralized steam distillery permitted turpentine farmers to close their camp fire stills and to eliminate auxiliary operations. Along with the cooper, the stiller and his deckhands were among the first to lose their livelihoods to modern industrial processes. But, the axeman, the mauler, the gutterman, the cup hanger, the chipper, and the dipper would soon join them as relicts of a less sophisticated technology. Their labors unneeded and, today, nearly unremembered, spirits in the pines moved from the trees to the plants.

Today, working on turpentine farms and living in the camps' quarters would seem primitive, even brutal. But, despite racial oppression and the poverty of peonage labor, black turpentiners preserved a rich African-American heritage. In order to appreciate the cultural landscape of the turpentine orchards, an understanding of the labor force's composition and its attendant economy is needed.