

WEEKLY INDUSTRIAL RECORD.

PUBLISHED EVERY SATURDAY, DEVOTED TO NAVAL STORES, LUMBER AND MANUFACTURING INTERESTS.

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FOR THE CONSERVATION OF NAVAL STORES.

Interesting and Instructive Report Presented the Conservation Commission—Under Present Methods and Rate of Consumption, the Turpentine Resources of This Country May Become Practically Extinct Within Thirty Years—Necessity for Rigid Economy—Saving of the Cup Gutter System, Etc.

Washington, March 15, 1909.

The forthcoming report of the Conservation Commission will contain a chapter of unusual interest and the greatest possible importance to the naval stores industry on "Conservative Turpentining," prepared by George B. Sudworth, the naval stores expert of the Forest Service. The report is comprehensive and is designed to show how the industry may be given absolute permanence not only by the employment of conservative methods of turpentining, as in the use of the cup and gutter system, but also through the application of approved forestry methods in extending the areas of pine and in the systematic working of forests for naval stores in co-ordination with lumber operations. The necessity of fire protection is also pointed out. Mr. Sudworth's report is as follows:

"Naval stores are produced now almost entirely in the South Atlantic and Gulf States. Southeastern Virginia, Eastern North Carolina and South Carolina originally yielded this country's naval stores. They are produced now chiefly by Georgia, Florida, Alabama, Mississippi, Louisiana and Eastern Texas, but very little comes from the last named State. The center of production is in Florida, formerly having long been in Georgia. The seat of greatest production is likely to be next in the region of Louisiana, Mississippi and Texas, on which, after the exhaustion of Florida's pine forests, production must depend.

Species of Pines Yielding Naval Stores.

"The long-leaf pine (*pinus palustris*) and Cuban or 'slash' pine, which are pitchy, hard-wooded pines, yield the naval stores of our commerce. Practically all of the other native pines are capable of producing naval stores, but they are not now worked. The near future will unquestionably see at least two or three other Southern pitch pines added to the list of producing species, as well as one or two species of Western pines. It is not likely that the 'white' or soft-wooded pines will ever be resorted to as producers of naval stores.

How Naval Stores Are Obtained.

"Naval stores were first derived by charring or burning the wood of pitch and other pines in rudely constructed pits or kilns. The product then was pitch only, because charring the wood consumed or liberated as waste the volatile turpentine. Naval stores are now produced by distilling the crude resin obtained from living longleaf and slash pines. The principal product, turpentine, is driven off in steam in a simple copper 'still,' the turpentine being collected with the water after condensation. The residue, cleared of all im-

purities by straining, is commercial rosin. No other products are yielded.

"Various patented processes, which subject the ground or otherwise reduced 'fat' wood of long-leaf and slash pine stumps, waste logs and butts to steam or destructive heat applied to or in closed retorts, produce a form of turpentine, which, when refined, has practically the same commercial qualities as that distilled from crude gum or resin.

"This means of obtaining turpentine is comparatively new and still subject to considerable improvement. The steam processes have so far produced a purer grade of turpentine than any of the processes which carry distillation to the point of charring the wood. Much of their products require redistillation to obtain a pure grade of turpentine; but they derive, in addition to turpentine, charcoal and a residue of heavy pine-tar oil mixed with other ingredients not obtained by the steam processes. The charcoal is, however, practically a waste product, because it is usually too far from a market, while as yet there is very little profit derived from the sale of the heavy tar products.

Source of Crude Resin.

"It seems probable that much of the production of naval stores will be dependent in the future, as it has been in the immediate past, upon the production of crude resin from living trees.

"The utilization of the waste products of lumbering, such as stumps and other 'fat' portions of the trees for the production of wood spirits of turpentine, appears likely to be carried at once to a proper degree of strict economical use. But the magnitude of this utilization depends rather upon the enormous lumbering waste of the past than upon that of any system of lumbering now in vogue or likely to be in the future. The supply of dead and down 'fat' pine waste obtainable now is considerable (not determinable), but it is clearly exhaustible within comparatively few years. No such supply can be looked for even in the immediate future, and certainly not in the distant future, both for the reason that the enormous supply of southern pine timber once available is now very largely lumbered out, and because the intensely conservative lumbering of the present and future will leave comparatively little for the wood distilling turpentine plant.

