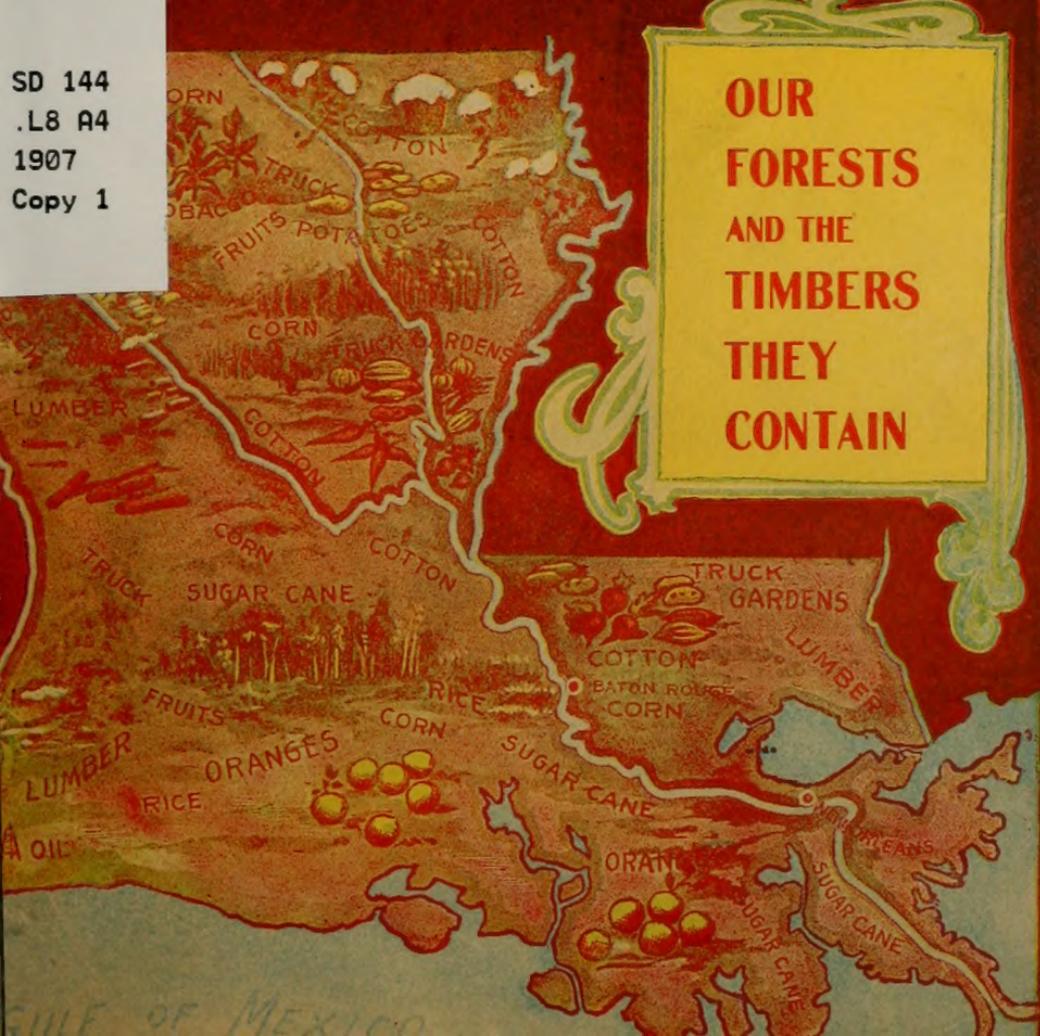


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OUR
FORESTS
AND THE
TIMBERS
THEY
CONTAIN

*SD 144
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Louisiana's
Invitation

SD 144
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LOUISIANA STATE COMMISSION

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LOUISIANA PURCHASE EXPOSITION

ST. LOUIS, MO.

Governor WILLIAM WRIGHT HEARD, President.
Major JORDAN GRAY LEE, Baton Rouge, La.
Col. CHARLES SCHULER, - - - Keachie, La.
Gen. J. B. LEVERT, - - - New Orleans, La.
Hon. HENRY L. GUEYDAN, Gueydan, La.

Dr. WILLIAM CARTER STUBBS,
State Commissioner.

ROBERT GLENK,
Assistant to State Commissioner.

Don't fail to see the Louisiana State Building, a replica of the Cabildo, in which the transfer of Louisiana took place in 1803.

See also Louisiana's exhibit in the following buildings: Agriculture, Horticulture, Education, Forestry, Fish and Game, Mines and Minerals, Liberal Arts, Transportation and Anthropology.

THE STATE OF LOUISIANA IS MAKING THE FOLLOWING DISPLAY AT THE WORLD'S FAIR, ST. LOUIS :

1st. Louisiana State Building—An exact reproduction of the "Cabildo" of New Orleans in which the actual transfer of Louisiana from France to the United States on December 20th, 1803, took place. It is furnished throughout with furniture of the Empire and Colonial styles.

2nd. A grand display of agriculture in the Agricultural Palace, showing the products of the field and the machinery by which they are wrought into merchantable forms. A complete sugar house, a rice mill, an irrigation plant, cotton gins and presses, cotton seed oil mill, etc., are shown in perfect forms on a reduced scale. Forage and garden crops; tobacco (yellow leaf, cigar leaf and cigars, and the famous Perique in all of its forms); fibre plants and products; grains, grasses, clovers, alfalfa, etc., are shown in profusion.

3rd. A fine display of fruits and plants in the Horticultural Building—

on the floor of the main building and in the conservatory. In this display will be found the best collection of the finest pecans grown.

4th. In the Forestry Building will be found all the trees of her forest, and the products manufactured from them.

5th. In the Forestry Building, but on a different space, will also be found all of the birds, fishes and wild animals of the State.

6th. In the Education Building will be found the school exhibits of the State, from the kindergarten to the universities.

7th. In the Mines and Minerals Building, the "Devil in sulphur," a "Pyramid in sulphur," Lot's Wife in salt, crude and refined petroleum, marbles, coal, etc., fresh from the mines of Louisiana, are exhibited.

8th. In the Liberal Arts Building will be found topographic maps of the levees of the State (35 ft. by 4 ft.), New Or-

leans of 1803 (2 ft. by 2 ft.), and New Orleans of 1903 (15 ft. by 15 ft.). Two hundred maps of the Gulf Coast from 1500 to the present time, some rare old books, and a working model of the great United States Dock in New Orleans.

