SOUTHERN CENTRAL DIVISION.

ALABAMA.

The northern and northeastern portions of Alabama, embracing the foot-hills of the southern Alleghany mountains and the valley of the Tennessee river, are covered with a rich and varied forest growth of broad-leaved trees, in which oaks, hickories, ashes, walnuts, and cherries abound. South of the Tennessee river the rolling country is covered with oaks, through which belts of short-leaved pine occur. In Cherokee and Saint Clair counties isolated bodies of long-leaved pine appear, while a narrow strip of the same species stretches nearly across the state between the thirty-third and thirty-second degrees of north latitude. South of this central belt the country is again covered with forests of hard woods, which farther south, in the rolling pine-hill region, are mixed with a heavy growth of the long-leaved pine; and this species occupies, or once occupied, almost exclusively, outside of the numerous river bottoms, the sandy plain extending along the coast and reaching nearly 100 miles inland from the shores of the Gulf. Great regions of swamp covered with heavy forests of cypress occur in the southern part of the state, especially in the region watered by the lower Tombigbee and Alabama rivers.

The forests of northern Alabama still contain great bodies of hard-wood timber, although the demands of the rapidly-increasing iron industry located here have already stripped of their tree covering many of the low hills of northeastern Alabama. The best pine has been gathered from Mobile and Baldwin counties, in the neighborhood of Mobile bay, from the lines of railroads and the banks of streams heading in the southern part of the state and flowing to the Gulf through western Florida.

The pine forests of southern Alabama have long suffered from the reckless manufacture of naval stores.

During the census year 569,160 acres of woodland were reported destroyed by fire, with an estimated loss of $121,225. Of these fires the largest number were set to improve grazing, or by careless farmers and hunters.

The manufacture of cooperage and wheel stock, furniture, and other articles of wood is still in its infancy in Alabama and the other Gulf states. Such industries, in view of the magnificent forests of hard wood covering great areas in this region and the rapid exhaustion of the best material in the north and west, must in the near future be largely transferred to the southern states.

The cypress swamps adjacent to Mobile bay yield a large number of hand-split shingles and give employment to many persons, principally blacks.

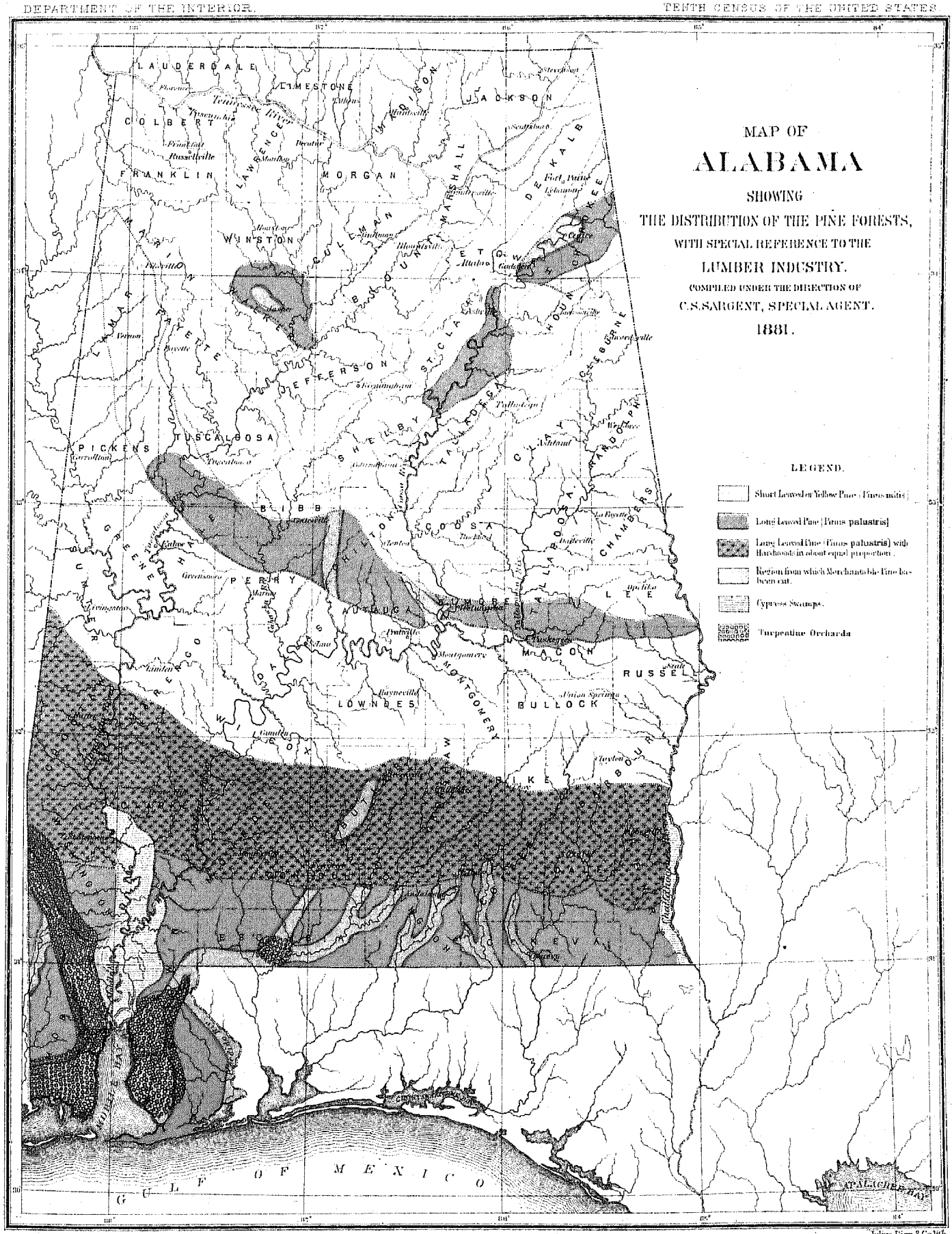
The following estimate of the amount of pine standing in the state May 31, 1880, was prepared by Dr. Charles Mohr, of Mobile, who carefully examined the whole pine region of the Gulf states:

LONG-LEAVED PINE (*Pinus palustris*).

Regions.	Feet, board measure.
East of Perdido river	4,055,000,000
West of Perdido river	2,000,000,000
In the region of mixed growth	10,000,000,000
In the Central Pine Belt	1,750,000,000
In the Coosa River basin	900,000,000
In the Walker County district	180,000,000
Total	18,885,000,000
Cut for the census year ending May 31, 1880 (including 77,500,000 feet, estimated, grown in Alabama and sawed in western Florida).	245,396,000

SHORT-LEAVED PINE (*Pinus mitis*).

In the Central Pine Belt	1,875,000,000
In the Coosa River basin	432,000,000
Total	2,307,000,000
Cut for the census year ending May 31, 1880, none reported.	


MAP OF
ALABAMA
SHOWING
THE DISTRIBUTION OF THE PINE FORESTS,
WITH SPECIAL REFERENCE TO THE
LUMBER INDUSTRY.
COMPILED UNDER THE DIRECTION OF
C.S.SARGENT, SPECIAL AGENT.
1881.
LEGEND.
Short Leaved or Yellow Pine [Pinus mitis]
Long Leaved Pine [Pinus palustris]
Long Leaved Pine [Pinus palustris] with Hardwoods in about equal proportion.
Region from which Merchantable Pine has been cut.
Cypress Swamps.
Turpentine Orchards
LAUDERDALE
LIMESTONE
JACKSON
COLBERT
FRANKLIN
MORGAN
DE KALB
WINSTON
CULLMAN
MARSHALL
ETOWAH
CHEROKEE
MARION
LAMAR
FAYETTE
WALKER
BLOUNT
JEFFERSON
ST. CLAIR
CALHOUN
CLEBURNE
SHELBY
TALLADEGA
CLAY
RANDOLPH
PICKENS
TUSCALOOSA
BIBB
COOSA
TALLAPOOSA
CHAMBERS
GREENE
HALE
PERRY
CHILTON
ELMORE
LEE
MACON
RUSSELL
LOWNDES
BULLOCK
MONTGOMERY
CHOCTAW
WILCOX
PIKE
BUTLER
CONECUH
COVINGTON
CRENSHAW
BARBOUR
HENRY
DALE
GENEVA
HOUSTON
MOBILE
BALDWIN
GULF OF MEXICO
Mobile
Pensacola
Apalachicola Bay
Scale
25 0 25 50 75 100 MILES.
Julius Bien & Co. lith.

In this estimate no account is made of small timber standing on some 1,282,000 acres which have been cut over, and from which the merchantable pine has been practically removed, or on 600,000 acres injured by the manufacture of turpentine.

There are fewer pine trees per acre in the region of mixed growth than in the pine belt proper, with which it mingles on the north; but the individual trees being larger, the average amount of standing pine per acre is greater, although generally of poorer quality.

Mobile is still the principal center in the state for the manufacture of pine and cypress lumber; a large amount of pine lumber is manufactured also along the line of the railroads penetrating the pine belt in Etowah county, and considerable hard wood is sawed in counties bordering the Tennessee river for local use and northern shipment. Mobile is also the distributing point for the naval stores manufactured in the state.

The following notes upon the forests of Alabama are extracted from Dr. Mohr's report:

"THE MARITIME PINE REGION.

"West of Mobile the road traversed for a distance of over 5 miles the plain, or so-called 'second bottom', composed of a more or less tenacious or sandy yellow clay. It has an elevation above the alluvial of the river of 15 to 25 feet, and is bordered on the west by the ridges of the stratified drift, which extend to within 6 to 18 miles of the shore-line. Near the coast this plain, flat and devoid of drainage, forms for many miles the low, wet savannas sparsely covered with a stunted growth of long-leaved pines; near the estuaries it is interspersed with tracts covered with a black, light soil, rich in humus and bearing a luxuriant growth of broad-leaved trees associated with a few *Coniferæ*, and with the wooded swamps which extend over the depressions about the base of the higher land, and follow the low, inundated banks of the numerous streams. The prevailing forest tree of this plain, now much cultivated in the vicinity of Mobile, is the long-leaved pine. Situations offering a moister and somewhat richer soil along the hummocks and gentle acclivities bordering the swamps and the bottoms of the water-courses are occupied by the loblolly pine. With this is often associated the pitch pine (*Pinus Cubensis*), which prefers, however, the more or less inundated and always wet, swampy forest, where its spreading crown towers above the gum trees and white cedars. Wherever in the plain the long-leaved pine has been cut down, this pitch pine principally and the loblolly pine spring up to replace it.

"Many acres can be seen in this region covered with thrifty seedlings of this pitch pine, and trees have sprung up, to my own knowledge, since 1865, which are now from 20 to 25 feet in height with a diameter of trunk of from 4 to 6 inches; and trees from 50 to 60 feet in height with a circumference of from 3 to 4 feet, forming quite extensive forests, may be seen upon the shores of the bay from which the primeval forest was removed about fifty years ago.

"Ascending the highlands of drift, with its porous soil composed of irregular strata of white or ferruginous sands, gravels, and pebbles interspersed with layers of clay, the home of the long-leaved pine, which here arrives at perfection and forms the entire forest growth over immense areas, is entered. Upon this formation, after the removal of the original forest, either the long-leaved pine takes possession again of the soil or is replaced by a more or less stunted growth of various species of oak (*Quercus Catesbæi*, *cinerea*, *nigra*, *obtusiloba*, and *falcata*), the mocker-nut, and a few other small trees and shrubs. What the conditions are by which such a rotation is regulated is not apparent. It is no doubt much influenced by the conflagrations which annually sweep through the woods and which are particularly destructive to the young pines, but it cannot be explained solely upon that ground. I have, however, observed that the more broken lands with the same sandy character of surface soil, but with a more argillaceous subsoil more or less impervious to water, are mostly covered with this second growth of deciduous trees, and that the flat table-lands with either a sandy or gravelly soil are invariably covered again with a second growth of the long-leaved pine. Among such young growths of this species I have never been able to discover a single seedling of the other pines.

"CYPRESS SWAMPS OF THE TENSAS RIVER.—The river was extraordinarily high, the lowlands being overflowed to a depth of more than 10 feet. The torrents which had fallen during the past three weeks caused a heavier freshet than any that had been experienced since the spring of 1875. Since that year no such opportunity has been offered for getting heavy cypress timber from the depths of these swampy forests. No idle man was to be found on shore; everybody who could swing an ax, paddle a boat, or pilot a log was in the swamp engaged in felling and floating cypress timber. All the mill-hands worked in the swamps; fields and gardens were left untouched, and even clerks from the stores were sent to the swamps as overseers.

"We soon entered the deep, dark forest stocked with some fine and large cypress trees, and came upon two negroes, each standing in his little skiff, engaged in felling a tree of the largest size. It was astonishing to witness the steadiness and celerity with which they performed their work, considering the instability of their footholds in the narrow boats. Every stroke of the ax told at the designated place, and it took them scarcely longer to cut a tree in this way than if they had been working upon solid ground. The top of the tree when felled is sawed off close to the first limbs by one man working under water a single-handled cross-cut saw. Another, provided with a long pole armed with a sharp iron spike, seizes the trunk and tows it, with the aid of

the slow current, to one of the lake-like sheets of still water which, interspersed with streams, are so common in these lowlands. Here the trunks are made into rafts and can be floated down the river to the mills along the banks below after the subsidence of the flood. The greatest part of this large timber is only accessible during the time of a high stage of water, so that the energies of the whole population are devoted during the times of freshets to getting out as much of it as possible. The large number of logs harvested shows clearly with what activity the destruction of these treasures of the forest is being pushed; and the reports, as of heavy thunder, caused by the fall of the mighty trees, resounding at short intervals from near and far, speak of its rapid progress.

"In 1831 Mr. Vaughn found these cypress swamps untouched by the ax. At present their resources are so diminished by the inroads made upon them during the last twelve years that, with a prospect of a rapidly-increasing demand for cypress lumber in the near future, he judges that they will be completely exhausted during the next ten years. This opinion is shared by all mill-owners here, who believe that in less than that time their business must come to an end. There is no hope that the supply will be continued by the natural increase of young trees. It is rare to find small trees among the large specimens. Seedlings and saplings are not found in these deep, swampy forests, and only occur in the openings and upon the banks of water-courses. The fact that the almost impenetrable shade, excluding the admission of light and air to a soil almost constantly drenched with water, is unfavorable to the growth of a new generation of the cypress, threatens to exclude it from localities where formerly this tree attained its greatest perfection. In swamps open to the influences of light and air, and not liable to prolonged periods of inundation, a growth of seedlings and small trees, especially along the banks of the smaller tributaries of the larger streams, springs up. The extremely slow growth of the cypress, however, during all stages of its existence, even if young trees spring up, destroys all hope of an adequate supply of this timber to meet the wants of coming generations. Trees of small size are as frequently cut as large ones. Saplings from 4 to 12 inches in diameter even are cut and supply the farmer, the builder, and the mechanic with material for many useful purposes. Logs not over 30 inches in diameter, however, are not worked up in the Tensas mills, which only use logs of larger size, the saplings being sent in rafts with pine logs to the saw-mills of Mobile. It is rare that a tree over 3 feet in diameter is found perfectly sound. Trees above 4 feet through are almost always invested with signs of decay. No timber seems to be open to so many defects as that of the cypress. Many of the trees are 'wind-shaken'; that is, portions of the body of the wood have separated in the direction of the concentric rings, causing annual splits which extend throughout a great length of the trunk, and if occurring repeatedly in the same stick render it unfit for use. A considerable number of the larger trees are rotten in sections. Logs cut from such trees may appear perfectly sound at both ends, but are found hollow and rotten in the interior. The inspection of cypress logs requires great experience and care to protect the buyer from loss. But there is one disease which particularly affects this timber, the cause of which is a perfect mystery to all interested in the matter. (*a*) From the center of the tree outward, although never extending into the sap-wood, occur great numbers of spindle-shaped, narrow excavations with perfectly smooth, rounded walls more or less tapering toward the ends, parallel with the bundles of woody fibers and nearly regularly disposed in the direction of the annual rings of growth. These cavities vary from one-half an inch or less to a foot in length, and are found from a few lines to an inch in width. They are filled with a yellowish-brown powder, the result of decayed, woody substance, although the walls of the cavities appear perfectly sound and unaffected by decay. These excavations are called 'pegs', and timber so affected 'peggy' timber. The cavities have no communication with the surface apparently, and remain always inclosed within the surrounding belt of sap-wood. It is only in the case of very old trees that the larger cavities produced by the junction of the pegs sometimes reach openings produced by external decay or accident. Undoubtedly these pegs cause the large hollows so often found in the center of large-sized and apparently perfectly healthy trees. Some of the timber of medium-sized specimens is honey-combed with these pegs. Such peggy stuff is useful for poles and pickets, which are found not less durable than if made from solid lumber.

"Two varieties of cypress timber are recognized according to the color, firmness, and heaviness of the wood, and are known as white cypress and black cypress; the latter has darker, closer grained, and more resinous wood than the former, and will sink in water. Its weight makes impossible the transportation of black-cypress logs by floating under ordinary circumstances, and the lumberman, unable always to recognize these peculiarities of the wood in the standing tree, cuts a chip before felling, which thrown into the water indicates, by its floating or sinking, whether it is black or white cypress. Trees of the heavy variety are deadened during the months of August and September by cutting a deep ring through the bark, and in the spring of the second season the timber is found sufficiently light to float.

