Wolfe, Stanley Lloyd
Wood-using industries of
South Carolina

State of South Carolina

Department of Agriculture, Commerce and Industries

E. J. WATSON, *Commissioner*

IN CO-OPERATION WITH THE

Forest Service

U. S. Department of Agriculture

HENRY S. GRAVES, *Forester*

Wood-Using Industries of South Carolina

By STANLEY L. WOLFE
Forest Assistant, Forest Service

1913

THE R. L. BRYAN COMPANY
COLUMBIA, S. C.
1913

State of South Carolina

Department of Agriculture, Commerce and Industries

E. J. WATSON, *Commissioner*

IN CO-OPERATION WITH THE

Forest Service

U. S. Department of Agriculture

HENRY S. GRAVES, *Forester*

Wood-Using Industries of South Carolina

By STANLEY L. WOLFE
Forest Assistant, Forest Service

1913

THE R. L. BRYAN COMPANY
COLUMBIA, S. C.
1913

NOTICE.

THE investigation upon which this report is based was undertaken by the Forest Service in co-operation with the Department of Agriculture, Commerce and Industries, State of South Carolina, the work being done under the direction of O. T. Swan, in charge of Industrial Investigations, Forest Service, United States Department of Agriculture, Washington, D. C. The statistics were compiled from data covering the calendar year of 1912. By the terms of the co-operative agreement, the State is authorized to publish the findings of the investigation.

CONTENTS.

INTRODUCTION.

THIS report was compiled by the Forest Service of the United States Department of Agriculture in co-operation with the Department of Agriculture, Commerce and Industries of the State of South Carolina. A portion of the material was collected by correspondence with the manufacturers and part was secured by personal visits and study at the factories. Representatives of both the Forest Service and of the State were engaged in the field work. The statistics given relate to the twelve calendar months of 1912.

The work was done in accordance with the plan followed by the Forest Service in preparing similar reports for other States. It contains data showing the kinds and quantities of the various woods employed by manufacturers, and whether they are procured within the State or outside; the particular products made, and general information regarding methods of manufacture; the numerous uses found for the different woods; and the cost, or price, of the various kinds of wood delivered as rough lumber at the factories.

This report gives the results of the first comprehensive attempt ever made in the "Palmetto State" to ascertain the character and scope of the industries which employ wood as raw material and reduce it to finished products. It is not possible, therefore, to compare present figures with equivalent data for earlier years and thereby measure the progress made. But it is generally known that although the supply of timber is decreasing, the methods of using it are improving.

The Bureau of the Census and the Forest Service publish statistics yearly showing the cut of lumber in the State, and this forms part of the annual lumber report for the United States. It is quite distinct from the present undertaking which is a special study and made once only for each State. It is concerned with the conversion of wood, principally rough lumber, into merchantable commodities. The report contains a directory of the firms which contributed information, the names being arranged according to industries. A list of the uses of the different woods is also appended.

South Carolina has an area of 30,989 square miles, or nearly 20,000,000 acres. Its population in 1910 was 1,515,400 and is not concentrated in a few large cities as is so often the case elsewhere, but is scattered throughout the State. Only one city, Charleston, has a population of over 50,000, while there are only three others having a population of over 10,000. These figures indicate that the State is an agricultural and timber producing community. Within the last decade or two, however, striking development has been made in the manufacturing industries.

Several large rivers and their tributaries afford means for log transportation in the coastal plain and a network of railroads throughout the State furnishes facilities for the shipment of products from one part of the State to another as well as to outside markets. In addition to railways and navigable streams, South Carolina has a few seaports of considerable commercial importance which should be considered as a part of her transportation system. Charleston is one of the most important of the southern seaports and affords harboring and docking facilities for men-of-war and ocean liners. It also figures greatly in coastwise trade while Georgetown is the shipping point for the bulk of the costal plain lumber which is transported by water.

The growing of cotton and the manufacture of its products are pre-eminent among all industries of the State. The varied climate, ranging from semitropic in the southern coastal region to temperate in the northwestern part of the State makes it possible to raise agricultural crops of corresponding differences. Practically every variety of crop known to the United States can be grown in some portion of South Carolina.

According to the United States Census for 1910, lumber and lumber products stand second in importance in the State and are exceeded only by cotton goods. In fact the number of establishments engaged in the handling of lumber and timber products largely exceeds those engaged in any other industry. South Carolina stands twenty-second among the States in the amount of lumber cut annually.

FORESTS.