9th. In the Transportation Building are illustrations of transportation on the Mississippi River, past and present, beginning with the Indian canoe and ending with the monster ocean liner of today.

10th. In the Anthropological Building is a fine collection of Indian relics, including a number of baskets of rare and beautiful types.

Descriptive pamphlets of each exhibit may be had on application. For fuller information of the State, apply at the Louisiana State Building for "Handbook of Louisiana." Louisiana has a fully equipped Department of Agriculture and Immigration, which will cheerfully supply any information desired.

Apply to MAJOR J. G. LEE, Commissioner of Agriculture and Immigration, Baton Rouge, La.
and your wants will be filled.

Our Forests and the Timbers They Contain.

This pamphlet has been prepared to give information relative to our immense forests. Further information can be obtained by application to Prof. W. R. Dodson, in charge of Forestry exhibit from the State of Louisiana, in Forestry Building of the Louisiana Purchase Exposition.

The Forests of Louisiana and What They Contain.

Description of Pines.

SPECIES.

There are six species of pines growing native in Louisiana. Named in order of their abundance and importance, they are as follows:

- 1st. Long-leaf Pine (*Pinus palustris* or *P. Australis*)
- 2nd. Short-leaf Pine (*Pinus echinata*, or *P. mitis*).
- 3rd. Loblolly Pine (*Pinus Taeda*).
- 4th. Cuban Pine (*Pinus heterophylla*).
- 5th. Pond Pine (*Pinus serotina*).
- 6th. Jersey Pine (*Pinus Virginiana*).

DESCRIPTION OF SPECIES.

The Long-leaf Pine has three leaves or needles in a bundle, each nine to ten inches or more in length, with a cone six to nine inches long, and three to five inches in diameter, covered with scales seven-eighths to one inch broad, with wrinkled tops. Color of cones light chestnut brown, turning grey with age. The buds are three-quarters of an inch long, and one-half of an inch in diameter, and are silver white in color. The bark is moderately thin, broken by longitudinal and cross fissures, scaling off in thin plates. It has thin sap and very resinous heart wood.

The Short-leaf Pine has two to three needles in a bundle, one and three-eighths to four inches long, with cones one and one-half to two inches long, one and one-half to one and three-quarters of an inch in diameter. Scales five-sixteenths to three-eighths of an inch broad with light yellow brown tips. Buds three-eighths to one-half inch long and one-eighth inch diameter, and of brownish color. Fissures in the bark not so close together as in long-leaf pine, and the scaly plates larger and thinner. The bark is somewhat thicker and lighter in color.

The Loblolly Pine has three needles in a bundle, four to six inches in length; cones two and one-half to six inches long and one and three-quarters to three inches in diameter. Scales three-eighths to three-fourths inch broad, with smooth tips, and of a dull yellow brown color. Buds one-half to three-quarters of an inch long and one-quarter of an inch in diameter and of brownish color. The bark on the larger trees is three-quarters to one inch in thickness, and nearer a cherry color than that of any of the other pines. The longitudinal fissures are very deep.

The Cuban Pine has two to three needles in a bundle,

seven to twelve inches long, cones four to six and a half inches long, three to four and three-quarters inches in diameter, with scales eleven-sixteenths to seven-eighths of an inch broad, and a deep russet sherry brown color. Buds one-half inch long, one-quarter inch in diameter, and of a brownish color. The bark is thicker than the preceding species, and the fissures not so deep.

Pond Pine has three-leaved clusters of slender leaves from six to eight inches long, giving it much the appearance of the long leaf pine. The cones are two to three inches long, conical in shape; the scales are armed with slender incurved prickles which drop off as the cones mature. The bark is very similar to that of the long-leaf pine, but the scales are thinner and larger. The wood is very resinous.

Jersey Pine has only two leaves in a cluster, stout gray-green, from an inch and a half to three inches long. Cones oblong conical, from one to three inches long, scales armed with slender prickles. Bark is thick, quite dark in color, broken into smaller segments by longitudinal and cross fissures than are any of the preceding.

QUALITY, COMMON NAMES, ETC.

In regard to the common names of these pines, great confusion exists, not only among the denizens of the forests, but even in the lumber market. Among the

saw-mill men, engineers, architects and carpenters, Long-leaf and Cuban pines are never distinguished. Short-leaf and Loblolly pines are mixed indiscriminately. In building, "Southern Pine" or "Yellow Southern Pine" frequently satisfies the specifications of the architect and may come from any of the four species.

Technically, the wood of the four pines differ as follows: That of the Long-leaf and Cuban are about equal in strength, the former excelling by its finer grain and smaller amount of sap wood. As a rule, the same comparison may be made with regard to the Loblolly and Short-leaf pines. They are, however, very variable in weight and grain, and there will occur numerous exceptions to the rule. It is especially apparent that the wood derived from more southern localities is generally heavier and stronger than that grown further North. Hence great superiority of Louisiana and Texas Short-leaf Pine lumber.

There are a number of small mills that saw Loblolly exclusively, and it makes very satisfactory framing material and interior finish that is to be painted. For exterior finish it is not as desirable as the other pines, but if kept well painted is very durable for all exposed work also. The growth being rapid the annual layers are thick and the heart wood is small.

Superiority of Pine Trees.—Pines are the most important timber trees of the world. They attain this pre-eminence from a combination of properties. They pos-

sess such qualities of strength, elasticity, combined with comparatively light weight and ease of working as to fit them specially for use in construction which requires the largest amount of wood. They occur as forests in the temperate zones, often to the exclusion of other species, so that their exploitation is made easy and profitable. They are easily reproduced and are tolerably quick growers (especially Short-leaf and Loblolly varieties). They occupy the poorest soils, producing valuable crops from the dry sands, and hence are of the greatest value from the standpoint of national economy.

Importance of Pine Forests of Louisiana can scarcely be properly estimated. The immense development of the large timberless prairies of the Western States, whose rapidly increasing population depends mainly upon the forests of the Gulf for the supply of the material required in building up their homes; the large demands made annually by Central and South American Republics, for building timber in their port cities; the acknowledged adaptability of these straight timbers of Long-leaf Pine in car and bridge building and the consequent demand of large quantities by the different railroad companies of the West and South, all proclaim in distinct tones the present value of our lumber, and clearly foreshadow the probable enormous future wealth resident in these forests.