"The cypress region of southern Alabama, which must be regarded as one of the great resources of its forest wealth, commences upon Mobile river, about 16 or 18 miles above its entrance into Mobile bay, extending through the lowlands upon both banks of this river, in Baldwin and Mobile counties, where it covers an extreme area of from 75 to 80 square miles. It extends northward to the junction of the Alabama and Tombigbee rivers, covering

a This injury to the cypress is caused by a fungoid plant not yet determined, although widely distributed along the Gulf coast.—C. S. S.

large tracts in the delta between them, follows northward the course of these streams, and covers the extensive swamps which border their banks and the mouths of their numerous tributaries. Upon the Alabama the cypress swamps extend to the lower part of Clarke county. Next to the Mobile River region the largest supply of cypress can be drawn from the extensive bottoms of the Tombigbee, about the mouth of Bassett creek, near Jackson. During the freshet of the present year (1880) a large number of logs from this vicinity will be sent to the mills on the Tensas.

"BALDWIN COUNTY.—A quarter of a century ago a pine forest, unequaled in the magnificence of its tree growth, and supposed at that time to contain an inexhaustible supply of timber, covered Baldwin county through its whole extent. To-day this forest, from the line of the Mobile and Montgomery railroad, along the eastern shore of Mobile bay, and along all the water-courses as far as Bonsecours bay, upon the Gulf, is entirely destroyed, and presents a picture of ruin and utter desolation painful to behold.

"The production of naval stores has been carried on in this region without regard to any of its future interests, and, the forest being exhausted, manufacturers have been driven to seek new fields of operation. In the old turpentine orchards, long abandoned, no young trees have sprung up. Too far remote to make it possible to get their timber to the saw-mills, the large trees which have sufficient strength to withstand the effects of the barbarous process of boxing drag out their precarious existence for years after the smaller and weaker trees have been laid low, and shade the ground sufficiently to prevent the start of a young growth. The wood of these old boxes, as dead pines are called, is, after the loss of their vitality, charged throughout with an excess of resinous matter, and is in that condition sold as 'fat' or 'light' wood, being greatly esteemed as fuel for the generation of steam. For this purpose this final product of the pine forest is carried to the city of Mobile in broad flatboats, propelled by one huge square sail, and steered by a ponderous horizontal beam serving as a rudder. In a few years, however, this, the least valuable and the last product of the pine forest, will have forever disappeared, and with it the last remnant of the original forest growth of this part of the state. Occasionally, under the shade of the trees left standing, a young growth of pine is found, and on the high and undulating table-land between Mobile bay and Fish river, where the soil is light and very porous, a low and scanty oak scrub has taken possession of the ground. Toward the banks of the water-courses, however, where the largest trees were first cut to furnish timber to the mills once situated on Fish river, thus early leaving the ground open to atmospheric influences, fine and promising groves of long-leaved pine now often cover areas of wide extent. I measured many trees in these young second-growth pine forests, grown up within the last twelve to twenty-five years, standing from 15 to 30 feet in height with a diameter of trunk of from 4 to 6 inches, of thrifty growth, and rapidly overcoming the small oak growth with which it had to contend for the possession of the soil. It is the turkey and the upland willow oak alone which occur in these thin soils, too poor to support the Spanish and black oaks.

"The banks of the North Branch of the Fish river are composed of marsh or white drift sand. The arid, sandy ground is covered with a dwarf growth of live oak and myrtle live oak, observed here for the first time, and which farther east formed by far the largest part of the oak scrub covering the shore-lines of the large bays of western Florida. Two or three miles beyond the forks of Fish river a belt of pine forest is reached, not yet destroyed by the mutilations of the 'box-cutter' nor bereft of its best growth by the log-gatherer; it covers the highlands and declivities between Fish river and the waters which find their way into Perdido bay. This may be regarded as a virgin forest, only slightly invaded up to the present time along the Blackwater creek, Hollenger's creek, the Perdido river, and the bay shore. The mills situated on Perdido river and bay depend entirely for their present and future supply of logs upon this forest of southern Baldwin county, although I learn that it is expected to supply them during the next five years only, even if their production of lumber does not increase. This forest extends over six townships and covers an area estimated at from 125,000 to 150,000 acres.

"THE FORESTS OF THE CHATTAHOOCHEE IN EASTERN ALABAMA, MIXED FOREST GROWTH, ETC.

"The forests which once covered the wide bottom lands of the Chattahoochee in the neighborhood of Franklin, Alabama (opposite Fort Gaines), are now reduced to small patches of woodland confined to the base of ranges of low hills bordering the plain valley to the southeast. The tree growth was found here to differ in no way from that found lower down, except that the short-leaved pine (*Pinus mitis*) occurs more frequently. The crab apple and the cockspur thorn are frequent along the borders of the woods, but the pond pine (*Pinus serotina*), which might have been expected here, was not observed. In the sandy, wet, and deeply-shaded bottoms of a sluggish stream winding along the base of these hills I found the spruce pine (*Pinus glabra*) abundantly associated with the loblolly bay, red and sweet bays, and stately magnolias. The live oak is not found here, and it is doubtful if it extends in this part of the Gulf region more than a few miles north of the thirty-first degree of latitude. The low hills do not rise more than 150 feet above the plain; in entering them the second division of the sylvan vegetation characteristic of the eastern Gulf states is reached—a forest of mixed growth, which must be regarded, on account of its extent as well as the variety of its vegetation, as one of the important natural features of the region. I am of opinion that the deciduous-leaved trees have an equal representation in this forest with the

conifers. This certainly was the case before the settlement of the country, but as the broad-leaved trees occupy the best land, the areas of hard-wood forest have been more reduced by the demands of agriculture than have the forests of pine.

"The distribution of the different species of trees throughout this region depends upon the nature of the soil and the topographical features of the country. In general it can be stated that the marls and calcareous Tertiary strata which form the lower ridges and more or less undulating uplands and plains are chiefly occupied by trees with deciduous leaves, and by a few yellow pines. Here oaks predominate, and especially the post oak (*Quercus obtusiloba*), which prefers the level or gently-swelling ground with a generous, warm, and open soil; with it is frequently found the black oak (*Quercus tinctoria*), the Spanish oak and black-jack upon soils of poorer quality, the last, particularly, preferring one of closer, more argillaceous character mixed with fine sand. The black-jack finds here its best development, rivaling often in size the post oak; it enters largely also into the undergrowth of the post-oak woods, forming dense thickets on lands too poor to sustain a heavier tree growth.

"The hickories are unimportant features in the forests of this region. In the dry uplands they seldom attain more than medium size, although in the more shaded and richer situations the mocker-nut and pig-nut are not rare.

"The long-leaved pine, on account of the broad extent it covers, its gregarious habit, and the splendid growth it attains here, must be regarded as the most important timber tree of this region. Confined to a siliceous, dry, and porous soil, it occupies the high ridges invariably covered with a deposit of drift, often found widely spread over the more elevated highlands. For this reason the pine forests crown the hills and cover the more or less broken plateaus. They are found also toward the southern boundaries of this region, where the sands and gravels of the drift of the lower pine region encroach upon and mingle with the strata of older formations. Under these circumstances it is evident that the line of demarkation between this and the pine region of the coast is difficult to determine. The best distinction is found in the fact that in the pine forests of the lower pine region the growth of pines upon the uplands is never broken by patches of oak, and that the short-leaved pine never occurs there. Another point of distinction is found in the nature of the second growth, which springs up after the large pines have been removed. In the pine woods in the region of mixed tree growth the subsoil, of Tertiary origin, seems more favorable to the growth of oaks than to a second growth of the long-leaved pine. This is replaced generally by oaks mixed with the short-leaved pine and various deciduous trees. It is safe to assert that the southern limits of this region coincide with a line following the northern boundary of the coast drifts, along which the lower strata have completely disappeared beneath it.

"PIKE COUNTY.—On the broad ridges which form the divide between the waters of the Pea and Conecuh rivers, upon a purely sandy soil, are found, within the forest of long-leaved pine, tracts with strictly-defined outlines from a half mile to several miles in width, covered with a dense vegetation of small trees and shrubs peculiar to the perpetually moist and cool hummocks of the coast. The soil covered with this growth presents no unusual features; it is as poor and arid as that covering the rest of these heights. Surrounded on all sides by pine forests, not a single pine tree is seen within the limits of these glades, called by the inhabitants 'pogosines', an Indian name the meaning of which I was unable to learn.

"The trees are of small growth, the willow oak, the water oak, beech, red maple, and black gum rarely rising to a height of more than 30 feet among the sourwoods, junipers, hornbeams, hollies, papaws, fringe-trees, red bays, and other trees of the coast. These glades verge upon deep ravines from which issue large springs, and from this fact I conclude that, below their sandy, porous soil, strata must exist perpetually moistened by subterranean waters near enough to the surface to supply the moisture necessary to support such a luxuriant vegetation.

"FORESTS OF THE TENNESSEE VALLEY.

"The character of the forest vegetation changes upon the limestone formation of the valley of the Tennessee. This new region of tree growth extends from the northeastern confines of Alabama to a short distance beyond the Mississippi state line with a width of from 35 to 40 miles, and reaching beyond the northern boundary of the state. Its prominent feature is the total absence of pine and the scarcity of other evergreen trees. A few scattered saplings of the loblolly pine are found on its lower borders, waifs strayed from their natural habitats, the lower part of Morgan county, the true northern limit of this species, in Alabama at least. The red cedar is the only evergreen tree common among the forest growth of this limestone region, and the durability of its wood combined with its beauty places this tree among the most useful produced in this region. The red cedar forms here almost exclusively the second growth after the removal of the original forest, covering everywhere with extensive groves the dry, rocky hillsides and flats. The timber, however, of this second growth is only fit for the most ordinary purposes. The trees branch low, and the trunks are consequently full of knots and unfit for anything except fence posts. The fertile portions of this region have been largely denuded of their forest growth, although more than half is still covered with wood, a considerable portion with almost virgin forest. This is particularly true of Lauderdale and Colbert counties and the mountainous portions of the counties of Madison and Jackson. The vast quantities of oak, ash, walnut, and poplar timber contained in these counties can be sent to northern markets as soon as the Tennessee river has been made navigable by the removal of the obstacles at the Mussel shoals.

"The road from Decatur to Moulton, in Lawrence county, leads through broad and fertile valley lands, broken, as the mountains are approached, by limestone ridges jutting out into the plain. The beautiful Moulton valley, inclosed by the low foot-hills of the Sandy Mountain range which form its southern boundary, shows only along the base of the mountains a remnant of its original tree covering. Here the water oak, willow oak, red oak, mulberries, elms, and ashes were the trees found in the lower situations, and on rolling, higher land the white oak, the black oak, post oak, sassafras, and dogwood formed the prevailing forest growth. The lower flank of the steep escarpment of the highlands, a terrace of limestone cliffs mostly destitute of soil, bears a stunted tree growth. Here the red cedar and the upland hickory abound, and where the surface is less broken and a deeper soil covers the rock, chestnuts make their appearance with white oaks and the shell-bark and mocker-nut hickories. The ascent is less precipitous as the sandstone ledges are reached, and here the yellow pine (*Pinus mitis*) and the scrub pine (*Pinus inops*) are prominent among the oak forests of the mountains. When the crest of this abrupt decline is passed the oak forest is reached. It covers the extensive table-land between the Coosa and the eastern tributaries of the Tombigbee, and extends southward from the valley of the Tennessee to the lowlands commencing below Tuscaloosa, occupying an area of nearly 6,000 square miles.

"GENERAL REMARKS.

"The forests of long-leaved pine are principally confined to the following limited regions east of the Mississippi river: 1. The Great Maritime Pine region. 2. The Central Pine Belt of Alabama. 3. The Pine Region of the Coosa.

"Pine forests of more or less extent, too, mixed with woodlands composed of deciduous-leaved trees, occupy the ridges covered with a porous siliceous soil in the region of what I have called the mixed tree growth, and which upon its southern borders verges upon the Coast Pine Belt. Upon the heights of the low ranges of the metamorphic region of Alabama are also found more or less extensive tracts of this pine, generally, however, of inferior quality and size, while as far north as the thirty-fourth degree of latitude patches of thinly-scattered pine are met on the brows of the mountains, and, rarely, on the plateau of the carboniferous sand.

"The pine forests of Alabama, from the Escambia to the Mississippi state line, in the counties of Monroe, Baldwin, Washington, Mobile, and in portions of Clarke county, cover 3,500 square miles. Of these about 1,000 square miles have already been more or less destroyed in the manufacture of naval stores. Allowing 25 per cent. for land under cultivation, or covered by a forest of different trees, by water, etc., there are still 1,875 square miles left of this forest to supply the demands of the future.

"The whole amount of long-leaved pine lumber received at the port of Mobile averages about 60,000,000 feet, board measure, representing the product of mills at that place and along the various railroad lines leading to it. The amount of hewed square timber received is still small, but the business of exporting timber of this sort promises to assume large proportions in the near future.

"THE PINE BELT OF CENTRAL ALABAMA.—This forest occupies the deposits of drift which, in a strip varying from 10 to 30 miles in width, traverses the state from east to west. It is nearly in the center of the line connecting its eastern and western limits that its greatest width is found. This forest is estimated to cover 550 square miles, no allowance being made for lands cultivated or covered by other trees. The timber, both in quality and quantity, is unsurpassed by that growing on the best sections of the lower pine region. The manufacture of lumber and its export to northern markets has only been carried on in this region to any large extent during the last three or four years, and it is now rapidly assuming large proportions. The most important saw-mills in this region are situated on the line of the Louisville and Nashville railroad, between Clear creek and Elmore, Elmore county, and produced in the aggregate 67,000,000 feet of lumber, board measure, during the years 1879–'80. Considerable lumber is also produced along the line of the Selma, Rome and Dalton railroad, in Chilton county.

"Naval stores are not yet manufactured in this region.

"THE PINE REGION OF THE COOSA.—A detached belt of drift largely composed of coarse pebbles stretches from the eastern base of the Lookout Mountain range through the valley of the Coosa river, near Gadsden, covering nearly the whole of Cherokee county, to the Georgia state line. This forest is estimated to cover from 400 to 450 square miles, although much of the best timber nearest to the river has already been exhausted. Logs are driven down the Coosa and sawed at Gadsden. The manufacture of lumber at this place has been carried on for a number of years, and amounts to an average of 20,000,000 feet.

"NAVAL STORES.

"The manufacture of naval stores in the central Gulf states is almost entirely restricted for the present to the forest contiguous to Mobile and to the railroad lines leading to that port and to the southern confines of the pine belt in Mississippi. It is only during the past two seasons that turpentine orchards have been worked near Pascagoula, Mississippi, Pearl river, and in eastern Louisiana above Covington. The first turpentine distilleries were established on the Gulf coast a little more than a quarter of a century ago, along Fish river on the eastern and Dog river on the western shores of Mobile bay. The business soon assumed such proportions as to lead to the destruction of the

forests covering hundreds of square miles, particularly in Baldwin county. The production of naval stores in this county, as well as in the lower part of Mobile county, has at present nearly ceased, on account of the exhaustion of the forest. It is, however, now carried on with the greatest activity on the line of the Mobile and Ohio railroad. Between Mobile station, in Mobile county, and Quitman, Mississippi, there are at this date not less than thirty-three stills in operation, while along the Louisville and Nashville railroad there have been during the last five years fifty-three stills established in Alabama and Mississippi. These, with few exceptions, are controlled by Mobile capital, their whole product being handled from that market, so that the returns contained in the annual reports of the board of trade of Mobile fairly represent the whole production of naval stores in this pine region.

"According to the statements contained in the report for 1880, the crops amounted in the years 1879–'80 to 25,409 barrels of spirits of turpentine and 158,482 barrels of rosin. During a period of eight years, between 1873 and the close of the business year of 1880, 160,000 barrels of spirits of turpentine and 800,000 barrels of rosin have been produced in this same district. (*a*)

"The increase in prices during the last few years for all kinds of naval stores, and particularly the active demand for the best class of rosin, have given an increased impetus to this business, in consequence of which many of the older orchards have been abandoned and new ones started, while the number of new boxes cut during the present season is greater than ever before. There are no returns to be obtained of the production prior to 1875, but it can be safely assumed that up to that year 250 square miles of pine forest had been boxed. The production since 1875 must have involved a further destruction of 640,000 acres, or 1,000 square miles of forest. With the low price at which pine lands are held there is not the slightest regard paid to the utilization of their resources, and under the present system they are rapidly destroyed, regardless of the needs of the future and with the sole object of obtaining the quickest possible returns on the capital invested.

"It may be of interest to mention here the results obtained by a practical manufacturer by submitting the refuse of saw-mills, that is, slabs and sawdust, to a process of combined steam and dry distillation, with the view of utilizing the volatile products of such waste. He obtained from one cord of slabs 12 gallons of spirits of turpentine, 25 gallons of tar, 120 gallons of weak pyroligneous acid, and 12 barrels of charcoal. From one cord of lightwood he obtained 12 gallons of spirits of turpentine, 62½ gallons of tar, and 60 gallons of pyroligneous acid. The sawdust obtained from sawing 10,000 feet of pine lumber, subjected to distillation during one day, produced 22 gallons of spirits of turpentine."

MISSISSIPPI.