The product, therefore, of wood spirits of turpentine can be safely put down as a small part of the country's total naval stores product. Production of wood spirits must then depend entirely upon the use of mill waste, and very much shorter stumps than old systems of lumbering are now affording. Mill waste yields

approximately only about one-fifth as much turpentine as the heavy 'fat' pine waste logs and high stumps which are worked entirely now for wood spirits.

How Crude Resin Is Obtained.

"The first method of obtaining crude resin was to cut a deep pocket or 'box' in the base of the tree for the purpose of collecting the resin which flowed from the cuts made in the tree's trunk just above the box. Now cuts, 'streaks,' were made, one above another, each week in order to stimulate a fresh flow of resin, which dripped from the edge of the new cut 'chip' into the box. The box held about three pints of resin, and at the end of every four weeks this was 'dipped' out by means of a thin, flat, spadelike tool called a dipper.

"The weekly chipping proceeded from March to September, when the resin would no longer flow readily. Each tree was usually worked, 'turpentined,' for from four to five seasons, when it was abandoned.

"At the end of four or five years the aggregate chipping done to each tree was equivalent to cutting off from two to six slabs (three-fourths of an inch to two inches deep) from two or three sides of the tree. The breadth of these slabs was from eight to twelve inches and from five to seven feet in height. Large trees were thus often practically stripped of their outer layers of living or 'sap' wood. Moreover, the depth and width of the box was so great as to actually cut away from one-third to two-thirds of the tree's thickness at the base. The trees were thus so weakened that heavy wind storms easily threw them in large numbers.

Area of Pine Forest Producing Naval Stores.

"Originally the long-leaf and slash pine forest, capable of, and in part, yielding the naval stores of this country, included Southeastern Virginia, the coastal plain of North Carolina, South Carolina, Georgia, Florida, Mississippi, Louisiana and the eastern border of Texas.

"But the area now producing naval stores is very much less, being confined practically to the extreme south border counties of Georgia, to Florida, to limited areas in Southern Alabama, to Mississippi, to Louisiana and to a considerably less extent to Eastern Texas. Virginia's and the Carolinas' original pine forests, being nearly or quite exhausted, are now practically out of the producing belt, while Eastern Texas forests, still largely intact, are really not yet in the producing belt. This is because of a prejudice among Texas timberland owners against 'turpentining' their pine, and also because they

fear the added danger of fire to their timber, which must be specially protected in a turpentine forest. Their belief is that working the trees for naval stores reduces the market value and price of the lumber cut from such trees beyond all profit realized from the turpentine operations. The same belief is shared also by some pine-timber owners in Louisiana and Mississippi. In the latter States this prejudice has prevented, until within the last five years, the rapid and complete establishment of naval stores production in that region. It is beginning to advance there now, through extensive combined lumbering and naval stores operations, and is likely within the next decade to become fully established throughout the long-leaf pine belt.

"The still quite general, unrelenting prejudice of Texas pine-timber owners is keeping the long-leaf pine forest of that region out of naval stores production, except in a few localities.

Region of Greatest Naval Stores Production.

"Georgia, Florida and Alabama, with Florida in the lead, now produce the bulk of our naval stores. Mississippi and Louisiana are next in point of production. Normally these five states, with Texas, should constitute the region of largest production. It is most probable, however, that the center of production, now in Florida, will move westward into the Mississippi River States. With the present generally wasteful methods of working the forests, this movement may take place within the next twenty-five years, or possibly sooner, owing to the present extremely rapid and exhaustive spread of the production in Florida.

Condition of Forests Producing Naval Stores.

"Of the pine forest now yielding or being worked for naval stores 87½ per cent is being worked by the ancient, destructive box system. Twenty per cent of this timber is passing the point of production, while the remaining 80 per cent is at the height of its productiveness and will cease yielding within two years. Of this producing forest 20 per cent has been more or less burned, which means that the total possible production has not only been appreciably reduced (amount undeterminable), but that as a result of burning the turpentine tree trunks the commercial quality of lumber available from this timber is also degraded. Charring the chipped or turpentine trunks produces extensive pitchy areas in approximately 8 to 10 per cent of the saw timber. The total loss from this damage is conservatively estimated at 5 per cent. It is believed to amount to from 5 to 10 per cent, for the