Area of Timber.—Referring to the “forestry” map* of Louisiana, the territories occupied by the different timbers can be easily traced.

Eastern Louisiana.—Entering the State from the east, it is found that “The Long-leaf Pine” covers this section to the extent of 3,880 square miles. Beginning at Pearl river on the east, it extends westwardly almost on a line with the Amite river, where it is supplanted by the short-leaf pine, and oaks and hickories on the uplands, and by the hardwoods of the Mississippi bottoms. Slightly undulating flat woods cover fully one-fifth of this area and with a somewhat loamy porous soil, support a better timber growth than is generally found in the flat pine barrens of the plain. Owing to the proximity of this section to the Gulf coast and the numerous streams passing through it, this forest has been extensively invaded. Also along the lines of Illinois Central and New Orleans & Northeastern railroads, the adjacent woods have been depleted, but elsewhere large areas exist untouched by the ax or the saw.

The saw mills in this section find their market in New Orleans, and it is estimated that their total annual output is about 20,000,000 feet board measure. In this section a considerable quantity of naval stores is produced which also finds a market in New Orleans.

*As a part of the exhibit in the Forestry Building will be found a topographical map of Louisiana, with the distribution of her forest trees indicated in colors.

West of the Mississippi.—The forests of "The Long-leaf Pine" are geographically limited to the sands and gravels of the latest Tertiary and earliest Post-Tertiary formations. They make their appearance beyond the great alluvial plain, and are first seen in the uplands bordering the Ouachita river, which it follows for over fifty miles, and then extends west skirting Lake Catahoula and the alluvial lands of the Red river. North of this river, these pine forests cover an area estimated at 1,625,000 acres, extending northward for a distance of nearly sixty miles. Toward their northern limit the forests pass gradually into a mixed growth of deciduous trees and short-leaf pine. In the center of this region the pine ridges alternate with tracts of white oak and hickory. Tending towards the Red river, the pure forest of Long-leaf Pine, which covers the undulating uplands, is unbroken, and has been, as yet, scarcely touched by the ax.

On the low hills of this northern division of the pine belt of northwestern Louisiana the forests are somewhat open and are composed of trees of the first order as regards their dimensions; the well drained, warm and deep soil of sandy loam being highly favorable to their development. This is shown in the six test logs obtained from this forest by the "Division of Forestry" at Washington. These trees had on an average height of 117 feet, with 171 rings on the stumps, a diameter at breast height of 22 inches, and giving a timber 44 feet

in length and 19 inches in diameter. Upon one acre of this forest, there was found an average of 38 trees, of which fourteen were 24 inches in diameter, and giving a timber 45 feet in length; six were 19 inches in diameter and giving a timber 40 feet in length; nine were 17 inches in diameter and of a timber length of 35 feet, and nine of 13 inches in diameter and a timber length of 30 feet.

Nowhere, in the opinion of experts, will an average acre fall below 6,000 feet board measure.

As far back as 1892, the mills of this section shipped annually 56,000,000 feet to the markets.

South of the Red river bottom the forests of Long-leaf pine continue unbroken to the Sabine river and South to the treeless prairies of the coast.

Roughly speaking, these forests cover an area of nearly 3,000,000 of acres.

In the lower pine flats of this section the best merchantable timber has been removed by the mills at Lake Charles, but beyond on the lands rising gently above the flat woods will be found immense areas of Long-leaf pine of an exceedingly fine growth. The trees are tall and slender, and their timber unequalled by any in the Southern States. On these low ridges five trees were cut for test logs, and the average results given by the "Division of Forestry" are as follows: Height 118 feet, rings on stumps 185, diameter breast high 21 inches, length of timber 43 feet, diameter 18 inches. Upon one

average acre there were counted 44 trees, of which three gave timbers 50 feet long and 25 inches at butt; six 50 feet long and 28 inches at butt; nineteen 40 feet long and 18 inches at butt, fourteen 36 feet long and 14 inches at butt, or an average of over 15,000 feet board measure.

On a selected acre, regarded as first-class, there were counted 72 trees, with an aggregate of 35,000 feet board measure.

Lake Charles, Louisiana, and Orange, Texas, are the chief sites of the mills which consume the timber from this section. It is estimated that at least 500,000,000 feet board measure of Long-leaf pine will be cut during the present year from the forests of Louisiana.

Short-leaf Pine.—East of the Mississippi, occurs Short-leaf pine of rather a restricted area, not over 400 square miles, much of which has been cleared and is now under cultivation. This pine here, as elsewhere in the South, is intermixed with oaks and hickories. Again, much of it at present is second growth, the fields once cleared having been permitted to grow up with this tree. A few saw mills can still be found in this section, which covers the greater part of East Feliciana and parts of West Feliciana and East Baton Rouge.

West of the Mississippi river, north of the region of Long-leaf pine, is found an immense area of Short-leaf pine in the fullest perfection. It is here that this tree finds its best development and forms pine forests, ex-

tending over many hundreds of square miles with but little interruption. This forest extends north into Arkansas and west into Texas, and the United States census for 1880 estimates the amount of merchantable lumber of this tree, standing in these three States, at 87,000,000,000 feet board measure. The area in Louisiana is a little over 8,000 square miles. The resources of pine timber in these mixed forests of oaks, hickories and Short-leaf pine, removed as they have been from the highways of traffic, have been but slightly drawn upon. But the number of railroads now penetrating this section from the North are bringing with them saw mills by the hundred and this section is now a theatre of lumber activities. No less than five railroads have already entered this section of the State from the North and are gradually building southward. These forests, covering the undulating plains and table lands of this hill country, now rival in timber wealth and economic importance the great lumber regions of the coast.

Second Growth Pines.—Throughout the Oak, Hickory and Pine Uplands of this section occur large fields of second growth pine which have sprung up in fields (once cultivated) abandoned since the civil war. These fields are in many instances covered with a dense forest of trees, 65 feet and over in height, with a diameter of 10 to 18 inches, with no undergrowth whatever. Such forests, occurring with every stage of growth, afford highly instructive lessons of nature's method of re-for-

esting our hillsides. When young, the saplings form a dense thicket. In time they are thinned by the natural principle of "the survival of the fittest," the stronger trees killing the weaker by shade and an appropriation of the elements of growth. In time the stand becomes permanent, growth continues with an equal pace with each tree, until finally, at a period of fifty to one hundred years from birth, the pine has reached maturity and is ready for the sawyer's axe. Thus a rotation of Short-leaf pine, under favorable circumstances, may be reckoned at least every century, and of Loblolly every half century. These trees, therefore, can be relied upon for the re-forestation of large areas in a comparatively short time. The Short-leaf pine is sometimes bled for turpentine.