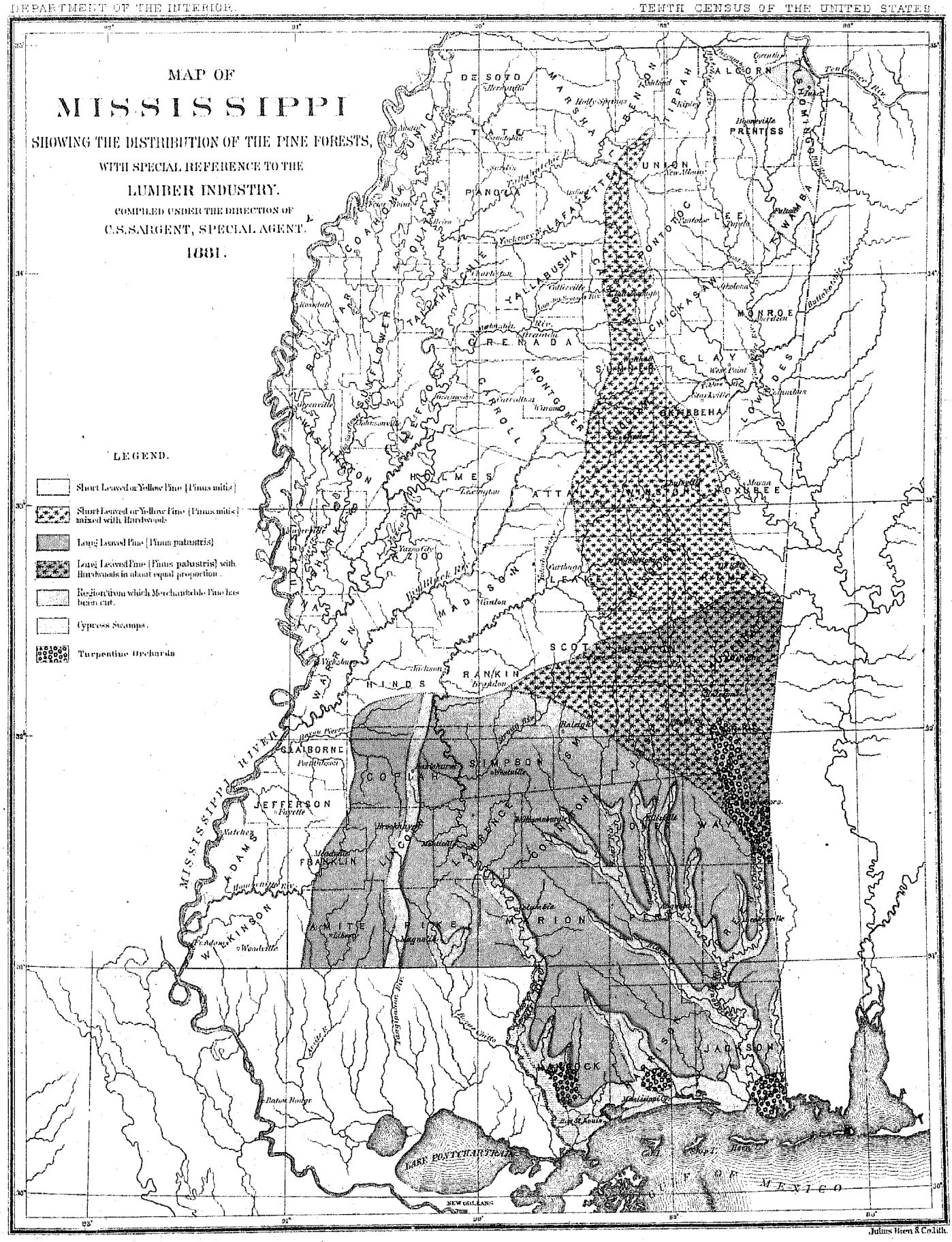
The forests of Mississippi originally extended over nearly the entire state. Prairies of no great area, situated in the northern central part of the state, presented the only break in its tree covering. The forest consisted of a belt of long-leaved pine, occupying the coast plain and reaching from the eastern confines of the state to the bottom lands of the Mississippi river, and from the coast nearly to the line of Vicksburg and Meridian. The northeastern portion of this long-leaved pine forest spread over a high rolling country, and here the pines were mixed with various hard-wood trees; north of the long-leaved pine forest a long belt gradually narrowing toward the north and occupied by a growth of short-leaved pine and of hard woods reached nearly to the northern boundary of the state, while south of the Tennessee river, in Tishomingo, Prentiss, and Itawamba counties, a considerable area was covered with forests of the short-leaved pine. The remainder of the state was clothed with a growth of hard woods, which in the swamps of the Yazoo delta and the bottom lands of the Mississippi river formed vast and almost impenetrable forests, where cypresses, gums, water oaks, ashes, and other trees which find their home in the deep, inundated swamps of the South Atlantic region attained noble dimensions and great value.

The pine forests have been removed from the immediate neighborhood of the Pascagoula and Pearl rivers and from their principal tributaries within the southern tier of counties; the most accessible timber has been cleared from the Biloxi, Blind, Jordan, Wolf, and Tchefuncta rivers, flowing into Mississippi sound, and from the line of the Chicago, Saint Louis, and New Orleans railroad. The long-leaved pine of Mississippi is, however, still practically intact, and these forests are capable of supplying an immense amount of timber as soon as the means of transportation can be furnished for it. A small amount of pine has been cut in the northeastern pine region from along the line of the Memphis and Charleston railroad.

The hard-wood forests outside of the bottom lands have been largely cleared from many counties in providing for the requirements of agriculture. Such land when abandoned is again covered in the central part of the state with a growth of old-field pine, and in the north, and especially in the northeastern counties, by a vigorous growth of short-leaved pine (*Pinus mitis*), which seems destined to become the most important timber tree of that region. The forests which cover the swamps of the state are still almost intact, although the most accessible cypress, which has long been cut in the Yazoo delta and the valley of the Pearl river to supply the New Orleans market, has become scarce.

During the census year 222,800 acres of woodland were reported destroyed by fire, with a loss of $78,500. Of these fires the largest number was set by hunters, and by farmers carelessly starting fires in clearing land or to improve pasturage.

a These figures differ somewhat from those prepared by Mr. Van Bokkelen. See page 493.—C. S. S.


MAP OF
MISSISSIPPI
SHOWING THE DISTRIBUTION OF THE PINE FORESTS,
WITH SPECIAL REFERENCE TO THE
LUMBER INDUSTRY.
COMPILED UNDER THE DIRECTION OF
C.S.SARGENT, SPECIAL AGENT.
1881.
LEGEND.
Short Leaved or Yellow Pine (Pinus mitis)
Short Leaved or Yellow Pine (Pinus mitis) mixed with Hardwoods
Long Leaved Pine (Pinus palustris)
Long Leaved Pine (Pinus palustris) with Hardwoods in about equal proportion.
Region from which Merchantable Pine has been cut.
Cypress Swamps.
Turpentine Orchards
MISSISSIPPI RIVER
LAKE PONTCHARTRAIN
NEW ORLEANS
GULF OF MEXICO
Julius Bien & Co. lith.
Scale
25 0 25 50 75 100 MILES.

Establishments for the manufacture of wagons, wheel-stock, cooperage, etc., have been established at different times in the northern part of the state. The industries, however, which depend upon the hard-wood forests for material are still in their infancy in Mississippi, and are capable of enormous development.

The following estimates of the standing-pine supply of Mississippi, May 31, 1880, were prepared by Dr. Charles Mohr, who carefully explored the forests of the state:

LONG-LEAVED PINE (*Pinus palustris*).

Regions.	Feet, board measure.
In region west of Pearl river, tributary to the Chicago, Saint Louis, and New Orleans railroad.	6,800,000,000
East of Pearl river	7,600,000,000
Region of mixed growth, exclusive of 200,000 acres injured by the manufacture of turpentine.	3,800,000,000
Total	18,200,000,000
Cut for the census year ending May 31, 1880	108,000,000

SHORT-LEAVED PINE (*Pinus mitis*).

In the northeastern belt	1,600,000,000
In northern region of mixed growth	5,175,000,000
Total	6,775,000,000
Cut for the census year ending May 31, 1880	7,775,000

In this estimate no account is made of small timber standing on some 2,912,000 acres which have been cut over, and from which the merchantable pine has been practically removed.

The region of mixed growth, which adjoins the pine belt upon the north, contains a smaller number of pine trees per acre than the pine belt proper; but, the individual trees being larger, the average amount of standing pine per acre is here greater, although generally of poorer quality, than nearer the coast.

The principal centers of lumber manufacture are at the mouth of Pascagoula river, in Jackson county, at Mississippi City, in Harrison county, along the lower Pearl river, upon the line of the Chicago, Saint Louis, and New Orleans railroad in Lincoln county, and in the northeastern counties, where are located many small railroad mills, manufacturing in the aggregate a large amount of yellow-pine lumber (*Pinus mitis*).

The pine forests of the state have up to the present time suffered but little damage from the manufacture of naval stores. Turpentine orchards, however, have been recently established in the vicinity of the coast, near the mouth of the Pascagoula river, and at other points in the coast counties.

The following remarks are extracted from Dr. Charles Mohr's report upon the forests of Mississippi:

"THE PINE FORESTS OF SOUTHERN MISSISSIPPI.—In the vicinity of Scranton, near the mouth of the Pascagoula river, little is left of the original pine forest. The old clearings are covered with fine loblolly pine, from 40 to 60 feet high, upon rather close, dry soil. The pitch pine (*Pinus Cubensis*) forms dense groves, with seedling trees from 20 to 30 feet in height upon lands of lighter soil extending to the sea-shore. Oaks are not common. Fine groves of stately live oaks, however, line the banks of the river up to Moss Point, 4 miles distant.

"The annual export of lumber during the last four or five years has averaged 45,000,000 feet from the Pascagoula river. The largest percentage of this lumber is manufactured into boards and scantling for ordinary building purposes, and is shipped to Cuba, the Windward islands, to Mexico, Brazil, and a small part, in the form of deals 2 or 3 inches in thickness, intended for ship-building, to France, Spain, Holland, Belgium, and Germany. Large quantities of charcoal burned upon the banks of Black and Red creeks are sent to New Orleans in small coasting schooners, which run also from the bay of Biloxi and the bay of Saint Louis. At Moss Point eleven saw-mills, which furnish the lumber manufactured upon it, are situated on both banks of the East Pascagoula river. The combined capacity of these mills amounts to 220,000 feet a day, although the annual production during the past years has scarcely exceeded 40,000,000 feet. The timber manufactured in these mills comes from the Pascagoula and its tributaries, the Leaf and Chickasawha rivers and their sources, the Bogue Homo, Tallahala, Bay, and Okatuma creeks, as far up as the southern limits of Covington and Jones counties. A small number of logs also comes from the Escatawpa. The logs received at these mills average 20 inches in diameter and 40 feet in length Sticks of such average dimensions are only furnished from first-class timber-lands, which, according to the best judges, produce six or seven trees of that size to the acre. Only lands lining the streams just mentioned, in a belt not exceeding 3 miles in width on each bank, have been up to this time invaded by the log-getter to supply these mills.

"The vastness of the timber resources yet contained in the region embraced in the northern half of Harrison and the whole of Greene and Perry, up to the southern confines of Marion and Jones counties, is astonishing. As is the case in Alabama, however, trees furnishing first-class spars for masts are difficult to find; they have been cut by spar-hunters in every part of the forest which could be reached by teams.

"Cypress lumber is not manufactured in this region, and the loblolly pine furnishes so small a part of the timber manufactured that it need not be considered. In Jones and Covington counties, about the headwaters of the upper tributaries of the Pascagoula, the country is rolling, intersected by numerous small, swift streams and rivulets. This region is magnificently timbered, and devoid of the barren ridges of almost pure sand so frequently found in the pine belt of Alabama.

"The low, flat, more or less wide pine lands bordering upon the marshes of the coast are sparsely covered with pine, while the trees growing in this wet, boggy soil, devoid of drainage and overlying a subsoil impervious to water, are stunted and of little value. The lower part of Harrison county is covered with these pine meadows, which fact accounts for the comparatively small importance of the bay of Saint Louis as a lumber-producing center.

"At Pearlington, on the Pearl river, is established the large saw-mill of Poitevent & Favre, capable of producing 100,000 feet of lumber a day; at Logton, 2 miles farther up the river, are two mills, and 5 miles above these, at Gainesville, there is another. The largest part of the logs sawed at these mills is cut upon the banks of the Abolochitto creek, in Hancock county, and its tributaries extending into the lower part of Marion county, 50 or 60 miles distant. The remainder comes from the banks of the Pearl and the upper and lower Little rivers, which empty into it 10 miles above Columbia.

"The cypress is nearly exhausted from the lower Pearl river, and the 20,000 or 30,000 feet of this lumber which are sawed annually at Pearlington are derived from the cypress swamps on the upper waters of the Pearl and Jackson rivers, where there is still a large amount of this timber of good size.

"The eastern bank of the Pearl river, within the Maritime Pine Belt, is sparsely settled, and forests, the especially in Hancock county and the upper part of Marion county, are unsurpassed in the quality and quantity of their pine timber. It is estimated by good judges that these forests will yield an average of 2,000 feet of lumber, board measure, to the acre. Up to the present time a strip of land scarcely 3 miles in width, embracing the banks of the water-courses, has been stripped of its timber growth, and fine spar timber is yet to be found here a few miles back from all the streams. Almost the whole of these rich timber-lands supplying the mills on Pearl river form a part of the public domain.

"The almost unbroken pine forests covering the upper tier of counties between the Pearl and Pascagoula rivers, toward the northern confines of the pine region, are still practically intact. The wealth of these forests has as yet found no outlet to the markets of the world. Thinly settled, they are still largely the property of the government, but in view of the speedily-increasing demand for lumber and the profits derived from the lumber business, such a condition of affairs must soon come to an end. It can be safely asserted that by far the largest part of the timber, felled in the Abolochitto region is taken from government land. There can be no question of this when it is considered how insignificantly small is the area of land which has been legally entered by private persons along that stream. The necessity of adopting proper measures to protect the timber wealth upon the public domain from depredations of such enormous extent forces itself upon the most casual observer, while to one who looks closer at the consequences of the continuance of the existing state of affairs the urgency becomes appallingly apparent. The ever-increasing consumption of timber at the mills upon Pearl river, of which one alone can cut 100,000 feet of lumber a day, will prove a powerful stimulus to a people who, since the development of the lumber business in these regions, have almost completely abandoned their former agricultural and pastoral pursuits and now depend entirely for their support upon cutting pine logs, to supply this enormous demand at the expense of the public property. Already plans have been made to invade this region by tramways and railroads, in order that its timber may be brought to market. This is true, too, of the region between the Pearl and the Amite rivers, down to the marshy lands of eastern Louisiana, a region in which the forests are also particularly good.

"In the state of Mississippi it is safe to estimate that, after deducting 25 per cent. for areas of swampy and cleared land, 9,000 square miles are still covered by forests of long-leaved pine. The production of this region during the census year amounts to 108,000,000 feet; of this, 60,000,000 finds its outlet at Pascagoula, 30,000,000 by Pearl river, 6,000,000 by bay of Saint Louis, and 12,000,000 by the Chicago, Saint Louis, and New Orleans railroad to northern markets.

"In the northern part of Harrison county we crossed a tract from which twelve years ago a hurricane swept a belt a quarter of a mile wide of all tree growth. It is interesting to note the growth which has since sprung up among the prostrate charred trunks of the pines still found lying about in large numbers. Black-jack oaks, the largest not over 12 feet in height, are mixed in almost equal numbers with stunted, thin saplings of the long-leaved pine. These plainly exhibit the helplessness of the struggle to which these offspring of the great timber tree are subjected under the influence of repeated conflagrations wherever the oak scrub has sprung up and added fuel, in the abundance of its leaves, to the fires which annually sweep through these woods.

"THE NORTHEASTERN COUNTIES.—After crossing the Sucarnoochee river below Scooba, in Kemper county, the pines which had covered the ridges near the borders of Lauderdale county disappear; scarcely a stray sapling

of the loblolly pine is seen as Scooba is reached. The cold, wet, calcareous soil of the flatwoods and prairies is unsuited to the growth of all coniferous trees, with the exception of the cypress. Along the railroad, as it traverses the flat prairie region, the country is sparsely wooded; large tracts of the prairie lands have always been destitute of trees, and the woodlands with which they were interspersed were cleared at the first settlement of the country. What remains of the original forest growth is now confined to localities too difficult of drainage to make agriculture profitable, and to the banks of streams subject to inundation. More or less extensive patches of woods are found also on the ledges where the limestone rock comes to the surface. In the swampy land the willow oak, the water oak, the black gum, sweet gum, white ash, and along the ponds willows and cottonwoods, prevail. The post oaks, white oaks, and cow oaks are mingled more or less freely with these trees in localities enjoying better drainage. Black-jack and black oaks, mixed with various haws, viburnums, and persimmons, occupy the rocky flats. No magnolias were seen in this region. The red, willow, and water oaks, the sycamore, and the sweet gum abound along the streams here, and are so common as to deserve special mention, while on the rolling uplands black oaks, post oaks, and white oaks, with poplars, shell-bark and pig-nut hickories, are common. From Tupelo toward Corinth the country is poorly wooded. The ascent is constant, reaching the point of highest elevation between the Gulf of Mexico and the Ohio river at Booneville. Corinth is situated on a wide pine plain, bounded on the west by the valley of the Tuscumbia river and east by the ridges which mark the water-shed of the Tennessee. The soil is here a deep calcareous clay, very stiff and heavy, hard as brick in warm, dry weather, and suddenly becoming a bottomless, stiff mire in seasons of rain. Below the valley of the Tuscumbia river the road passes over low and undulating ridges, of which the higher and steeper are yet covered with the remnants of the old oak forest. Here the Spanish and post oaks predominate in numbers; then follow the black oak and the scarlet oak, while the shell-bark hickory and the mocker-nut form but a small part of the tree growth of these uplands. The bottoms of the Tuscumbia, although subject to frequent overflows, are covered with a primeval forest not inferior in luxuriance and variety to that of the Mississippi river bottom lands. White-oak timber of the finest quality is found here in the greatest abundance and perfection. The most common species is the cow oak (*Quercus Michauxii*). I found that this river-bottom forest contained, by actual count, an average of from twelve to fourteen trees of this species, from 30 to 35 inches in diameter, to the acre. It is known to the inhabitants here by the name of cow oak or basket oak, being easily split into narrow, thin strips. The wood is extensively used in the manufacture of baskets used by the negroes in cotton-picking. These baskets are light, and of considerable strength and durability. Next in frequency follows the willow oak, and then the over-cup swamp oak (*Quercus lyrata*), and finally the red oak, found especially on the outskirts of the forest.