When the settlers first caught sight of the coast line of South Carolina it probably resembled a low, dense jungle of semitropic vegetation. Further back on the higher ground extensive forests of almost pure longleaf pine appeared and as the mountains

Figure 1. Yellow Pine and Hardwoods in Oconee County.

were approached, the hardwoods took their place. From that time until the present, exploitation of the timber has steadily progressed, but it was not until comparatively recent years that the extensive logging operations began. A report issued in 1867 by the Immigration Commission of South Carolina stated that only 4,500,000 acres had been cleared or about 23 per cent. of the State's area, the rest being virgin forest. In 1910, a report "Forest Conditions of South Carolina" made by the Forest Service, United States Department of Agriculture in co-operation with the South Carolina State Department of Agriculture, Commerce and Industries, points out that the area in forests amounted to only 5,532,000 acres, leaving 8,209,000 acres unimproved land, mostly wooded, and nearly 6,000,000 acres as farm land. In other words, about 70 per cent of the total area of the State was in woods. The valuable pine forests of the coastal sand plain were of course the first to go and today very little of them is left.

South Carolina is divided into two principal topographic regions, the coastal and the Piedmont. The mountainous country in the extreme northwest may be considered as part of the Piedmont region since it has the same kind of soil. The so-called "Fall line" runs from North Augusta through Columbia and Camden to the North Carolina line northeast of Cheraw. The area west of this line comprises the Piedmont region, that east of it comprises the coastal plain. Lumber operations are smallest near the "Fall line" and increase toward the coast on the one hand and toward the mountains on the other. The largest virgin stands remaining are located on the swampy land along the Atlantic Coast where on account of inundation during large portions of the year, it is difficult and expensive to log. The timber here consists of cypress, sand pine, water oak, and live oak. Exploitation of the coastal forests has taken place and during recent years has been rapid. Back from the coast, near the "Fall line," agricultural land has taken the forest's place and woodlots only are found. There are also large tracts here not suitable for agriculture, and in the sand hill region around Columbia are extensive areas of sand barrens once covered by longleaf pine, but now supporting nothing but scrub or "forked leaf" black jack oak. However, small patches of young longleaf pine are common, and if ample fire protection were afforded, part of the barrens would soon be restocked naturally with valuable pine

timber. The soil here is of little agricultural value, and the growing of timber is without doubt its greatest use. Some parts could not be restocked by natural methods and artificial planting would be required.

The soils of the Piedmont region have been derived from the disintegration of the underlying granites and gneisses, making a reddish, loamy soil of exceptional fertility. The soils of the coastal plains are yellowish white sands which, having little fertility in themselves, are capable of being made fertile by the humus formed from the vegetation of the region.

The State has been divided into several forest regions, which briefly enumerated are: Alpine, piedmont, sand hill, red hill, upper pine belt, lower pine belt, and coast. These occur from west to east in the order named. The Alpine belt comprises the highland in the extreme western part of the State. The surface of this belt is rolling or mountainous, and approximately twenty-five per cent. of it was once cleared. Some of the clearings have now been abandoned. Oak, chestnut, black locust, scrub pine, and shortleaf pine are the principal species in the higher altitudes. The highest points sometimes produce white pine, hemlock, and fir, but not in commercial quantities. The lower slopes grow oaks, maples, hickories, chestnut, walnut, butternut, black locust, gums, yellow poplar, basswood, white ash, red cedar, shortleaf pine, and scrub pine.

The Piedmont forest region, comprising one-third of the State, lies next to the Alpine and is distinctly agricultural. Only about twenty-five per cent. is forested and that is principally in woodlots. The forest consists chiefly of shortleaf pine. Small amounts of oak, chestnut, walnut, black locust, gum, ash, basswood, and yellow poplar are in mixture. Along the river courses, red gum, yellow poplar, sycamore, oak, willow and shortleaf pine are common.

The sand hill region consists of a narrow strip across the State adjoining the Piedmont area. The surface is generally undulating and the soil is composed of a loose sand. This region was once forested with longleaf pine of great size and in practically pure stands. The soil is good for little except timber, and if properly protected from fire, would soon become restocked with longleaf pine. It is thus stocked on the small areas which accidentally escape fire. Other areas have been so damaged by burnings that natural regeneration is doubtful. Loblolly and

Figure 2. Young Longleaf Pine in Hampton County. When Fire is Kept Out the Land is Completely Restocked.

Figure 3. Hauling Loblolly Pine Logs by Means of High Wheel Carts.

Figure 4. Logging by Means of Steam Skidder. Hampton County.

shortleaf pines are at present found mixed with longleaf, and some hardwoods, especially black jack and other oaks, occur in mixture.

The red hill region consists of a series of low ridges having a red loam soil. Woodlots are the only form of forest now found in this area. Shortleaf, longleaf, and loblolly, with understories of oak, hickory, and dogwood are the principal species in the woodlots, while in moist places, sumach, holly, hawthorne, sassafras, hackberry and gums occur.

The upper pine belt covers the level country next to the sand and red hill regions; it is about twenty miles wide and extends across the State. Part of this region is wet and cypress swamps alternate with pine ridges. Loblolly and longleaf pine are the principal species, with cypress in the swamps.

The lower pine belt is similar to the upper, except that considerable areas are inundated during part of the year. Longleaf and loblolly pines are again the principal species, the former being confined to the high places. Cypress occurs in the swamps with gums, oaks, yellow poplar, and ashes. This region is the great lumber area of South Carolina and it is here that the large companies are now cutting.