THE LOBLOLLY PINE

is perhaps the most active tree in taking possession of abandoned fields, and this faculty gives it a special economic significance in forestry studies. It is said that every fifty years will produce trees large enough for saw logs, three to each tree, averaging 16 feet in length. The best kind of the original timber from this tree is called "Rosamary Pine," now rarely found on the market. The oldest and best matured trees of the second growth are called "Swamp" or "Slash" pine, while the young and inferior trees are called "Oldfield" pine.

In Southwest Louisiana the Loblolly pine is found frequently scattered in the level woods bordering upon

the grassy marshes of the coast; while in North Louisiana, between Lake Beaudeau and Bayou Dauchite, and extending to the Arkansas line, this species forms the principal tree covering.

The original forest furnishes lumber with a fair proportion of heart-wood, free from blemish, and the equal of timber from Short-leaf, and sometimes even of the Long-leaf.

The introduction of dry kilns, by which the excess of moisture is driven off, thus preventing the sap wood from turning "blue," has done much to adapt it to many purposes for which it was once rejected. The tree is not worked for turpentine.

CUBAN PINE

is not found in West Louisiana, having its western extremity in the Pearl river valley of East Louisiana, where it extends, mixed with the Long-leaf pine, from the coast inland for a distance of 60 miles.

POND PINE

is not abundant in the State. It is found principally on the hills immediately adjacent to the flats and in the flats near the alluvial lands of the Red river and Ouachita. It is cut and sent to the mills with the Long-leaf pine.

THE JERSEY PINE

is found only in the alluvial lands and the adjacent

hills. It is quite abundant along many of the narrow bottoms of small streams and branches, but seldom invades the broad expanse of alluvial deposits along the principal streams. It is not highly esteemed for lumber purposes even when clear, and is generally knotty.

Uses of the Wood of Pines.

In actual use the wood of all species is much alike.

The coarse grained, heavy, resinous forms are especially suited for timbers and dimension stuff, while the fine grained wood, whatever the species, is used for a great variety of purposes. Formerly these pines were cut or hewn into timbers, but since "dry kilns" have been almost universally adopted, and the simple oil finish has supplanted paint, the Southern pine is cut into every form and grade of lumber. However, the Long-leaf and Cuban pines furnish the ideal lumber for bridges and supports to buildings, for which they are cut into sizes above 6x6 and over 20 feet long. These two pines also furnish large quantities of railway ties.

In naval architecture, for masts and spars, the Long-leaf pine excels. Large quantities of long and heavy sticks of square timber, sawn or hewn, are shipped to British and Continental ports for uses above described, and the demand is constantly increasing. The fine grained and "curly" varieties of Long-leaf pine lumber are susceptible of a high polish and have recently entered the list of high priced woods for ornamental inside

work. Besides supplying all home demands for building, for furniture, fuel, and railroad ties, the South exports annually over 1,500,000,000 feet, board measure, of Long-leaf pine to domestic and foreign ports.

Naval Stores.—The Long-leaf pine furnishes the bulk of the naval stores of the world.

The resin exuding from trees specially incised and shaped to collect it, consists of a volatile oil (spirits of turpentine) and a solid resin (rosin) held in solution. The resin yielded by an orchard the first year is usually styled "Virgin Dip." It is almost colorless and contains the largest quantity of volatile oil. The second year the resin has a yellowish color, becoming each succeeding year darker in color, more viscid and poorer in volatile oil. By distillation this resin is made to yield

Spirits or Oil of Turpentine,

which has numberless uses in the arts. There remains in the retort, in a liquid condition, at the end of the distillation, the non-volatile part of the resin. This is drawn into barrels and permitted to cool, when it solidifies. It is put on the market and sold as

"Rosin,"

which has varying colors (pale straw to dark brown) according to the nature of the crude turpentine; depending upon the number of seasons the trees have been worked. The market value is regulated by the quality.

Pine Tar is made, as before remarked, by the destructive distillation of fat pine, one cord of wood yielding forty to fifty gallons of tar.

Common Pitch is obtained by boiling down tar until it has lost about one-third or more of its weight. It is also obtained as a residue in the dry distillation of resin for resin oil.

Effect of Boxing or Bleeding.—Bleeding pine trees for their resin, which is practiced mainly upon the Longleaf and Cuban species, has generally been regarded as injurious to timber. Many architects and railroad men, in their specifications, exclude "bled" timber.

Special investigations, involving mechanical tests, physical and chemical analyses of the "bled" and "unbled," have been made by the "Division of Forestry," and the results obtained show conclusively, 1st, that "bled" lumber is as strong as "unbled," if of the same weight; 2nd, that the weight and shrinkage of the wood is not affected by "bleeding"; 3d, that "bled" trees contain practically neither more nor less resin than "unbled" trees, the loss of resin referring only to the sap wood, and therefore the durability is not affected by the bleeding process.

However, it is patent to anyone going through a forest that has been tapped for turpentine and abandoned for a few years, that great losses have actually occurred. A considerable quantity of rosin continues to collect on the scarified surface, and during forest fires this rosin

often catches on fire and results in burning the tree down, or burning it till it is broken off by succeeding heavy winds. In many instances, three or four sides of the trees are blazed and only a small strip of living bark left between the cut portions, and this strip is killed by the heat from the burning rosin near it, and the tree soon dies, and in succeeding fires is burned to the ground. In many instances where the land is leased, trees no more than six inches in diameter are tapped. These individuals never become very much older till they are destroyed by forest fires. The owner of the tree considers the pittance that he gets as rental and has little regard for the future of the forest. This is more especially true remote from the mills, where there is little or no market for the timber.

Lightwood.—In late years a profitable industry has been inaugurated, which utilizes the resinous stumps of pine trees as kindling material. The stumps are cut off close or into the ground, split into long narrow strips, which are rolled into small bundles ready for shipment to the cities.