"The white ash is not so frequently seen here as elsewhere in similar localities, and does not seem to thrive on these stiff, cold soils. It is in part replaced by the green ash, which here attains the size of a large tree. The black gum is very common, and where the soil is least subjected to overflow the true white oak is found, with fine groups of beech, overtowered by large poplars. Among the smaller trees the mulberry, hornbeam, holly, and abundant papaws must be mentioned.

"The pine hills in the eastern part of Alcorn county are reached at a distance of 6 or 7 miles in a southerly direction from Corinth. Pine occurs on the dividing ridges between the waters of the Tuscumbia river and Yellow creek, or toward the south on those between the Tombigbee and the Tennessee rivers. A short distance west of Glendale station the Cretaceous strata disappear under the ferruginous sands, and mixed with a stunted growth of post oak and Spanish oak, pines appear, forming vast forests on the crests of the hills. This pine (*Pinus mitis*) takes possession of all the old clearings and fields thrown out of cultivation. The rapid growth of the seedlings, which spontaneously spring up thickly after the removal of the broad-leaved trees, leaves no chance for the seedling oaks. It is therefore a certainty that in the future the short-leaved pine will be almost the sole forest tree in this part of the state, outside of the bottom lands, and that it will probably extend its domain far beyond the original limits of its growth.

"The aspect of these pine woods resembles closely that of the lower pine region. The short-leaved pine replaces here the long-leaved pine of the coast, the scrubby post and Spanish oaks take the place of the turkey and the upland willow oaks, while the black-jack is common to both these regions of identical geological formation. The flora of the two regions also presents the same general features; the asters, goldenrods, sunflowers, and various leguminous plants are often the same or belong to closely-allied species. The pine-clad drift hills interspersed between the Carboniferous and Cretaceous regions are parts of the northern interior drift belt which extends throughout Alabama. The region of the short-leaved pine of northeastern Mississippi extends from the southern border of the valley of the Tennessee river to the southern extremity of Itawamba county, and is on an average 10 miles in width, embracing an area of nearly 600 square miles. Of this region, after the deduction of the fertile bottoms of the Tombigbee and Yellow Creek valleys, where no pines are found, two-thirds can be regarded as occupied by the pine forest. As the sole supply of pine lumber in the northern part of the state, this region is of great importance. Several saw-mills, none of which have an annual capacity of more than 3,000,000 feet, are established on the railroad line at Glendale, Burnsville, and near Iuka; portable saw-mills are worked also through this forest in its whole extent, their product being hauled in wagons for miles to the nearest station on the Mobile and Ohio and the Memphis and Charleston railroads. The largest shipments are made from Burnsville and Corinth.

"The second growth of the short-leaved pine, which is already growing with great rapidity in northern Mississippi upon exhausted fields thrown out of cultivation and wherever the forest has been cut from the ridges, should be protected and fostered by the owners of the soil. The care bestowed upon the natural seeding of this useful and valuable timber tree, and in assisting it to gain a permanent foothold on lands regarded as unfit or unprofitable for agriculture, of which tens of thousands of acres are now found in this state, would lead to results of great benefit to the community. The people have it in their power to replenish their timber resources, fast failing through the ever-progressing destruction of the original forest, without other outlay than simply assisting nature in her efforts to recover from injuries sustained in the wholesale destruction of the forest. The restoration of the forest over vast areas, now barren and unproductive wastes, would add vastly to the general welfare and prosperity through the influence such forests would exert upon the climate and salubrity of the country, by the shelter they would offer to insectivorous birds ever busy in the destruction of insects injurious to farm crops, and by the formation of protective screens against the cotton-worm, the most destructive of all insects in this part of the country; for it must be admitted as an undisputed fact that the destruction caused by the cotton-worm is far less upon the small farms where strips of woodland divide the fields than upon the plantations in the rich prairie lands where large areas are destitute of woods. Such forests would serve as windbreaks for crops growing in field and orchard, and as protection against the washing away of the light soil so peculiarly adapted to the cultivation of the great staple of the country, thus preventing the ruin of many productive fields, the *débris* from which, carried away by the rain and floods, fills the rivers and their estuaries, rendering navigation every year more dangerous.

"CENTRAL PINE HILLS.—A hilly region, the northern limit of which is near the center of Benton county, covered with upland oaks and short-leaved pines, extends eastward to the flatwoods in a belt from 8 to 12 miles in width. Farther south, in Calhoun and Sumter counties, this pine region is much wider, embracing the largest part of these and Choctaw and the western part of Oktibbeha counties; from Kosciusko, Attala county, it extends over the whole of Winston and the western part of Noxubee counties, being merged, south of Neshoba in the western part of Kemper county, with the region of mixed tree growth. This pine forest supplies a sufficient amount of lumber for the local demand, and portable saw-mills are found near the large settlements from Kosciusko to the southern limits of the region. It forms a prominent feature in the eastern Gulf states by its geographical position, and must be regarded as one of the distinct divisions which might be designated as the region of the central pine hills. Botanically this region differs from that of the mixed tree growth, upon which it borders toward the south, by the more equal distribution of the pines among the oaks, and particularly by the total absence of the long-leaved pine and other conifers, with the exception of the loblolly pine and of scattered cypress along the river banks, and by the absence of the great magnolia (*M. grandiflora*). The second forest growth in the northern part of this region consists almost exclusively of the short-leaved pine, which southward is associated with the loblolly pine. The short-leaved pine will in the future be the chief forest tree of this region.

"I have personally seen but little of the flatwoods proper, having only touched their southern limits in Kemper county. It is a region of close, cold soil, devoid of drainage, and covered with a stunted growth of post oak; and in its economic aspects as a timber region, or botanically, is of little interest or importance.

"WESTERN MISSISSIPPI.—In Copiah county, below the village of Terry, fifteen saw-mills are in operation along the railroad, obtaining their supply of logs from the heavily-timbered hills in the neighborhood. This lumber is shipped by rail to Saint Louis and Chicago. This business has already reached large proportions and is still increasing rapidly, the mills running without intermission at their full capacity throughout the year.

"Beyond Crystal Springs the country loses its rolling character; the pine hills disappear, and a short distance above the northern boundary of Copiah county, near Terry, a different geological formation is entered, and a strongly-marked change in the vegetation takes place. Horizontal strata of loam, inclosing layers of what appears a whitish sand, stretch northward over a vast extent of level country, and the long-leaved pine disappears with the gravels and sands of the drift.

"North of the pine region a large amount of rich land between the Pearl and Mississippi rivers has been brought under cultivation, especially along the bottoms of the Pearl river and along the principal railway lines. At Jackson, on the Pearl river, little is left of the original tree growth which covered its banks. Still enough is left, however, to show that it was chiefly composed of sweet gums, white oaks, elms, white ashes, etc. The railroad from Jackson to Vicksburg passes through a fertile agricultural country, where only small strips of forest remain between the large plantations and farms. Pines are not seen here, and the black walnut, originally so abundant among the oak and hickory forests which covered this region, must now be regarded as entirely exterminated. Beyond the Blackwater, in the hilly region of the bluff formation, the great magnolia covers the hillsides, although in the vicinity of Vicksburg the hills for miles around the city are entirely stripped of their forests.

"Vicksburg is the center of a considerable lumber industry, depending for its supply of timber upon the cypress rafted down from the mouth of the Yazoo river. The first mill devoted to the manufacture of cypress lumber was established in Vicksburg in 1865. Before that time all the timber from the Yazoo valley was rafted down the Mississippi river, mostly to New Orleans, as is still the case with the greatest number of the rafts. A second mill has lately been built at Vicksburg, and the combined annual capacity of the two is ten or twelve million feet. No

manufactured lumber is shipped from here farther south than Baton Rouge, nearly the whole production being consumed in the erection of small dwellings in the Mississippi and Yazoo bottoms. The logs received at these mills average 25 inches in diameter, with a length of from 30 to 70 feet.

"The hillsides in the neighborhood of Vicksburg, when thrown out of cultivation, are seen covered with a stunted growth of locust, Chickasaw plums, and other shrubs. The original forests of the bluff hills consist of extensive groves of stately magnolias, stretching down the slopes and mixing with large white oaks, Spanish oaks, beeches, and towering poplars, covering the mossy ground of the small valleys with delightful shade. Many of the magnolias are from 18 inches to 2 feet in diameter. The full-grown trees, however, show that they have already passed their prime; the upper limbs have begun to die, the base of their trunks being often rotten and hollow. Small specimens and sapling or seedling trees I could not find. The large trees are cut down to supply the neighboring city with fuel, and it is inevitable that in a comparatively short time these magnolia groves will have disappeared, and that these delightfully-shaded hills must share the desolation which surrounds the town.

"THE YAZOO DELTA.—Indian bayou, one of the small water-courses between Pearl river, Deer creek, and Sunflower river, has a sluggish current even in time of high water. As is the case with all the streams of the Yazoo delta, its banks are elevated often to a height of 10 or 15 feet above the surface of the water, thus affording excellent natural drainage for the adjacent country, which is covered with a yellow-brown loam of unsurpassed fertility. As the land, however, recedes from the banks it gradually sinks down again toward the level of the bed of the stream, and the water-courses, following the general direction of the Mississippi river, inclose corresponding lines of depression nearly level with the beds of the streams. These troughs between the bayous and rivers are one of the characteristic features in the topography of the Yazoo delta. They are of various extent, depth, and shape; flat and wide, they form tracts of dark, wet forest swamp, more or less dry in summer; or, narrower and deeper, they form swamps rarely ever entirely free from water; sometimes they are inundated wooded marshes and cane-brakes, or ponds and lagoons more or less shallow and studded with the mighty trunks of the cypress. When these depressions are of considerable depth, lakes, presenting open sheets of water sometimes miles in extent, are formed, their margins, only, overgrown with the cypress. Upon these features depend the great diversity of the forest growth which yet covers the largest part of the Yazoo valley. Along the elevated ridges fronting the streams the white oak, the willow oak, the shell-bark and mocker-nut hickories, the black walnut in great numbers, the yellow poplar and the sassafras large enough to furnish canoes of great size, the mulberry, the Spanish oak, the sweet and the black gums are the principal forest trees, with an undergrowth in the openings of dogwood, various haws, crab apples, wild grapes, buckthorns, etc. In the forests covering the lower lands, which slope back to the swamps and reservoirs, the cow oak takes the place of the white oak, while the over-cup white oak occurs everywhere in the more or less saturated soil. Here the sweet gum reaches its greatest size, and here grow also in great perfection the bitter-nut, the elms, hornbeams, white ash, box-elder, and red maples of enormous size. The honey locust, water oaks, and red and Spanish oaks are equally common. Here, among the smaller trees, the holly attains its greatest development, with hornbeans and wahoo elms, while papaws, haws, and privets form the mass of the dense undergrowth, which, interspersed with dense cane-brakes, covers the ground under the large trees.

"The region covered by these splendid forests of hard woods possesses a wealth of timber of the most valuable kinds and in surprising variety. They occupy by far the greatest part of Sunflower and the adjoining counties between the Mississippi river and the hills which border upon the Yazoo to the east. Most of the clearings made in this region before the outbreak of the war, by the planters settled lower down, have since been abandoned and are again densely covered with the young growth of the trees of which the forest was originally composed. During the last few years, however, the country has been entered again for cultivation by a class of small farmers, who from being farm hands have now risen to the position of independent landholders. It is astonishing to see the utter disregard of these settlers for the forest wealth of the country, which in a short time could not fail to be of great commercial value. On the shores of Indian bayou may be seen clearings with hundreds of the finest black walnuts among the deadened trees, while many of the noblest specimens of this valuable timber tree are felled for fence rails or trifling purposes. The amount of oak and hickory timber destroyed here annually is amazing. It is generally believed, however, that not one acre in fifty over this whole region of hard-wood forest has yet been stripped of its tree covering. Quite different is the condition of the cypress growth in the great Yazoo valley. This tree, confined to low and more or less inundated bottoms bordering on the Mississippi, the Lower Yazoo, Big Sunflower, and their numerous tributaries, was once found in the greatest abundance in this region, and immense quantities of cypress lumber have been furnished by the lower parts of Issaquena and Washington and the western parts of Warren and Yazoo counties. The most valuable timber has now, however, disappeared from the immediate neighborhood of the low river banks easily accessible at seasons of high water during every winter and spring. Only groves standing remote from the banks of the water-courses, and which are only accessible to the raftsman during exceptionally high stages of water, now supply this lumber. In the upper portions of the valley, however, in the low depressions described as extending between the elevated banks of the streams, more or less limited areas of undisturbed cypress forest are found. The shallow lagoons, covered with water except during seasons of prolonged drought, and called cypress creeks, present in the spring of the year a strange sight. No object meets the eye between the immense trunks of the mighty trees, as in these cypress groves no other tree nor

shrub can live in the dark, shaded, water-covered soil. These reservoirs of drainage, generally without outlet, are called cypress lakes if the water in any part of them, too deep to allow the growth of trees, confines the cypress to their more shallow borders. Here the cypress arrives at its greatest dimensions and produces timber of the finest quality. These cypress lakes and cypress brakes, remote from streams, at no time of the year connected with them, and always surrounded with a mire of forest swamp impassable to wagons, still retain their best timber. Of late years, since swamp and overflowed lands have become the property of the state, planters have added many of these cypress tracts to their estates by purchase; many others have been acquired by companies formed to construct artificial channels by which the timber may be floated to the nearest streams. The richest and most extensive of these groves of cypress, already more or less in the hands of capitalists, are found along Steele's bayou, between Deer creek and the Sunflower river, in Washington county; between that stream and the lower course of Bogue Phalia, and between the Mississippi river and Black creek above Greenville. There is also a very large body of cypress inclosing the 'California brake', upon the Little Sunflower, in the counties of Bolivar and Coahoma, extending through Tallahatchie county to the Yazoo river.

"The traffic in cypress lumber in the Yazoo region dates from 1830. In 1838 it was commenced upon the Sunflower river and Deer creek, ten years after the first settlements were established upon the banks of these streams; since that time rafts have been sent regularly to New Orleans, and camps of lumbermen have been established in every direction, the forests, particularly those upon the public domains, being regarded as the undisputed property and lawful prey of the log-getter. In consequence the cypress groves have been, if not entirely destroyed, largely culled of their best timber wherever it could be obtained without investment of capital, that is by simply floating the logs to the streams at times of freshet and overflow.

"The cutting of these cypress forests is not wisely regulated under the ownership of the state. These lands have been thrown into the market at 50 cents an acre with the condition of settlement. Beneficial as such a law might prove in the disposal of lands fit for cultivation, it results, in the case of timber-land unfit for the plow, in the reckless destruction of one of the surest sources of public revenue. The state thus sells for 50 cents what on its face is worth to the purchaser hundreds of dollars, and which, when deprived of its value and rendered forever worthless, will be turned back to the state again.

"Much of the destruction of the timber can be traced to wasteful methods practiced by the negroes. Under present methods any one having rented a plantation will, for the most trifling wants, cut down a tree, regardless of size, and without any effort to preserve for future use the parts not immediately wanted, so that the next quarter of a century will probably see the entire destruction of the vast quantities of timber stored in the whole of this great territory."

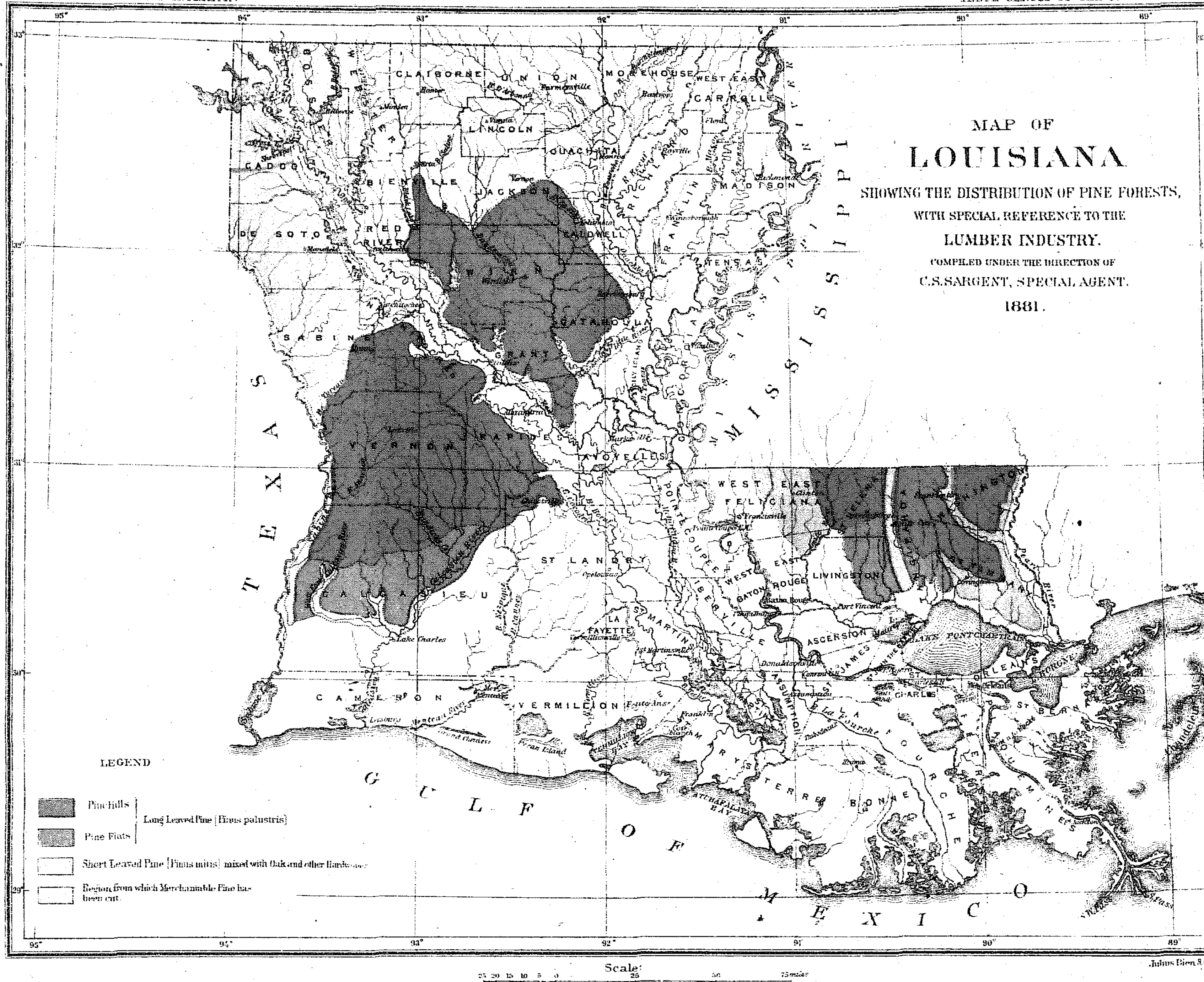
LOUISIANA.