Distilling Pine Knots.—The knots, limbs and roots of particularly "fat" pine are distilled, crudely to make tar, or carefully and with improved apparatus, Pyroligneous Acid, Acetone, Tar, etc.

Charcoal Burning.—The small trees and limbs unfit for lumber are burned for charcoal. Each neighborhood

burns locally its own charcoal, and in proximity to large cities, the industry is carried on to a large extent, to supply on the one hand the blast furnaces for the manufacture of charcoal iron, and on the other the demands of the city. Large quantities of charcoal manufactured in East Louisiana finds annually a market in New Orleans.

Product From the Leaves.—The green leaves of the pine furnish by distillation an essential oil of balsamic odor closely resembling spirits of turpentine. "Pine-wool" is made from the cellular tissue of the leaves, treated with a strong alkaline solution at boiling heat, the remaining fibre being cleaned and carded. It is used in upholstery and is said to be a valuable antiseptic in dressing wounds. It is also manufactured into textile fabrics—e. g., a carpet resembling cocoa matting—but closely woven, very durable, and a rich brown color. This is quite a growing industry.

Uses of Dry Pine Straw.—The dead leaves are raked from the forests and used for mulching the strawberry orchards in the truck raising sections and for this purpose they cannot be excelled. It is also largely used for bedding in stables and for storing potatoes.

CYPRESS.

While cypress is not popularly considered as a pine, botanically it belongs to the pine family. Next to the pine lumber interests in Louisiana stands the cypress

lumber industry. While vast areas have had all of the most easily accessible cypress cut, there are still extensive regions with an abundance of this most valuable timber unmolested.

There are about 1,000,000 acres of cypress timber in Louisiana, situated in the alluvial lands and in the swamps of the uplands. This area contains about 10,000,000,000 feet board measure of timber, which a score or more saw mills are converting into lumber at the rate of nearly 300,000,000 feet per annum.

Two varieties are recognized by lumbermen, the wood of the red or black, heavier than water when green, rather harder and considered more durable than the others; the unseasoned wood of the white cypress, lighter than water, and rather lighter colored than red or black cypress

The wood is soft but compact, straight grained, and easily worked. For making doors, sash, blinds and similar articles it stands without an equal. It is also the most desirable wood to be obtained for railroad tanks, cisterns, some kinds of cooperage, and is the most durable wood we have in abundance when in contact with the soil or exposed to the weather. It is extensively used for railroad ties, telegraph posts, bridging material, piling, fencing, for frame and finish on nice houses, and in all kinds of work requiring close joints and smooth finish without showing shrinkage from changes in the weather.

It makes the finest shingles that are to be secured.

Frequently the centre of the trees are affected with a fungus disease which results in the breaking away of portions of the tissue as if worms had been working through it. This is called "pecky cypress," and while it is disqualified for all uses where a good finish is required, the wood is more durable than the clear timber, and is therefore very desirable for many purposes where it meets all requirements.

COTTON WOOD, (*Populus monilifera*.)

The wood is soft and light, compact, not very strong, does not split easily after drying. It is not very durable when exposed to the weather unless well painted.

It is quite abundant throughout the alluvial lands, and is found to some extent in the hill lands not occupied with pine. The growth on the hill lands is but little used commercially. In the rich bottoms it often attains a diameter of three to four feet, and gives several saw cuts from each tree. There has been a wonderful development in the past few years in the utilization of cottonwood lumber. Quite a number of large mills are sawing it almost exclusively. It is also extensively used by the veneering establishments for making all kinds of fruit and vegetable boxes, egg cases and so forth. It is also used in making boxes for vehicles, and some farm implements. It is beginning to be used extensively for making boxes for shipping meat and gro-

ceries. The logs are floated on the rivers and bayous like cypress and pine. Immense quantities of this lumber is shipped to Germany and other continental countries of Europe, to be used for carriages.

Hard Woods.

The **Hard Woods** are found in the alluvial and Bluff lands on which they constitute the lumber growth, exclusive of cypress and cottonwood. They also occur interspersed with the pines, upon the better localities and creek bottoms of the "Good Uplands." Until recently these woods were scarcely touched. Now they are being purchased in large areas, saw mills have been erected and the finished timber is finding its way to domestic and foreign markets.

The following is a list of the more important hard woods of the State:

SWEET GUM, RED GUM, (*Liquidamber styraciflua*.)

The tree is quite plentiful in the Bluff lands and the higher portions of the alluvial bottoms, where it reaches a majestic growth, often attaining a diameter of four or five feet and a height of a hundred to a hundred and twenty-five feet. The wood is heavy, hard and difficult to split. It is close grained and takes a very good finish. It is used in the construction of houses, cabinet making, street paving, making wooden vessels, fruit boxes and so forth. The wood "buckles" badly when exposed to rain

and sunshine and is not desirable for exterior finish. The logs are exported to a considerable extent and the sawed lumber to a small extent. For exportation the logs are hewn with axes to a uniform eight sided figure. Logs finishing less than thirty inches in diameter are apt to be rejected.

Logs are sometimes found that present a very beautiful "calico" or clouded stain in the heart wood, and these logs command a high price in the market. They are shipped as "Satin Walnut" and are used abroad in cabinet making.

The amount of gum entering the market is rapidly increasing. There is opportunity for profitable enterprise in this line. The logs cannot be rafted unless attached to lighter woods to keep them from sinking. They are rafted with cypress and cottonwood.

BLACK GUM,

(*Nyssa sylvatica.*)

The black gum is much less abundant and less valuable than the sweet gum. It is found sparingly almost everywhere the sweet gum is found, and it invades the hill lands considerably beyond the limits of the sweet gum. The heart wood is small. The thick white sap is difficult to split, quite hard and close grained, and is difficult to work. It is employed in making hubs for wheels, rollers, ox-yokes, wharf piles and so forth.

TUPELO GUM,

(*Nyssa aquatica.*)

Grows only in very wet places, in the margins of ponds, bayous, and low places in overflowed lands. The trunk of the tree is generally very much swollen at the base. This portion of the wood is more or less spongy when green, light, difficult to split, very white but fairly close grained, when dried. These swollen butts are used in making bread trays, and kitchen utensils. They are very light, durable and clean looking as they become further bleached in use. The wood of the upper portion of the trunk is much harder and more compact and much heavier. The wood is also used in making wooden shoes, broom handles, and woodenware. It is being used to some extent for fruit and vegetable boxes, and should be used very much more extensively. Large quantities of the wood are obtainable, and it can hardly be excelled for strength and appearance and is comparatively light in weight.