The coast of Louisiana is bordered by saline marshes and savannas extending inland from 10 to 40 miles, or is covered with a scattered growth of cypress occupying extensive fresh-water swamps peculiar to the region. In Vermillion, Calcasieu, Saint Martin's, and Saint Landry parishes considerable treeless areas, open grassy prairies in the borders of the forest, occur. With these exceptions Louisiana was originally covered with a dense and varied forest growth. The Maritime Pine Belt covered the eastern portion of the state nearly to the Amite river, or until checked from further western development by the alluvial deposits of the Mississippi. Forests of pine, too, occupied the western part of the state north and south of the Red river. The pine flats of Calcasieu were covered with forests formed almost exclusively of the long-leaved pine, which, farther north, mixed with oaks and various hard-wood trees, extends over the high rolling country which stretches from the Sabine northeasterly nearly to the Ouachita river. The northeastern part of the state was covered, outside of the broad bottom lands of the rivers, with a heavy forest of short-leaved pine (*Pinus mitis*) mixed with upland oaks, hickories, and other deciduous trees. The bottom lands and all that part of the state bordering the Mississippi were covered with a heavy growth of the trees peculiar to such low, rich soil throughout the Gulf region. The high bluffs which occur at different points along the Mississippi, the Atchafalaya, and other streams flowing through the western part of the state were covered with a noble forest of evergreen magnolias mingled with beeches, water oaks, and gums.

The most valuable forests of the state are still almost intact, although the pine has been cut from the banks of the Pearl river and some of its tributaries, and from along the line of the Chicago, Saint Louis, and New Orleans railroad, to furnish the New Orleans market with lumber. Pine has also been cut along the Sabine river, from both forks of the Calcasieu, along the Red river in the neighborhood of Alexandria and Shreveport, and more recently in Catahoula parish, along Little river. The river swamps and rolling hills in the eastern and northern parts of the state still contain vast bodies of valuable hard-wood forest yet untouched by the ax.

The forests of Louisiana, uninvaded as yet by the manufacturers of naval stores, have not greatly suffered from forest fires. During the census year only 64,410 acres of woodland were reported as burned over by fire, with a loss of only $6,800. These fires were generally set to improve pasturage, or by careless hunters camping in the forest.

A small amount of cooperage stock is made in New Orleans almost entirely from cypress and pine, although that city has long been an important point of export for oak staves and headings brought there from Arkansas and


MAP OF
LOUISIANA
SHOWING THE DISTRIBUTION OF PINE FORESTS,
WITH SPECIAL REFERENCE TO THE
LUMBER INDUSTRY.
COMPILED UNDER THE DIRECTION OF
C.S.SARGENT, SPECIAL AGENT.
1881.
TEXAS
MISSISSIPPI
GULF OF MEXICO
CADDO
BOSSIER
WEBSTER
CLAIBORNE
UNION
MOREHOUSE
WEST CARROLL
EAST CARROLL
LINCOLN
OUACHITA
RICHLAND
FRANKLIN
MADISON
BIENVILLE
JACKSON
CALDWELL
DE SOTO
RED RIVER
WINN
TENSAS
CATAHOULA
SABINE
GRANT
RAPIDES
VERNON
AVOYELLES
CONCORDIA
WEST FELICIANA
EAST FELICIANA
ST LANDRY
POINTE COUPEE
WEST BATON ROUGE
EAST BATON ROUGE
LIVINGSTON
CALCASIEU
LAFAYETTE
ST MARTINS
IBERVILLE
ASCENSION
ST JAMES
ST CHARLES
ORLEANS
ST BERNARD
CAMERON
VERMILION
ASSUMPTION
LA FOURCHE
TERREBONNE
PLAQUEMINES
Lake Charles
LAKE PONTCHARTRAIN
LEGEND
Pine Hills
Pine Flats
Long Leaved Pine (Pinus palustris)
Short Leaved Pine (Pinus mitis) mixed with Oak and other Hardwoods
Region from which Merchantable Pine has been cut.
95°
94°
93°
92°
91°
90°
89°
33°
32°
31°
30°
29°
Scale:
25 20 15 10 5 0 25 50 75 miles
Julius Bien & Co. lith.

Tennessee by river. The magnificent hard woods common over much of the state can supply abundant material for many important industries which already at the north suffer from the exhaustion and deterioration of the local timber supply.

The following rough estimates of the amount of the long-leaved and short-leaved pine standing in the state have been prepared by measuring upon a large-scale map areas occupied by the pine forests, which coincide almost exactly with geological formations. From these areas the totals of clearings as returned by enumerators and all areas of swamp, bottom lands, and prairies are deducted to obtain the extent of territory covered with pine forests. By multiplying this area by the average stand of timber per acre, obtained by numerous observations in different parts of the state, the following estimate of the amount of merchantable pine standing May 31, 1880, is reached:

Parishes.	Long-leaved pine (*Pinus palustris*).	Short-leaved pine (*Pinus mitis*).
	Feet, board measure.	*Feet, board measure.*
Bienville	416, 000, 000	1, 837, 000, 000
Bossier	.....	1, 574, 000, 000
Caddo	.....	1, 696, 000, 000
Calcasieu	4, 219, 000, 000	.....
Caldwell	602, 000, 000	362, 000, 000
Catahoula	1, 558, 000, 000	304, 000, 000
Claiborne	.....	1, 923, 000, 000
De Soto	.....	1, 971, 000, 000
East Baton Rouge	.....	157, 000, 000
East Feliciana	198, 000, 000	886, 000, 000
Grant	1, 574, 000, 000	.....
Jackson	493, 000, 000	1, 670, 000, 000
Livingston	300, 000, 000	.....
Morehouse	.....	797, 000, 000
Natchitoches	1, 792, 000, 000	618, 000, 000
Ouachita	16, 000, 000	1, 126, 000, 000
Rapides	2, 422, 000, 000	.....
Red River	.....	643, 000, 000
Sabine	598, 000, 000	1, 974, 000, 000
Saint Helena	749, 000, 000	.....
Saint Landry	579, 000, 000	.....
Saint Tammany	1, 398, 000, 000	.....
Tangipahoa	1, 537, 000, 000	.....
Union	.....	2, 522, 000, 000
Vernon	3, 741, 000, 000	.....
Washington	1, 734, 000, 000	.....
Webster	.....	1, 443, 000, 000
West Feliciana	.....	122, 000, 000
Winn	2, 662, 000, 000	.....
Total	26, 588, 000, 000	21, 625, 000, 000
Cut for the census year ending May 31, 1880	61, 882, 000	22, 709, 000

The principal point of lumber manufacture is Saint Charles, in Calcasieu parish, on the southern border of the western pine forest. Lumber manufactured here is shipped east and west by rail, and in small schooners to Mexican and West Indian ports. A comparatively small amount of lumber is manufactured at New Orleans from logs cut in eastern Louisiana and towed through lake Pontchartrain and the canals to the city, and along the river front from logs rafted out of the Red, Little, Black, and other streams of northern Louisiana. New Orleans, however, is principally supplied with lumber sawed at Gulf ports, in spite of its position with reference to the most valuable hard-pine forests upon the continent, its large local demand for lumber and all saw-mill refuse, and its facilities for export, which would seem to indicate that it must become the most important center of lumber manufacture and distribution in the south. Small quantities of pine lumber have long been manufactured upon the Red river near Alexandria; short-leaved pine (*Pinus mitis*) is sawed at Shreveport, and in small quantities for local consumption at other points in the northern parishes.

MOSS GINNING.

New Orleans is the center of the "moss-ginning" industry of the United States. The "moss" (*Tillandsia usneoides*), a common epiphyte, growing in great quantities upon the cypress, live oak, and other southern trees, is gathered, by men known as "swampers", in the swamps of Louisiana, Mississippi, Alabama, and Florida. The moss when gathered is piled near the swamps and allowed to rot during ten or twelve months. It loses in this process about 90 per cent. of its weight, and is then shipped to New Orleans, where it is cleaned, dried, and ginned, losing in this latter operation 35 per cent. in weight. The prepared moss is used in upholstery, either alone or

mixed with hair. The product of the New Orleans factories is principally shipped to the western states, a comparatively small amount being sent to Europe. Six moss factories are located in New Orleans, and there are also small establishments at Plaquemine and at Morgan City, Louisiana, and at Pensacola, Florida. New Orleans received during the year ending August 31, 1881, 3,500 bales of rough moss, weighing 10,000,000 pounds, and valued at $315,000. A considerable amount, however, is ginned in the country and shipped direct to consumers, or is prepared by the consumers themselves. Persons most familiar with the volume of this industry estimate that the value of the prepared moss gathered annually in Louisiana, the principal region of supply, is not far from $550,000. The amount gathered, however, varies considerably from year to year. Moss can only be profitably collected at times of high floods, when the swamps are navigable to small boats, and the moss, hanging from the branches of the trees, can be easily gathered. The wages earned by the swampers, too, are not large, and the gathering of moss is only resorted to when more profitable employment upon farms cannot be obtained.

The following extracts are from notes of a hasty journey made through the forest region of western Louisiana by Dr. Charles Mohr:

"For the investigation of the important pine region of western Louisiana I selected Alexandria as my starting point. Situated almost centrally between the forests of long-leaved pine which skirt both sides of the Red River valley, Alexandria is the seat of the actual lumber trade and the point where the lumber interests of this great timber region must be developed in the future. Little is left of the vast cypress swamps which once covered the alluvial lands on the Mississippi river below the mouth of the Red river and the lower basin of that stream. It is only in the most inaccessble swamps, cut off from all communication with the rivers, that patches of this timber remain. The ever-increasing demand for this lumber has almost exhausted the available cypress of the Red River country, and cypress is now drawn from the forest farther north bordering the Black and Ouachita rivers. The lowlands along the river front, subject to inundation and devoid of drainage, present in their tree growth the same features as the low forests of the Mississippi and the Yazoo valleys. The bitter pecan flourishes here luxuriantly, and with it the white ash, the swamp over-cup oak, the persimmon, sycamore, sassafras, sweet gum, and cottonwood. The green ash is common, and in better-drained localities the willow, white, cow, and red oaks appear, with elms and occasional pecans. Twelve or 15 miles below Alexandria the first pines are seen looming up in the forest; upon a nearer approach they are recognized as the loblolly. A short distance farther up the river, upon sandy bluffs fronting the western shore, fine specimens of the short-leaved pine are observed, associated with black oaks, Spanish oak, the black-jack, and many of the shrubs peculiar to the drift of the coast pine region east of the Mississippi. The wide bottom lands of the river upon which Alexandria is situated extend west to bayou Bœuf. This district, unsurpassed in fertility and regarded as the garden of Louisiana, has but little left of the forest with which it was once covered. The pecan trees alone of the original forest growth have been spared from the general destruction. Of these, fine specimens line the roadsides and dot the fields. The unsightly honey locust occupies the waste low places, in company with a second growth of willows, hackberries, and catalpas. The shores of bayou Bœuf are covered with a variety of trees. Cypresses line the brink of the water; beyond these, sycamores, bitter gums, sweet and white gums, pecans, water and willow oaks, red and white elms, red maple, and ash occupy the gentle acclivities, with a dense undergrowth of smaller trees—the dogwood, several haws, wahoos, catalpas, Carolina buckthorn, southern prickly ash, etc. Ascending the ridge to the uplands the deep alluvial soil is left behind, and the light sandy loams of the Tertiary strata make their appearance, and with this change of soil the vegetation changes as suddenly. Stately loblolly pines rise above the groves of post, black, and Spanish oaks, and where the ridge descends again to what might be called the second bottom of bayou Bœuf, a forest of white oak is entered, which contains a stand of timber seldom equaled. On the long, gentle swells these are associated with fine Spanish oaks, a few pig-nuts and mocker-nuts, and in the depressions with red oak, elms, ash, and other trees found on soil of good quality in the same latitude east of the Mississippi river.

"The hills formed by the sandstone drift gravels rise suddenly from the plain covered with the forest of the long-leaved pine, comparing favorably both in the size and number of the trees with the best timber districts in the Coast Pine Belt of the eastern Gulf states. Trees under 12 inches in diameter are rarely seen, as is the case everywhere in these undisturbed primeval pine forests. The soil of this region is closer, more retentive of moisture, and richer in plant-food than that in the Maritime Pine Region east of the Mississippi. The pines here are therefore of more rapid growth and below the standard of quality for which the pine produced on the poor, siliceous ridges of lower Mississippi and Alabama is so highly valued. The numerous streams which cut their way through these pine hills are fringed with many of the evergreens peculiar to the eastern Gulf coast; and magnolias, the red and white bay, wax myrtles, willows, and the devilwood are common.

"The pine region west of the Red River valley spreads westward to the Sabine, forming part of the great pine forest which extends far into eastern Texas. Southward it constantly increases in width; and its length from north to south, where it verges upon the lower maritime prairies of the Calcasieu, is not less than 100 miles. It includes the whole of the parish of Vernon, the largest part of Calcasieu, and portions of the parishes of Natchitoches and Rapides, covering an area of about 4,500 square miles. The northern portion of this belt is one vast primeval forest. The small inroads made by the scattered settlers and the few small saw-mills which supply a small local

demand are too insignificant to be taken into account. In the southern portion of this forest the saw-mills on the Sabine river and at Lake Charles have already removed some timber from the banks of the principal streams.

"The region of long-leaved pine which skirts the eastern confines of the Red River valley, and which at its southern extremity almost touches the river banks, may be called the central pine region of west Louisiana. The village of Pineville, opposite the city of Alexandria, is the center of the lumber trade of this region. The high, undulating uplands formed of the Pliocene-Tertiary strata which here front the river bear a growth of loblolly and short-leaved pine mixed with upland oaks. A few miles to the eastward, however, upon the hills covered with drift, the forest of long-leaved pine appears. The surface in this central pine region is more broken, the soil poorer, more porous and siliceous than west of the Red River valley, and the timber produced here is of unsurpassed quality. An average of not less than fifteen trees to the acre, with a diameter of over 15 inches 3 feet from the ground, grow here. The production of lumber is limited to saw-mills situated 7 or 8 miles from the river. They have been gradually removed from its banks as the timber was exhausted on a line 7 or 8 miles in length north and south from Pineville. The production of these mills amounts in the aggregate to 40,000 feet a day. The lumber manufactured here supplies the population of the Red River valley as far west as Shreveport.

"The rolling uplands which extend to the edge of the river at Shreveport are covered with a heavy, cold, clayey soil almost impervious to water; they bear an open growth of oaks, among which the post oak is the prevailing species, finding here the conditions most favorable to its growth. The Spanish oak, invariably called west of the Mississippi river red oak, with fine black-jack makes up the larger part of the tree growth. Hickories, represented by the pig-nut and mocker-nut, are not frequent, and are of small size. The black oak is found in localities with somewhat rocky surface and loose subsoil, while white oaks occur along the base of declivities where an accumulation of vegetable matter has been deposited. The undergrowth in these woods is scanty, and consists for the most part of seedling oaks. Where, however, the forest has been entirely removed, the loblolly pine takes exclusive possession of the soil. These oak forests reach to the northern confines of the state and extend west into Texas. In their southern extremity toward the pine region the soil is better, and the white oak becomes the prevailing forest tree. My attention was directed to the fact that since the removal of the raft of the Red river the drainage of the upper part of the valley has been greatly improved, and many of the lakes and swamps formerly continually inundated are now dry, while the swamp forest growth, including the cypress, is dying, or has already died.