The green logs can be floated in water when the tree is cut near the ground, leaving a large portion of the expanded base of the tree as a part of the log. The upper cuts will not float.

OAKS.

The White Oak, (*Quercus alba*), and Cow Oak, (*Quercus Michauxii*), are the most important oaks of the State. Timbermen seldom make a distinction between

them. The last named however is the most abundant, the largest and most valuable. The stave interests of Louisiana are very extensive. For many years staves have formed a part of the cargo of almost every departing steamer from the waters of the upper portion of the State. Frequently large barges loaded exclusively with staves from upper Louisiana pass down the Mississippi to the New Orleans market, where a very large exporting trade has been built up mainly with Louisiana staves. All of the railroads through the northern part of the State find the shipping of staves an important source of their revenue. A number of factories turning out the finished products ready to be put together after shipment are now located in the midst of the best timber centers, and are doing business to their full capacity. There is room for further development along this line in many sections. Millions of feet of good timber are annually being deadened and destroyed by the farmers clearing land because they are not in communication with a market for the timber. These woods are also used extensively for making all kinds of agricultural implements, and wheels, and for fuel and for fencing. The cow oak is used in making the best quality of farm baskets, especially cotton baskets.

The smaller trees are used for railroad ties, bridge work, and sometimes in building houses.

Post Oak, (*Q. stellata*), is found to some extent and is used for fuel and fence posts. Sometimes used for rail-

road ties. There are two or three other species belonging to the white oaks found in the State but are not of commercial interest.

Live Oak, (*Q. virens*), is chiefly valuable as an ornamental tree, and the most beautiful specimens of great size are to be found in southeast and south Louisiana. They form a characteristic part of the most beautiful landscape scenes. Formerly the wood was used on account of its exceeding hardness and strength and durability, in the construction of water craft, but iron and steel have supplanted it for these purposes.

Red Oak, (*Q. Texana*). This tree is confounded with the red oak proper of more northern latitude. It is superior in quality to the red oak. It is used for some classes of cooperage for which it is excellently suited. It makes a good lumber for cabinet making and interior finish, and for construction work. It exists in moderate abundance, and grows to be a very large tree, one of the largest of the forest. It works nicely when green, and is frequently free from knots for very long cuts.

Black Oaks.—There are several species of black oaks that make good forest trees. The water oak and black oak proper are the most common. They make a good quality of lumber for construction purposes. The laurel oak is said to be the hardest of the oaks when well seasoned. Timbermen use the wood of this species to make wedges used in felling trees, and cutting logs.

A well seasoned wedge of this wood can be driven into a soft tree like cypress a sufficient distance to hold one end of a scaffold on which the woodmen stand in cutting trees that have to be cut some distance from the ground.

MAGNOLIA,

(*Magnolia grandiflora*),

is found principally on the Bluff lands of the State, but to some extent on the high ridges of the alluvial lands and in the bottoms of the hill lands. It grows to be a large tree, and is now being used to some extent in furniture making. The wood is soft when green but hard when dry. The sap is very thick and white, and shows a very nice finish if dried quickly after being sawed. It is believed the uses of this wood could be very much extended.

BEECH.

(*Fagus Americana*),

occurs in nearly all portions of the State except the alluvial lands. On the Bluff lands it grows to great perfection. The wood is very hard and compact, and has a decided quarter grain. It is used in the manufacture of chairs, shoe lasts, tool handles and is frequently substituted for sugar maple. Kitchen spoons, forks and many wooden articles of household use are made of beech wood. Planters use a board of beech wood for making slides on which to carry plows from field to field. It makes good fuel. There is no reason why it should

not be used much more extensively for interior finish and for cabinet making.

ASH,

(*Fraxinus Americana*, and *F. Quadrangulata*.)

Some ash is found in almost every portion of the State, but the growth reaches its finest development in the alluvial and Bluff lands, where the first named species only is of importance. In many places ash is quite abundant. There are two factories in the State converting this wood into oars, supplying not only the retail trade of a large territory of the United States, but furnishing the Federal Government with oars for the navy. Some foreign governments have for years been receiving large shipments of oars for use in their navies, from Louisiana. It is sawed to some extent for flooring, for which purpose it is admirably adapted. It is also used for furniture making, for interior finish, for handles of tools, baseball bats, broom handles, carriage building and so forth. It is considered the best fuel wood grown in the forest.

The last named species is less valuable, but often cut with the former when of sufficient size and good quality. The water ash does not reach sufficient size to be of great importance.

HICKORY.

Several species of hickory are found in all parts of the State where hard woods grow. *Hickoria alba*, White

Hickory is the most abundant and most valuable species. From this species are made nearly all high class handles and carriage materials put on the market from this State.

A number of factories in the State are doing a profitable business. The scaly bark hickory is sometimes used for making handles of a cheaper grade. The heart wood of this tree is much thicker and the wood is more brittle and less elastic. This species grows also to large size, but is found only in low wet places.

PECAN.

(*Hickoria Pecan.*)

This species of hickory is abundant in the alluvial lands, and its greatest value is in its fruit. It furnishes food for man, and an important source of food for hogs that are dependent upon nature's supply for their sustenance a good portion of the year. The wood makes good fuel, and is sometimes used as wagon making material. Many cheap handles are made of it. The class of axe handles retailing at ten cents are mostly made of pecan.

Another species called the bitter pecan is a smaller tree and produces a fruit that is not relished by man or beast. The wood also is less valuable.

YELLOW POPLAR.

(*Liriodendron tulipifera.*)

Poplar reaches its highest development on the Bluff lands and the ridges of the alluvial lands. Except where

new railroads are invading new territory, most of the available poplar, in hauling distance of the railroads, has been cut. A very large amount has been shipped out of the State for exportation during the past four or five years. A few miles from the railroads, considerable poplar is still to be found. The lumber is very valuable for all kinds of purposes where a moderately soft, light wood will serve the purpose. It is one of the most durable woods we have, and is well suited for house building, though now considered too expensive for that purpose as the market price is much above that of other lumber that is well suited for building. It is used in the manufacture of wooden pumps, shingles, boat building, furniture, interior finish, light parts of farm implements, wagons, carriages and so forth.

SYCAMORE.