"Opposite Shreveport the valley spreads out into an extensive plain from 8 to 10 miles in width, descending imperceptibly as it recedes from the bank of the river. These lowlands are mere swamps, often deeply overflowed by the backwater of the river, which finds its way through the numerous bayous and inlets which intersect this plain. The forest growth covering these swamps is of inferior size, and consists of but few species. The cypress occupies the overflowed swamps, but it is always below medium size, and I did not notice a single specimen 2 feet in diameter. The saline, gypsum soil does not seem suited to its full development. The water locust finds here its favorite home. It is very common in moist localities not subject to constant inundation. The wood of this tree is as hard and durable as that of the common honey locust, and is employed for the same purposes; that is, in the manufacture of stirrups, blocks, hubs, etc. The green ash is frequently seen here growing with the wahoo, hornbeam, holly, and privet, and forming broad clumps of great luxuriance beneath the larger trees. After passing Cross bayou the land gently rises, and, with better drainage, the trees of the swamps disappear and are replaced by a more varied and valuable timber growth. The white ash and white and red oaks are the more common trees in the woods which skirt the base of the ridges forming the eastern limits of the valley of the Red river. At this point they are separated from the low hills of the Pliocene sandy loams by a pretty, clear stream, the Red Chute, which runs swiftly over its bed along the base of the uplands; these form long, gentle, swelling slopes, or spread out into broad flats more or less deficient of drainage. The ridges are all wooded with upland oaks and short-leaved pines, while the loblolly pine, with water and willow oaks, sweet and black gums, cover the depressions and damp flats. The tree growth upon these ridges is vigorous. I have nowhere found the short-leaved pine of finer proportions, equaling in size and length of clear trunk the long-leaved species. This region of the short-leaved pine, with its low, heavily-timbered ridges, is similar in character of soil and vegetation to the pine hills of central and northern Mississippi, and might be designated as the region of the pine hills of northern Louisiana. Between lake Bodcau and lake Bistineau the surface of the country is very often imperfectly drained, and there the loblolly pine is the prevailing tree. A few miles back of Bellevue, in Bossier parish, the level forest is interrupted by a strip of prairie from 1 mile to 3 miles wide, covered with a cold, soapy, gray soil impervious to water. On these natural meadows no tree or shrub is growing, except a peculiar *Cratægus*, new to me. (*a*) It is a small tree or large shrub, forming strictly-defined, impenetrable, dense thickets a few rods or of several acres in extent. In its arborescent form it rises to a height of from 15 to 20 feet, with a more or less bent trunk 6 or 7 inches in diameter, spreading its crooked limbs at a height of from 4 to 6 feet above the ground. The fruit is said to be as large as that of the apple haw, sweet and edible; it is eagerly eaten by swine, which fatten upon it. This tree is here called by the people 'hogs' haw'.

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a Cratægus brachyacantha, Sargent and Engelmann.

"On the decline which leads to the valley of bayou Dauchitta, the flatwoods give way to a fine growth of Spanish and post oaks, elms, and gums.

"The western bank of the bayou is confronted by hills of the post-Tertiary sands and gravels which westward form a succession of steep ridges heavily wooded with the upland oaks and short-leaved pine. The narrow creek bottoms inclosed between these ridges are watered abundantly by springs and clear streams shaded by white and red bay, hollies, azaleas, and kalmias. The great magnolia is not seen here, and the American olive is missing. In these gravelly hills, extending westward to the valley of the Ouachita river, the short-leaved pine is very common and the characteristics of the pine-hill region are prominent. These hills cover a large area extending northward into Arkansas, and toward the south merging gradually into the oak woods which border upon the bottoms of the numerous tributaries of the Red river. This pine-hill region is sparsely settled, and, remote from water and rail communication, its original stores of pine and hard-wood timber have scarcely been touched.

"An intimate knowledge of the forest growth in this section was obtained by an excursion over the hills to bayou Dauchitta above its entrance to lake Bistineau. In the localities of the best drainage in this valley the cow oak is very common, mixed with the white and post oaks, while sweet gums, black gums, water and willow oaks, and hackberries occupy lower situations. On the immediate banks and in the sloughs small cypress trees are common, mixed with the bitter pecan, the hornbeam, the water locust, and the sycamore. The loblolly pine takes possession of every opening in the forest, descending the high hills, while numerous haws border the edges of the forest. In the bottoms and along the declivities, the Chickasaw and the American plum are found of larger size than farther east. Loblollies and hickories with the black and post oaks occupy the lower declivities, and upon the heights the yellow pine mixed with upland oaks forms fine forests."

TEXAS.

The most important forests of Texas are found in the extreme eastern part of the state, where the Maritime Pine Belt of the south Atlantic region extends to about midway between the Trinity and the Brazos rivers. A forest of long-leaved pine occupies most of the territory between the Sabine and the Brazos south of the thirty-first degree of north latitude, reaching south to within 20 miles of the coast. Beyond the long-leaved pine forests, forests of the loblolly pine, mixed with hard woods, stretch westward 50 or 60 miles, while north of these two regions a third division of the pine belt, composed of a heavy growth of short-leaved pine mingled with upland oaks, occupies the rolling ridges which extend northward to beyond the Red river. The swamps which line the larger streams flowing into the Gulf, especially within the limits of the pine belt, still contain large bodies of cypress. The quality of the Texas cypress, however, is inferior to that grown east of the Mississippi river, and probably one-third of the timber growing in the valleys of the Sabine and the Nueces rivers is "peggy" or affected by dry rot.

West of the pine belt open forests largely composed of post and black-jack oaks occur, gradually decreasing in density, and finally, west of the ninety-seventh degree of longitude, entirely disappearing. Farther west, however, the "lower" and "upper cross-timbers", two remarkable bodies of timber, composed of small and stunted specimens of these oaks, extend from the Indian territory far south into the prairie region, occupying long, narrow, irregular belts where sandy or gravelly alluvial deposits overlie the limestone of the prairie region. A belt of forest, largely composed of post and black-jack oaks, varying from 20 to 50 miles in width extends southwest of the Trinity nearly to the Nueces river, its eastern border following generally, at a distance of from 50 to 60 miles inland, the trend of the coast. The bottom lands east of the one hundredth meridian are lined with the deciduous trees which occupy similar situations in the eastern Gulf states. Near the coast the bottom lands of the large rivers, often several miles in width, are covered with dense forests composed of enormous trees. Farther west the bottoms gradually narrow, the number of arborescent species covering them decreases, and individual trees are small and stunted.

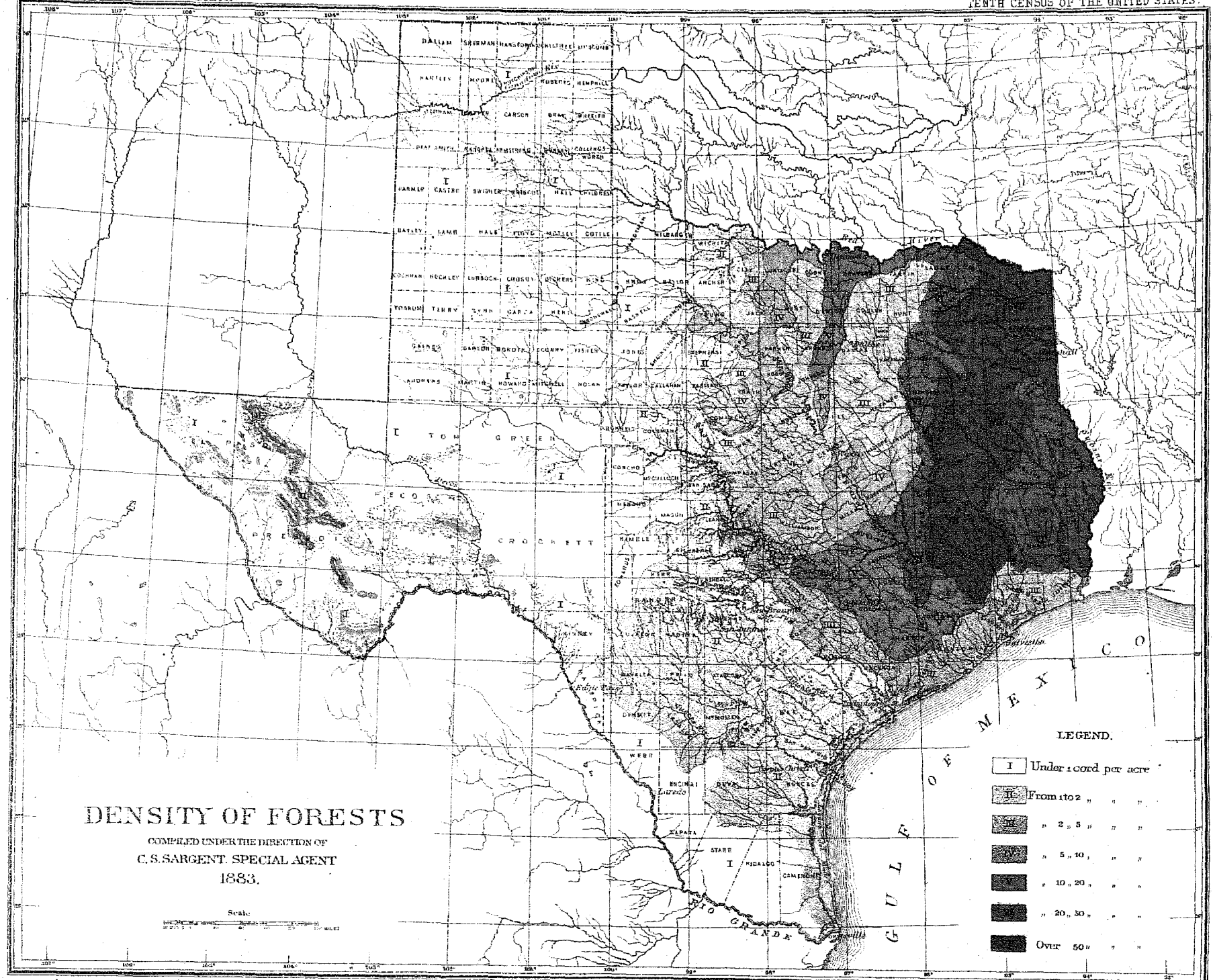
West of the Colorado river the forests of the Atlantic region are replaced outside of the bottom lands by Mexican forms of vegetation; the hills are covered with a stunted growth of mesquit, Mexican persimmon, various acacias, and other small trees of little value except for fuel and fencing.

An important tree in the forest of western Texas is the cedar covering the low limestone hills which occupy hundreds of square miles north and west of the Colorado river, in Travis, Bastrop, Hays, Comal, and adjacent counties. West of the one hundredth meridian all forest growth disappears, with the exception of a few scattered cottonwoods, elms, and hackberries, confined to the narrow bottoms, and a shrubby growth of mesquit, which covers the plains of western Texas, furnishing the only fuel of the region. The mountain ranges, outlying ridges of the Rocky mountains, which occupy the extreme western part of the state, are covered with an open, stunted forest of western pines and cedars, with which mingle the post oak, the yellow oak, and other species of the Atlantic region.

The pine belt covering the eastern counties of the state is alone important as a source of lumber supply. Areas of river-bottom land covered with trees are, as compared with the area of the state, insignificant in extent, and these river belts of forest are entirely insufficient to supply even the mere local wants of the nearest settlements. The oak forests, which stretch more or less continuously between the eastern pine belt and the treeless western prairies and plains, are, except along their extreme eastern borders, composed of small, stunted trees, often hollow, defective, and of little value except for fuel, fence rails, and railway ties. The forests of the western mountains are

DEPARTMENT OF THE INTERIOR.

TENTH CENSUS OF THE UNITED STATES.



TEXAS

not luxuriant, and at the best can only supply a limited local demand with inferior lumber. It is probably no exaggeration to say that west of the pine belt, and with the exception of the small amount of hard wood found on the bottom lands near the coast, the forests of Texas do not contain a single tree fit to manufacture into first-class lumber. The pine forests, therefore, of eastern Texas and western Louisiana are important factors in the future development of Texas, as well as of the treeless northeastern provinces of Mexico, which must draw their building material from these pineries. The position of these forests, therefore, with reference to an enormous territory destitute of timber, although adapted to agriculture and grazing, and which must soon be covered with a considerable population and a net-work of railroads, their richness of composition, and the facility with which they can be worked, give to them perhaps a greater prospective value than that possessed by any body of timber of similar extent in the United States.

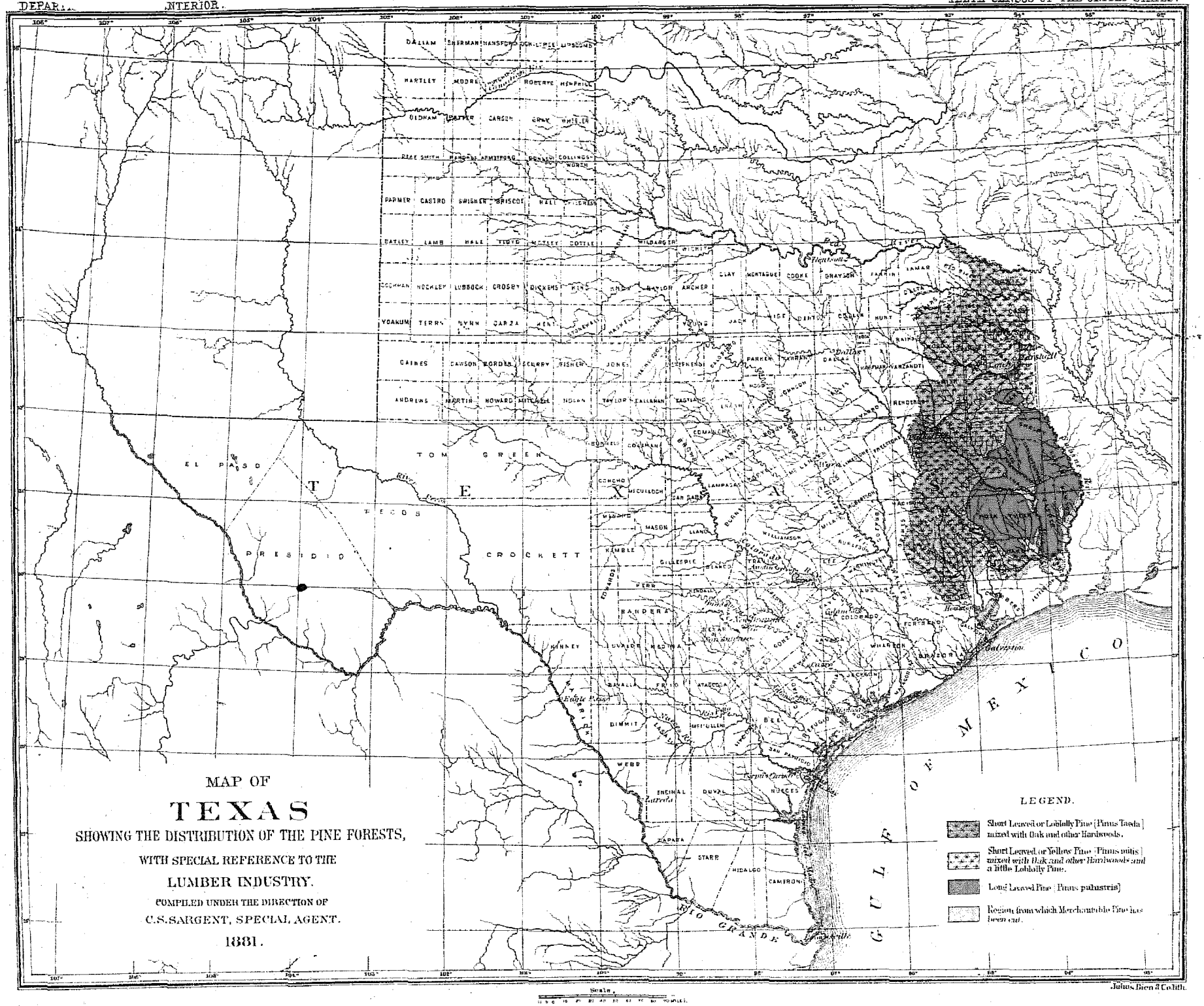
During the census year 599,359 acres of woodland were reported damaged by fire, with an estimated loss of $273,990. Of these fires the larger number was set to improve pasturage, in clearing land, or through malice. These returns do not include the large areas burned in western Texas by prairie fires, checking the growth of the mesquit over a great extent of territory.

Small amounts of cooperage stock and woodenware, principally for local consumption, are manufactured in the eastern counties from oak and cypress. Manufacturers report an abundant supply of material.

The following rough estimates of the amounts of the three kinds of pine standing in the state May 31, 1880, were made by multiplying the average stand of timber per acre by the county areas occupied by the pine forests, these being obtained by deducting, from total areas of the county, estimated areas covered by clearings, bottom lands, swamps, etc.:

Counties.	Long-leaved pine (*Pinus palustris*).	Short-leaved pine (*Pinus mitis*).	Loblolly pine (*Pinus Tæda*).
	Feet, board measure.	*Feet, board measure.*	*Feet, board measure.*
Anderson		336,000,000	1,763,000,000
Angelina	1,340,800,000		1,190,400,000
Bowie		2,380,800,000	
Camp		579,200,000	
Cass		2,470,400,000	
Cherokee		2,230,400,000	585,600,000
Franklin		448,000,000	
Gregg		598,400,000	
Grimes			211,200,000
Hardin	1,244,800,000		627,200,000
Harris			1,337,200,000
Harrison		2,926,400,000	
Henderson		521,600,000	
Hopkins		483,200,000	
Houston			3,216,000,000
Jasper	2,534,400,000		
Jefferson			288,000,000
Liberty	41,600,000		2,147,200,000
Madison			233,600,000
Marion		1,187,200,000	
Montgomery			2,326,400,000
Morris		729,600,000	
Nacogdoches	1,216,000,000	1,555,200,000	35,500,000
Newton	2,112,000,000		33,000,000
Orange	230,000,000		518,400,000
Panola	1,193,600,000	1,107,200,000	
Polk	2,720,000,000		473,600,000
Red River		272,000,000	
Rusk	115,200,000	2,492,800,000	
Sabine	1,648,000,000		
San Augustine	1,625,600,000		
San Jacinto			1,833,600,000
Shelby	1,884,800,000	425,600,000	
Smith		2,035,200,000	
Titus		896,000,000	
Trinity	51,000,000		1,987,200,000
Tyler	2,550,400,000		
Upshur		1,392,000,000	
Van Zandt		26,000,000	
Walker			1,590,400,000
Waller			19,000,000
Wood		1,600,000,000	
Total	20,508,200,000	26,093,200,000	20,907,100,000
Amount cut for the year ending May 31, 1880	66,450,000	*a* 146,420,000	61,570,000

a Including 30,290,000 shingles.


MAP OF
TEXAS
SHOWING THE DISTRIBUTION OF THE PINE FORESTS,
WITH SPECIAL REFERENCE TO THE
LUMBER INDUSTRY.
COMPILED UNDER THE DIRECTION OF
C.S.SARGENT, SPECIAL AGENT.
1881.
LEGEND.
Short Leaved or Loblolly Pine [Pinus Taeda] mixed with Oak and other Hardwoods.
Short Leaved or Yellow Pine [Pinus mitis] mixed with Oak and other Hardwoods and a little Loblolly Pine.
Long Leaved Pine [Pinus palustris]
Region from which Merchantable Pine has been cut.
GULF OF MEXICO
TEXAS
EL PASO
PRESIDIO
TOM GREEN
CROCKETT
PECOS
RIO GRANDE
Galveston
Scale.
Julius Bien & Co. lith.

The principal centers of lumber manufacture in Texas are Orange and Beaumont, on the Sabine and Nueces rivers, above Sabine pass. Long-leaved pine and cypress are sawed here and shipped east and west by rail, and in small quantities by schooner to Texan and Mexican ports. Loblolly pine is sawed at a number of small mills upon the line of the International and Great Northern railroad in the counties south of the Trinity river, and a large amount of short-leaved pine is manufactured in the mills upon the line of the Texas Pacific railroad in the northeastern counties, Longview, in Gregg county, being the principal center of this industry. The product of these mills is shipped west by rail to supply settlers upon the prairies of northern Texas with building material.

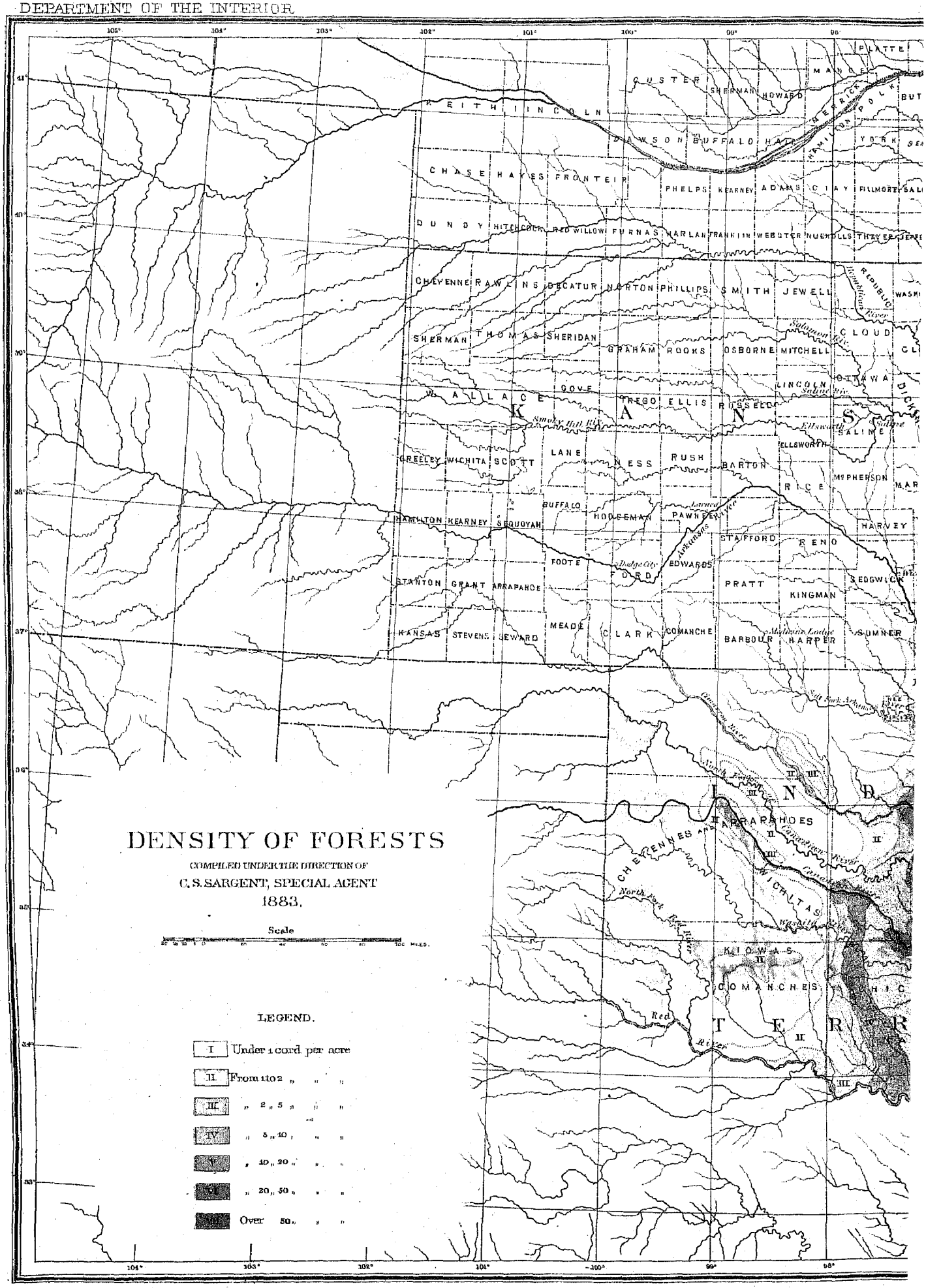
The following extracts are derived from the notes upon the forests of Texas made by Dr. Charles Mohr, of Mobile:

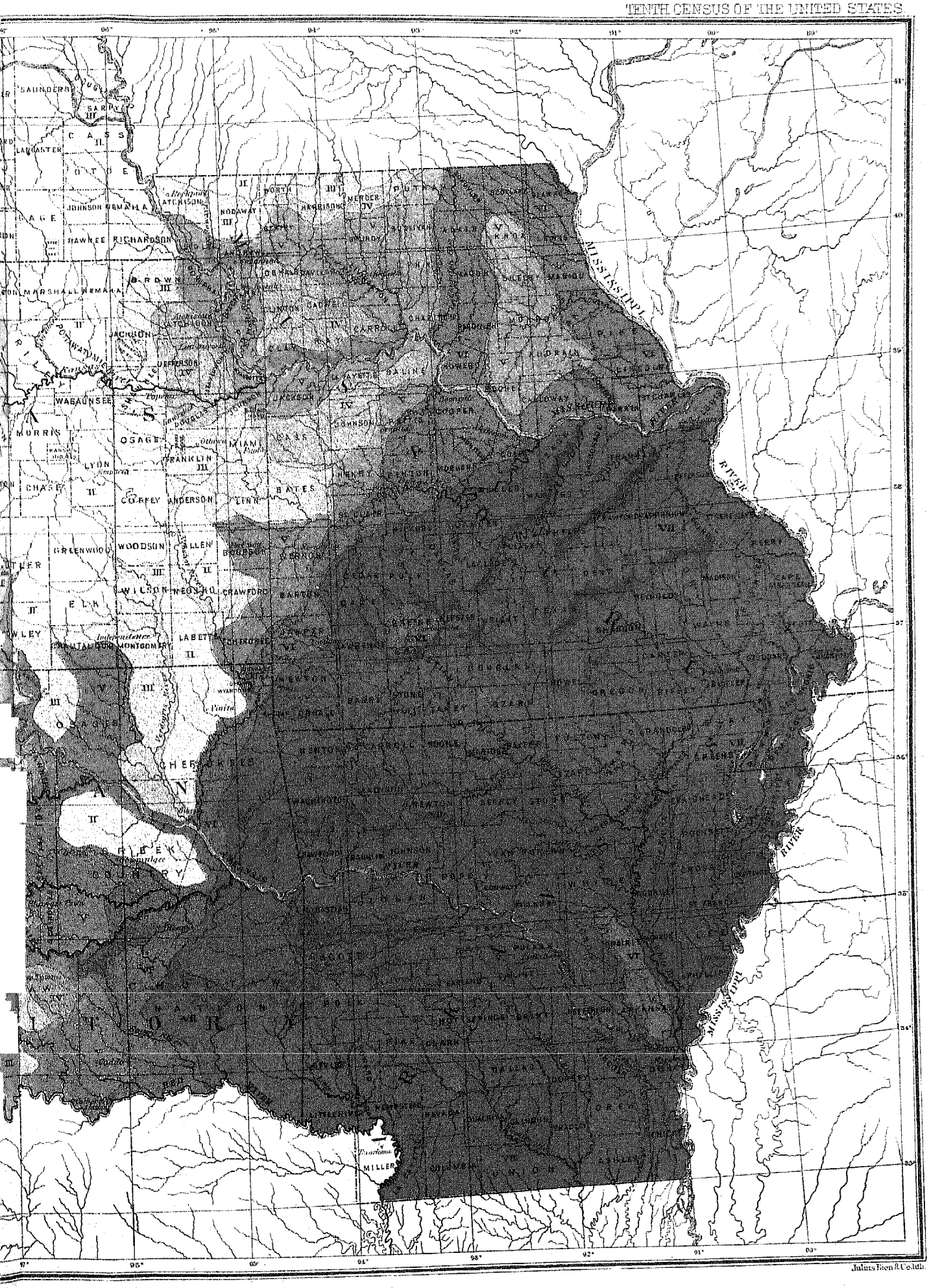
"West of Marshall, upon the Texas Pacific railroad, the surface of the land becomes more broken; the soil is lighter, more porous, and favorable to the growth of the short-leaved pine, which soon becomes the prevailing forest tree in the woods extending toward the west. Longview, a small town at the junction of the International and Great Northern and Texas Pacific railroads, is situated almost in the center of the short-leaved pine region, and is the seat of an active lumber business. These forests of short-leaved pine, more or less interspersed with oaks, extend to the northern boundary of the state, and southward with an easterly trend to the confines of the region of the long-leaved pine. The short-leaved pine finds its western limits near Mineola.

At Palestine, in Anderson county, the uplands are covered with a loamy, somewhat sandy, soil underlaid with a heavy clay. Here a more or less open oak forest is common. The black oak abounds, with the Spanish, black-jack, blue-jack, and post oak, the last, however, always the prevailing species. Next to the post oak the black-jack is the species of widest distribution in Texas, the two species being always found associated together from the northern confines of the state to the prairies of the coast, and from the east to the treeless regions of western Texas. The bois d'arc (*Maclura aurantiaca*) is common along the banks of the water-courses in eastern Texas, attaining a size large enough to be economically valuable. It is here, however, most probably adventitious from the region in the northwest, where it forms an almost uninterrupted belt of woods from 4 to 10 miles wide, extending from a short distance south of the city of Dallas to the northern frontier of the state, entering the Indian territory between Sherman and Paris. This tree attains a height of from 45 to 50 feet, with a diameter of from 1 foot to 2 feet, and is of great value.

"The timber growth immediately west of the Brazos is stunted and scanty; large areas of grass land intervene between the scrubby woods until all at once ligneous growth disappears, and the seemingly boundless prairie, in gently undulating swells, expands before the view on all sides. Near the center of Milam county a belt of open post-oak woods from 20 to 25 miles in width is entered. It extends from Belton, in Bell county, southward to the upper confines of Gonzales county. Post oaks stand here from 20 to 30 feet apart, with black-jacks and blue-jacks between them, the trees being all of small size. The soil of these oak hills is of poor quality, sandy, gravelly, and more or less broken, arid, and devoid of vegetable mold. Toward the southern limit of this belt, near Bastrop, a tract of loblolly pine is found covering nearly four townships, or about 90,000 acres. During the last twelve years all the useful timber on this isolated tract has been cut down. A second growth of pine, however, has sprung up, and is now growing vigorously under the fostering care of the owners of the land, and promises in a short time to afford a new supply of timber. A belt of post oak is found intersecting the prairie from the upper part of McLennan county, near Waco, and extending to the northern frontier of the state, where it joins the cross-timbers of the Wichita. It is known as the 'lower cross-timbers'. This belt of oak wood is nearly 150 miles long, with its greatest width of about 20 miles between Dallas and Fort Worth. At a distance of from 20 to 40 miles west of the lower cross-timbers another belt of oak extends from Comanche county to the northern boundary of the state, with a long western spur following the valley of the Brazos as far as the ninety-ninth meridian. This oak forest is known as 'the cross-timbers'.

"Taken as a whole, the country west of the Brazos river, except the basin of the Colorado, is a poorly-timbered region. The mesquit was first met with on the declivities of the prairie, which verge here upon the valley of the Colorado. The wood of this tree is hard, fine-grained, tough, heavy, and of great durability. In the western portions of the state, almost entirely destitute of other timber growth, it serves, according to its size, a variety of purposes in the economy of the stock ranch, and is there invaluable for fencing. Burning with a clear, smokeless flame and possessing great heating powers, it is unsurpassed as fuel by any other Texas wood. It serves, moreover, another important purpose in furnishing an abundance of wholesome and nutritious food to large herds of cattle, at a season of the year when long-continued droughts have destroyed the grass upon the prairie. With the increasing settlement of the treeless-prairie region during the last 15 or 20 years, this tree has spread rapidly east and north. Near San Antonio I saw extensive districts, reported to have been, a few years ago, entirely destitute of even a trace of ligneous growth, and which are now covered with copses of mesquit. Similar growths have sprung up everywhere in the prairies of western Texas. The appearance of this new growth may be traced to the influence of the vast herds of stock which range over the prairies, and which, in voiding the seeds of this tree, assist its wider distribution, and, in keeping down the grass, diminish the quantity of combustible material which feeds the prairie fires, and thus check and finally prevent the spread of the frequent conflagrations which swept year after year over these grassy plains.


DENSITY OF FORESTS
COMPILED UNDER THE DIRECTION OF
C. S. SARGENT, SPECIAL AGENT
1883.
Scale
LEGEND.
I Under 1 cord per acre
II From 1 to 2 " " "
III " 2 " 5 " " "
IV " 5 " 10 " " "
V " 10 " 20 " " "
VI " 20 " 50 " " "
VII Over 50 " " "
KANSAS
INDIAN TERRITORY
CUSTER
SHERMAN
HOWARD
MERRICK
POLK
BUTLER
YORK
KEITH
LINCOLN
DAWSON
BUFFALO
HALL
HAMILTON
CHASE
HAYES
FRONTIER
PHELPS
KEARNEY
ADAMS
CLAY
FILLMORE
DUNDY
HITCHCOCK
RED WILLOW
FURNAS
HARLAN
FRANKLIN
WEBSTER
NUCKOLLS
THAYER
CHEYENNE
RAWLINS
DECATUR
NORTON
PHILLIPS
SMITH
JEWELL
REPUBLIC
SHERMAN
THOMAS
SHERIDAN
GRAHAM
ROOKS
OSBORNE
MITCHELL
CLOUD
OTTAWA
LINCOLN
GOVE
WALLACE
TREGO
ELLIS
RUSSELL
SALINE
ELLSWORTH
GREELEY
WICHITA
SCOTT
LANE
NESS
RUSH
BARTON
RICE
McPHERSON
HAMILTON
KEARNEY
SEQUOYAH
BUFFALO
HODGEMAN
PAWNEE
STAFFORD
RENO
HARVEY
FOOTE
FORD
EDWARDS
PRATT
KINGMAN
SEDGWICK
STANTON
GRANT
ARRAPAHOE
KANSAS
STEVENS
SEWARD
MEADE
CLARK
COMANCHE
BARBOUR
HARPER
SUMNER
ARRAPAHOES
CHEYENNES
WICHITAS
KIOWAS
COMANCHES
Red River



Julius Bien & Co. lith.

"West of the Colorado river the pecan-nut is an important product, forming one of the staple articles of export. Shipments of this nut from San Antonio average annually 1,250,000 pounds, obtained from the bottom lands of the Nueces, the Rio Frio, Medina, and Rio Concho. A million pounds, obtained from the Colorado, Guadalupe, Rio Blanco, Pierderelis, Sabinal, Llano, and San Saba rivers, are shipped from Austin, and about a quarter of a million more from Indianola, gathered on the lower Guadalupe, San Antonio, Colorado, and other streams flowing into the Gulf. The nuts are worth, on an average, 5 cents a pound to the gatherer.

"On the range of low hills extending from San Antonio to Austin, which rise at some points to a height of over 500 feet above the plain, forming the base of the terraces leading to the table-land of northern Mexico, the woods are confined to the barrens and the declivities bordering upon them. The open plains on these table-lands are either entirely destitute of ligneous growth, or, when covered with deeper and more fertile soil, support low copses of mesquit. The western juniper is observed here for the first time. It is a tree of low growth, seldom exceeding 35 feet in height, or more than a foot in diameter. It branches at a short distance from the base, forming a broad, round head. The wood is of a dingy, reddish color, fine-grained, hard, and heavy, and in density and durability is not inferior to that of the red cedar. It is knotty, however, from near the base, and furnishes no sticks sufficiently long to allow its use in cabinet-making, and can only be employed for rough construction, posts, palings, etc., for which purposes it is invaluable. The home of the western cedar is found on the rugged highlands which surround the channels of the headwaters of the numerous streams which flow from the eastern declivity of these hills. Here it forms open groves, with scarcely any other woody growth among the somewhat scattered trees. These cedar woods are particularly common upon the brows of the steep escarpments from the base of which issue the large springs which form such a striking feature in this part of the state. In the vicinity of the settlements few of the full-grown trees have been left. The improvidence of the first settlers in obtaining their timber supplies and the prairie fires which ran through these cedar woods in former years have caused the destruction of large areas once covered by this valuable tree. According to my observation, the western cedar prefers a calcareous, dry soil. Its range of distribution seems limited to the hilly region bordering upon the upper part of the Colorado valley, extending toward the south a short distance below New Braunfels, and westward to the sources of the Nueces and Guadalupe rivers. Well-timbered tracts of this tree are still found west of New Braunfels as far as Boerne, in Kendall county, and on the terraces of the higher ranges in Bandera and Kerr counties."

INDIAN TERRITORY.