(*Platanus occidentalis.*)

The wood is very coarse grained with very large medullary planes giving it a very conspicuous quarter grain, and a handsome finish can be made of quarter sawed boards. It is used in furniture and interior finish. It is largely used for making boxes in which plug tobacco is packed. Butchers blocks are made of it, and it is used extensively for clothes pins.

PERSIMMON.

(*Diospyros Virginiana.*)

In wet localities this species attains the size of one to two feet in diameter, and from fifty to ninety feet

high. There is a considerable quantity of logs available measuring twelve to fifteen inches in diameter. During the past few years there has been developed a small trade in the exportation of this timber to foreign ports where it is used for making shuttles.

The wood is very close grained and hard, taking a fine polish.

MULBERRY,
(*Morus rubra.*)

The wood is extensively used for fence posts, and is considered as one of the most durable woods for this purpose that can be secured. It is seldom more than twelve to fourteen inches in diameter.

CEDAR.
(*Juniperus Virginiana.*)

This tree is found in abundance only in a few localities. Near Pine Ridge, La., is quite an extensive cedar break, where some fine specimens of the wood are to be found. It is used for posts, telegraph poles, railroad ties, and similar uses, and for making cooperage and lead pencils. Also planted as an ornamental plant.

WALNUT.
(*Juglans nigra.*)

The wood of the walnut tree, so valuable for furniture making, and for service where a durable wood in contact with soil or exposed to the weather is required, has been almost exterminated from the State as a commercial

timber. The large trees that remain are left for shade or for the fruit.

WILD CHERRY,
(*Prunus Caroliniana*),

is a little more plentiful than the walnut, but there is not sufficient good material in the State to make it worth while to undertake to use it commercially except in a very limited way in connection with other timbers.

HOLLY,
(*Ilex opaca.*)

While the tree does not ordinarily become very large, specimens eighteen to twenty-four inches in diameter are sometimes to be had, and a considerable quantity twelve to fifteen inches in diameter is available. The wood is very close grained, all white, there being no heart wood, and takes a very fine finish. The wood is adapted to a great variety of purposes.

ELMS,

The American Elm, (*Ulmus Americana*), is the most important elm in the State. The wood is hard, difficult to split, rather porous, and does not take a very good finish. It is used for wagon hubs, saddle trees, cooperage such as cheap barrels, and for veneering for baskets and fruit boxes, trays, and so forth.

The Slippery Elm, (*Ulmus fulva*), is used medicinally. The Winged Elm, (*U. alata*), is used as a shade tree, as is also the American elm.

BASS-WOOD,

(*Tilia Americana*.)

The wood is light and close grained. It is sawed into lumber under the name of white wood, and is used in wooden ware, cheap furniture, panels, bodies of carriages and for paper pulp.

WILLOW.

(*Salix nigra*.)

The wood is light, soft, weak, close grained. The bark is used as a tonic in the treatment of fever. The wood has little value. The wood would probably be well used for making fruit boxes or similar articles.

Young growth one to three inches in diameter is used for plaiting willow mats, used by engineers on the Mississippi river jetties and for stopping caving of banks at strategical points.

IRON WOOD,

(*Ostrya Virginica*.)

The wood is heavy, very strong and hard, tough, close grained, durable in contact with soil. It is used for fence posts, tool handles, mallets and many small articles. The bark is rich in tannin and is used in homeopathic practice.

HACKBERRY,

(*Celtis occidentalis*), L.

The wood is heavy, rather soft, not strong, and coarse grained. It is used for fencing and for making cheap furniture.

OSAGE ORANGE,

(*Toxylon pomifera*). Ref.

The wood is very heavy, hard and extremely durable in contact with soil. It is mostly cultivated. The wood is used for fence posts and for the manufacture of small articles.

HAW, RED,

(*Cratoegus coccinea*), and other species, L.

Wood heavy, hard, close grained, compact.

WILD PLUM,

(*Prunus Americana*), Marshal.

Wood heavy, very hard, strong, close grained, compact, satiny, susceptible of beautiful polish. Used for handles of tools, etc.

OSAGE ORANGE, BOIS D'ARC.

(*Maclura aurantica*), Nuttall.

Wood heavy, exceedingly hard, very strong, flexible, close grained, compact, very durable in contact with the ground, satiny, susceptible of beautiful polish. Color bright orange, turning brown on exposure. Sap wood yellow. Used largely for bedposts, paving blocks, railway ties, wheel stock. Planted largely for hedges.

THORN-LOCUST.

(*Gleditchia triacanthos*) L.

The wood is hard, strong, coarse grained, durable in contact with the soil. It is used for fence posts and for rails, for hubs of wheels, and to some extent in construction.

LOCUST.

(*Gleditchia monosperma.*)

Very similar to the above, except in size, as it seldom grows more than twelve inches in diameter.

MAPLE.

(*Acer rubrum*), L.

The wood is close grained, easily worked, and not very strong. It is used in the manufacture of chairs and wooden ware, and to some extent for furniture.

BOX ELDER.

(*Acer negundo*), L.

The wood is light, soft, close grained, not very strong. Occasionally it is used for manufacturing cheap furniture, sometimes for interior finish in houses, for wooden ware, cooperage, and for paper pulp. Small quantities of maple sugar are sometimes made from this tree.

PRICKLY ASH.

(*Xanthoxylum Clava Herculis*), L.

Wood light, hard, not strong, coarse grained, not durable. Bark used in medicine.

CATALPA.

(*Catalpa bignonioides.*)

Is found sparingly in the State. It makes very excellent posts, but is not large enough to be used for ties, or other purposes for which the larger growth of more northern latitudes is used.

SASSAFRAS.

(*Sassafras officinalis.*)

Has very light, tough wood, very durable, does not work easily unless very dry. The bark of the roots is used medicinally and for making tea which is sometimes used at the family table. The wood is used for making paddles, where lightness and strength and durability are desired. Sassafras is considered the most desirable wood there is for making the small water craft called "dug-out." One can easily carry a vessel large enough to transport several hundred pounds when placed in the water.

SPANISH MOSS.

(*Tillandsia usneoides*), L.

A so-called air plant found growing in all humid districts upon trees and hanging in festoons from the Live Oaks and other trees in the alluvial lands of this State, is of highest economic importance.

It is gathered and subjected to a treatment by which the outer cuticle is removed and the cellular tissue left, is carded and baled for market. There are numerous moss factories in this State, both in the cities and parishes, and the output annually is enormous. It is black in color, and is used in upholstering, cushions, beds, pillows, mattresses, horse collars, etc. Samples are on exhibition at the Louisiana exhibit.

List of Woods on Exhibition in Louisiana Exhibit in the Forestry Building, Louisiana Purchase Exposition, St. Louis, Arranged in Botanical Sequence :

Common Name—	Scientific Name.
Magnolia.....	Magnolia grandiflora.
Magnolia.....	Magnolia glanca
Tulip Tree, Yellow Poplar.....	Liriodendron tulipifera.
Papaw, or Custard Apple.....	Asimina triloba.
Linden, or Bass-Wood.....	Tilia Americana.
China Tree.....	Melia azederah.
Tooth-ache Tree.....	Xanthoxylum Clava-Herculis.
Hop-tree.....	Ptelea trifoliata
Sumac.....	Rhus typhina.
Sumac.....	Rhus copalina.
Grape.....	Vitis rotundifolia.
Supple Jack.....	Berchemia volubilis.
Buckthorn.....	Rhamnus Carolinianus.
Holly.....	Ilex apaca.
Holly.....	Ilex decidua.
Buckle-eye.....	Aesculus glabra.
Maple, Red.....	Acer rubrum.
Box Elder.....	Negundo aceroides.
Honey Locust.....	Gleditschia triacanthos.
Cherry.....	Prunus Pennsylvanica.
Plum.....	Prunus Americana.
Hawthorn.....	Crataegus spathulata.

Common Name—	Scientific Name.
Hawthorn.....	Crataegus apiifolia
Witch Hazle.....	Hamamelis Virginica.
Sweet Gum.....	Liquidamber styraciflua.
Tare Blanket.....	Aralia spinosa.
Dog Wood.....	Cornus florida.
Black Gum.....	Nyssa sylvatica.
Tupelo Gum.....	Nyssa uniflora.
Button Bush.....	Cephalanthus occidentalis.
Farkleberry.....	Vaccinium arboreum.
Sour Wood, Sorrel Tree.....	Oxydendrum arboreum.
Storax.....	Styrax grandiflora.
Persimmon.....	Diospyros Virginiana.
Bumelia.....	Bumelia lycioides.
Catalpa, Catawba.....	Catalpa bignonioides.
White Ash.....	Fraxinus Americana.
Blue Ash.....	Fraxinus quadrangulata.
Water Ash.....	Fraxinus platycarpa.
Sassafras.....	Sassafras officinalis.
Mulberry.....	Morus rubra.
Red Elm.....	Ulmus Americana.
Slippery Elm.....	Ulmus fulva.
Red-Bud.....	Celtis occidentalis.

Common Name—	Scientific Name.
Sycamore.....	<i>Platanus occidentalis</i> .
Hickory (White Hickory).....	<i>Carya alba</i> .
Pignut Hickory.....	<i>Carya glabra</i> .
Hickory.....	<i>Carya tomentosa</i> .
Pecan.....	<i>Carya olivaeformis</i> .
Bitter Pecan.....	<i>Carya amara</i> .
Scaly Bark Hickory.....	<i>Carya quatica</i> .
Walnut.....	<i>Juglans nigra</i> .
Willow Oak.....	<i>Quercus Phellos</i> .
Laurel Oak.....	<i>Quercus laurifolia</i> .
High Ground Willow Oak.....	<i>Quercus cinerea</i> .
Water Oak.....	<i>Quercus aquatica</i> .
Black Jack Oak.....	<i>Quercus nigra</i> .
Turkey Oak.....	<i>Quercus catesbaeli</i> .
Black Oak.....	<i>Quercus tinctoria</i> .
Spanish Oak.....	<i>Quercus falcata</i> .
Post Oak.....	<i>Quercus stellata</i> .
White Oak.....	<i>Quercus alba</i> .
Mossycup Oak.....	<i>Quercus macrocarpa</i> .
Overcup Oak.....	<i>Quercus lyrata</i> .

Common Name—	Scientific Name.
Cow Oak.....	<i>Quercus Michauxii</i> .
Peach Tree Oak.....	<i>Quercus (?)</i> .
Beech.....	<i>Fagus ferruginea</i> .
Hornbeam.....	<i>Carpinus Americana</i> .
Hop Hornbeam.....	<i>Ostrya Virginica</i> .
Birch.....	<i>Betula nigra</i> .
Alder.....	<i>Alnus viridis</i> .
Willow.....	<i>Salix nigra</i> .
Cottonwood.....	<i>Populus monolifera</i> .
Cottonwood.....	<i>Populus helerophylla</i> .
Jersey Pine.....	<i>Pinus inops</i> .
Short-leaved Pine.....	<i>Pinus mitis</i> .
Pond Pine.....	<i>Pinus serotina</i> .
Loblolly Pine.....	<i>Pinus Taeda</i> .
Cuban Pine.....	<i>Pinus Cubensis</i> .
Long-leaved Pine.....	<i>Pinus Australis</i> .
Red Cedar.....	<i>Juniperus Virginiana</i> .
Cypress.....	<i>Taxodium distichum</i> .
Cypress Knees.....	<i>Taxodium distichum</i> .
Palmetto.....	<i>Sabal palmetto</i> .

List of Articles in the Louisiana Exhibit of Forestry, showing some of the uses of Louisiana Woods:

Baseball Bats, of ash and cottonwood.
Baskets, of elm.
Boxes, Fruit, etc., of poplar, gum, cottonwood.
Bread Boards, of cottonwood.
Bread Trays, of Tupelo gum, sweet gum.
Butter-molds, of beech.
Butter-plates, of elm.
Butter-paddles, of beech.
Charcoal, of pine, white oak.
Clothes Pins, of beech.
Cooperage, of cypress, cottonwood, poplar, white oak,
cow oak, cedar.

Faucets, of cedar, beech.
Handles, Assorted, of hickory, white oak, cow oak.
Laths and Shingles, of cypress.
Oars, of ash.
Paddles, of sassafras, cypress.
Rims, or Felloes, of hickory, white oak, ash.
Spokes, of hickory, white oak.
Shingles, of cypress.
Shoe-lasts, of beech.
Spoons and Kitchen Utensils, of beech.
Horse Collars, and Bales, of Spanish moss.

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