The forests of the Indian territory are confined to its eastern portion. West of the ninety-ninth meridian trees are only found along the narrow river bottoms, the intervening ridges being bare of all forest growth. The extreme northeastern part of the territory contains numerous extensive open prairies, south of which a heavy body of forest composed of hard woods, mixed on the high ridges with the short-leaved pine, extends southward into Texas, with a maximum width in the Choctaw nation of 60 miles. In the Cherokee nation six considerable bodies of pine, varying from 10 to 30 miles in length and 2 to 4 miles in width, occur on Spavina creek, Illinois river, Salina river, Spring creek, and Bowman's Fork, tributaries of Grand river. A large body of pine occurs also 25 miles west of Reams, a station upon the Missouri, Kansas, and Texas railroad. Smaller bodies of pine are found, too, east of Reams, and at Stringtown, where lumber is manufactured and shipped southward by rail into northern Texas.

The bottom lands of all the streams flowing through the eastern portion of the territory are heavily timbered with hard woods, and especially those of the Neosho, Verdigris, Arkansas, and Canadian rivers contain great bodies of the finest black walnut now growing. A particularly fine growth of this timber extends along the Verdigris river for 50 miles above Coffeeville.

West of the region of heavy forest the country is covered with an open growth of upland oaks, among which the most prominent are the post oak and the black-jack. These forests are interspersed with prairies, often of considerable extent, which gradually occupy the whole country outside the bottom lands. Farther west, between the ninety-seventh and ninety-ninth degrees of west longitude, the "cross-timbers" enter the territory from the south. They are composed, as in Texas, of a stunted growth of post oak and black-jack, and extend northward across the territory in straggling patches into southern Kansas. The main belt of the "cross-timbers", about 70 miles wide at the Texas boundary, gradually becomes narrower toward the north and northwest, disappearing, at about longitude 99° west, upon the ridges south of the Cimarron river.

No returns of the amount of lumber manufactured in the territory have been received, nor other than the most general information in regard to its forest covering.

ARKANSAS.

Heavy forests cover the state of Arkansas, with the exception of a few isolated prairies principally confined to Prairie and Arkansas counties, north of the valley of the Arkansas river, and the western borders of the state. North of the Arkansas river the forests are mostly composed of the deciduous trees of the Mississippi basin, through which isolated belts occur, often of considerable extent, in which the short-leaved pine, the only species found in

northern Arkansas, is mixed with the hard woods. The southwestern part of the state south of the Arkansas river and west of the broad, level plain of the Mississippi is covered outside the river-bottom lands with an almost continuous forest of pine, in which the short-leaved species occupies the high, dry ridges and the loblolly the moist soil above the bottoms. Great bodies of cypress cover the extensive swamps that stretch along the eastern border of the state or line the bottoms of the White, Arkansas, Washita, and Red rivers. The hard-wood forests of the state are hardly surpassed in variety and richness, and contain inestimable bodies of the finest oak, walnut, hickory, and ash timber. Black walnut of large size is still widely scattered over the state, and is particularly abundant in the valley of the Red and other southern rivers. The pine forests are almost intact. Settlements made for agricultural purposes have been confined to bottom lands, and only during the last few years has pine lumber been manufactured in the state, except to supply a very limited local demand. Recently, however, comparatively small quantities of lumber manufactured at numerous railroad mills, principally established south of the Arkansas river, have been shipped north and south out of the state.

The forests of Arkansas have received comparatively little damage from fire. Pine generally succeeds pine even on burned land, although upon certain gravel and clay soils the second growth is largely composed of black and red oaks, or, in the southern part of the state, the sweet gum replaces other trees on bottom lands. During the census year 858,115 acres of woodland were reported devastated by fire, with an estimated loss of $259,470. The largest number of these fires was due to the carelessness of farmers in clearing land, or to hunters camping in the forest.

Industries consuming hard woods are still in their infancy in Arkansas, although doubtless destined to attain an important development. Rough white-oak staves are largely manufactured in the White River country and in the northeastern part of the state for eastern and European markets.

A considerable traffic exists in the southwestern counties in the wood of the Osage orange, used for wheel stock, and more recently as pavement in Saint Louis and other northern cities.

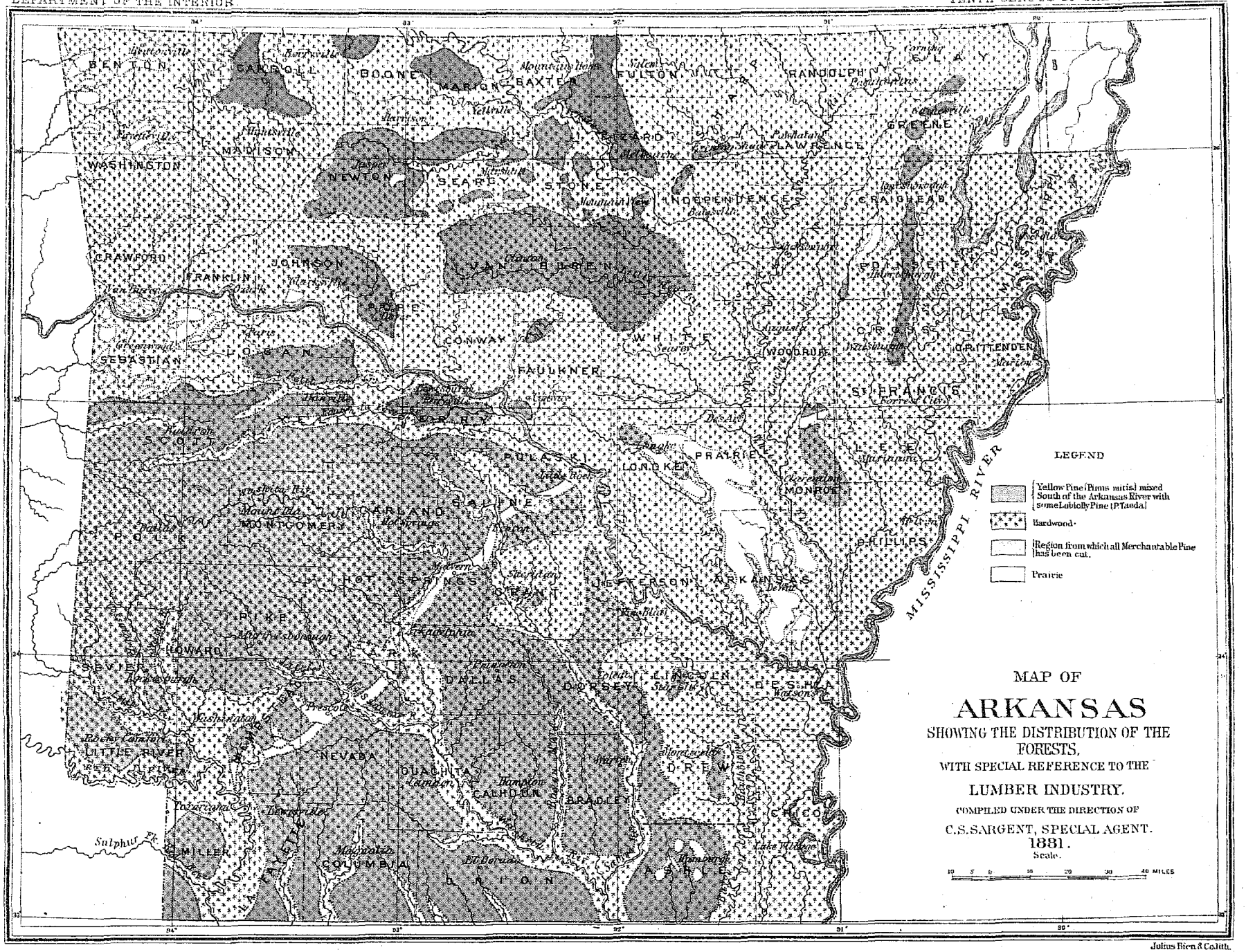
The following estimates of the amount of short-leaved pine standing in Arkansas May 31, 1880, were prepared by Professor F. L. Harvey, of Fayetteville:

SHORT-LEAVED PINE (*Pinus mitis*).

Counties.	Feet, board measure.	Counties.	Feet, board measure.	Counties.	Feet, board measure.
Ashley	1,555,000,000	Hot Spring	1,348,000,000	Perry	1,023,000,000
Baxter	187,000,000	Howard	1,254,000,000	Phillips	21,000,000
Boone	124,000,000	Independence	93,000,000	Pike	1,695,000,000
Bradley	1,140,000,000	Izard	242,000,000	Poinsett	45,000,000
Calhoun	1,519,000,000	Jefferson	518,000,000	Polk	2,592,000,000
Carroll	159,000,000	Johnson	248,000,000	Pope	208,000,000
Clarke	1,280,000,000	La Fayette	586,000,000	Pulaski	668,000,000
Clay	3,000,000	Lee	14,000,000	Saint Francis	7,000,000
Columbia	1,806,000,000	Lincoln	105,000,000	Saline	933,000,000
Craighead	18,000,000	Little River	690,000,000	Scott	1,516,000,000
Cross	54,000,000	Logan	554,000,000	Searcy	166,000,000
Dallas	1,659,000,000	Lonoke	20,000,000	Sebastian	243,000,000
Dorsey	726,000,000	Madison	55,000,000	Sevier	969,000,000
Drew	482,000,000	Marion	207,000,000	Sharp	35,000,000
Faulkner	42,000,000	Miller	622,000,000	Stone	179,000,000
Fulton	146,000,000	Monroe	180,000,000	Union	2,384,000,000
Garland	1,865,000,000	Montgomery	2,281,000,000	Van Buren	435,000,000
Grant	207,000,000	Nevada	1,453,000,000	White	23,000,000
Greene	38,000,000	Newton	767,000,000	Yell	1,306,000,000
Hempstead	1,176,000,000	Ouachita	1,384,000,000		
Total					41,315,000,000
Cut for the census year ending May 31, 1880 (including 57,943,000 shingles and 2,891,000 laths)					129,781,000

TENNESSEE.

The western counties of Tennessee are covered with heavy forests, similar in distribution and density to those which occupy the Yazoo region of western Mississippi. The river swamps in this part of the state still contain large bodies of cypress, while the hills are covered with oaks, hickories, and other hard-wood trees. The central portion of the state, now largely cleared for cultivation, was once covered with forests of hard wood, remnants of which are still found upon rocky ridges or land unfit for agriculture. Nearly through the center of this middle district, extending north and south, "the cedar glades" occupy an extensive region of Silurian limestone. Here the characteristic growth consists of red cedar (*Juniperus Virginiana*), often forming stunted forests of considerable extent, to the exclusion of other species, or is mixed with the honey locust, a characteristic species, also, of this well-marked region.



Julius Bien & Co.lith.

The eastern part of the state, occupied by the Cumberland plateau and the high ranges of the southern Alleghany mountains, is covered with a heavy forest of oak and other hard woods, mixed at high elevations with hemlock, pine, and spruce, and constituting one of the finest bodies of timber now standing in the United States. It contains, besides white and chestnut oak of fine quality, much yellow poplar, black walnut, and cherry. In the southeastern counties, especially in the valley of the Tennessee river, the hard-wood forests have been, however, already destroyed over large areas to furnish charcoal for the iron-manufacturing industry established here.

During the census year 985,430 acres of woodland were reported devastated by fire, with a loss of $5,254,980. Of these fires the largest number was set in the careless clearing of land for agriculture or to improve grazing, and by hunters, locomotives, etc.

Mr. A. G. Willey, of Manchester, Tennessee, has supplied the following statement in regard to the effects produced upon the forest growth by the annual burning of dead herbage to improve pasturage:

"EFFECT OF FIRES UPON THE FOREST.

"The practice of burning timber-land, said to have been of Indian origin, has been continued by the white settlers. The native grasses do not die down when killed by frost; they simply die standing, and the young grass in the spring has to push through the old tuft, which is often 6 or 8 inches high. The fires are set in the timber and old fields to burn these tufts, that stock may graze four or six weeks earlier than if the old herbage had been left upon the ground. In the barrens and on the Cumberland plateau the timber is principally oak of various kinds, which do not shed their leaves at once when killed by frost, or rot when partially green, but remain dry upon the trees and fall gradually during winter and spring. The largest portion, therefore, are on the ground in February, the time when fires are set. The effect of these fires is to destroy all the natural sources of fertility, grass, leaves, and fallen timber. Had these been allowed to accumulate, what are now called barren lands would be the most fertile in the state. The practice kills, too, the young trees, so that some of the most valuable timber that the land is suitable to produce is unable to stand. The black-jack, post oak, black oak, etc., however, on account of the protection afforded by their thick bark, are able to gain some headway, and so crowd out more valuable trees. The state law makes it a misdemeanor with heavy penalty for any one to set fire to and burn a neighbor's land; but the difficulty of detection and conviction in such cases makes this law non-effective. These are the causes and effects of forest fires in this section; they never occur here in summer."

Considerable cooperage and wheel stock is manufactured in Tennessee, but, except in the eastern part of the state, manufacturers report a scarcity and deterioration of the best hard woods, especially white oak. In the eastern counties the manufacture of oak staves and other industries using hard woods are capable of large development.

The principal center of lumber manufacture in the state is Nashville, where several mills saw large quantities of black walnut, poplar, cherry, ash, oak, etc., received by raft from the upper Cumberland river in Tennessee and Kentucky. The local market takes about one-third of the lumber manufactured here, the remainder being sent north and east by rail. Memphis, on the Mississippi river, is also an important manufacturing center. The mills here are largely supplied by rafts from Missouri, Arkansas, and Tennessee, and saw large quantities of cypress, ash, poplar, hickory, gum, and black walnut. Considerable hard-wood lumber manufactured in Dyer, Lincoln, Obion, and Smith counties, and pine and hard-wood lumber in Knox and Jefferson, largely from logs obtained in the vicinity of the mills, is principally consumed locally.

KENTUCKY.

The forests of Kentucky resemble in general features those of Tennessee. Cypress, gum, and various water oaks occupy the river swamps of the western counties. The central region, now largely cleared and devoted to agriculture, was once covered with the oaks, walnuts, and hickories of the Atlantic region, while over the eastern and southeastern counties the dense forests of the Alleghany mountains extended. The eastern counties still contain great bodies of the best hard wood, especially black walnut, white oak, cherry, and yellow poplar, which are particularly fine and abundant in Bell, Harlan, and other southeastern counties. These forests, protected by the falls of the Cumberland river, which have prevented the driving of logs from its upper waters, and inaccessible to rail communication, are still practically uninjured, and probably unsurpassed in the amount, quality, and value of the timber which they contain. The destruction of forests to supply numerous iron furnaces with charcoal has been great in the northeastern counties, and no small part of this region has already been cut over.

During the census year 556,647 acres of woodland were reported devastated by fire, with an estimated loss of $237,635. Of these fires by far the largest number was traced to farmers carelessly clearing land for agricultural purposes.

In Barren, Edmonson, and other central counties extensive tracts of prairie existed at the time of the earliest settlement of the state. The presence of these prairies in the midst of a heavily-timbered region is ascribed to the annual burning to which they were subjected by the aborigines. With the disappearance of the

Indians trees sprang up, and this region is now well covered with a vigorous growth of black oaks of different species. White oaks, however, are not abundant, and other species common to the region, such as the walnuts, the yellow poplar, and the beech, are wanting in these young forests, indicating perhaps the effect of fires in checking the subsequent growth or development of many useful timber trees.

PASTURAGE OF WOODLANDS.

The forests of Kentucky, as well as those of all the central and southern portion of the United States, suffer severely from the almost universal custom of using woodlands for pasturage. The evil resulting from this practice is only more apparent in Kentucky and Tennessee, because in these states the amount of live stock is proportionately larger than in other parts of the south, while in the thickly-settled agricultural sections of these states the ratio of woodland to total area is smaller. The pasturage of woodlands necessitates, or at least induces, the annual burning of the dead herbage, by which underbrush, young trees, seedlings, and seeds are destroyed and the succession and permanence of the forest endangered. What the fires spare, browsing animals devour; hogs root out seedlings, and by selecting the sweet acorns of the white oak in preference to the bitter fruit of the black oaks, are gradually changing the composition of the oak forests. Comparatively few white oaks spring up in the forests of the more thickly settled portions of the central Atlantic region, and this change of forest composition must be ascribed to the preference of domestic animals for the palatable fruit of what, as regards their timber, are the most valuable species. The injury, too, inflicted by the constant stamping of animals and consequent packing of the land about the stems of old trees is very great, and all reports speak of the gradual dying of old trees left standing in the grazing regions of Kentucky and Tennessee.

The spread of the mistletoe (*Phoradendron flavescens*), consequent upon the removal of the forest and the increase in the number of birds (the mistletoe seems to require a certain amount of light and air for its development; it does not flourish or increase rapidly in the dense forest, and cannot spread except by the agency of birds), is a cause of serious injury to the forest of this whole region. It slowly but surely destroys the trees upon which it obtains a foothold. The black walnut especially suffers from the growth of this parasite, which seems destined to destroy the finest walnut timber left standing in the settled portions of the southern central region.

Large quantities of cooperage and wheel stock are produced all over the state, and manufacturers generally report no scarcity or deterioration of timber, with the exception of white oak. The principal centers of lumber manufacture are at the mouth of the Tennessee river, in McCracken county, where a large amount of cypress, sycamore, gum, oak, walnut, and other hard wood is manufactured for the northern market from logs rafted down the Tennessee and other streams flowing into the Mississippi; at Frankfort, where poplar, oak, ash, walnut, pine, cherry, hickory, and maple logs, rafted from the upper waters of the Kentucky river, are sawed, the lumber being shipped north and east by rail; and at Louisville, where walnut, poplar, and oak lumber is manufactured for local consumption. The manufacture of pumps and water-pipes from logs of the Jersey pine (*Pinus inops*), at one time an important industry at Louisville, has, since the general introduction of city and town water-works, become unremunerative and unimportant.