The coast regions take in the numerous islands off the coast and a narrow strip of mainland, the entire area being not more than ten miles wide. In the swamps the principal trees are oak, maple, magnolia, and cypress, while longleaf, sand, loblolly, and shortleaf pines occur in the drier situations.

Methods of logging vary greatly in the State. The old style methods of log hauling vie with the latest and most approved methods, and the use of ox teams, log driving in streams and big wheels may be seen in the same lumber region where steam skidders, steam loaders and railroad hauling are used. The advent into the lumber industry of the latter methods has made possible the exploitation of the coastal forests especially in swamps.

KINDS OF WOOD USED.

There are thirty-one species which enter into the commodities produced in the State. Three species, mahogany, Spanish cedar, and lignum vitae, are foreign; the other twenty-eight grow in South Carolina. Two of these, spruce and white pine, do not occur in merchantable quantities. Judged by quantity and use, the most important woods of the region are cypress and the three native pines, longleaf, shortleaf, and loblolly. Among the hardwoods, oak, yellow poplar, and the three gums, red, black, and tupelo or cotton gum, are of greatest value.

Very great differences exist in the quantities of woods employed and the purposes for which they are used. Some of those listed are demanded by a single industry, others appear in a dozen or more, but not one occurs in all the industries.

Over ninety per cent. of the wood used is grown in the State which produces much more timber than is now needed at home. Large amounts are sent to other markets, principally in the North.

Table 1 presents certain facts, as there indicated, concerning the thirty-one species used. These species are given in the table, and are discussed in the succeeding pages, in the order of their respective importance.

THE SOUTHERN YELLOW PINES

These are by far the most important species of South Carolina. They include longleaf, shortleaf, loblolly, and some Cuban and pond pine, and other minor species. It is not difficult to distinguish the species while standing in the forest, but in the lumber yard they are not so readily identified and separated. In 1911 the State ranked eleventh in the production of yellow pine lumber. All was not needed at home and much was shipped to northern and foreign markets. This group of pines is very important in supplying planing mills and for construction purposes. Shortleaf demands drier situations than the other southern pines, and on high grounds it is the predominant species. In the upper and lower pine regions and near the coast it occupies the drier ridges, while loblolly grows more in the wet places. However, much shortleaf was reported by manufac-

TABLE 1.—SUMMARY OF KINDS OF WOOD USED IN SOUTH CAROLINA.

KIND OF WOOD.		Quantity used annually.					
Common name.	Botanical name.	Feet b. m.	Per cent.	Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
Shortleaf pine	*Pinus echinata*	254,449,500	60.06	$ 14.17	$ 3,604,342	248,949,500	5,500,000
Longleaf pine	*Pinus palustris*	93,560,400	22.08	14.39	1,346,301	87,920,400	5,640,000
Cypress (bald)	*Taxodium distichum*	17,938,000	4.23	21.52	385,977	14,338,000	3,600,000
Red gum	*Liquidambar styraciflua*	12,726,000	3.00	13.81	175,780	12,588,500	137,500
Loblolly pine	*Pinus taeda*	11,880,000	2.80	12.89	153,082	11,880,000	.....
Yellow poplar	*Liriodendron tulipifera*	10,135,000	2.39	17.17	174,052	9,012,000	1,123,000
Black gum	*Nyssa sylvatica*	6,179,300	1.46	13.72	84,885	6,046,800	132,500
Cotton gum	*Nyssa aquatica*	3,527,000	.83	12.59	44,406	3,514,500	12,500
White oak	*Quercus (species)*	3,133,900	.74	22.27	69,817	2,854,500	279,400
Dogwood	*Cornus florida*	3,050,000	.72	21.97	67,000	550,000	2,500,000
Persimmon	*Diospyros virginiana*	1,550,000	.37	18.06	28,000	550,000	1,000,000
Ash	*Fraxinus (species)*	1,518,000	.36	19.80	30,054	1,412,000	106,000
Sugar maple	*Acer saccharum*	1,471,100	.35	19.55	28,764	1,421,100	50,000
Red Oak	*Quercus (species)*	997,200	.24	18.84	18,787	882,200	115,000
Hickory	*Hicoria (species)*	422,000	.10	25.38	10,712	334,500	87,500
Chestnut	*Castanea dentata*	401,000	.09	20.01	8,026	.....	401,000
White pine	*Pinus strobus*	166,900	.04	88.93	14,843	.....	166,900
Basswood	*Tilia americana*	165,000	.04	45.88	7,570	.....	165,000
Elm	*Ulmus (species)*	100,000	.02	12.00	1,200	100,000	.....
Spanish cedar	*Cedrela odorata*	75,000	.02	140.00	10,500	.....	75,000
Birch	*Betula (species)*	48,400	.01	37.00	1,791	20,000	28,400
Sycamore	*Platanus occidentalis*	45,000	.01	16.33	735	32,500	12,500
Cottonwood	*Populus deltoides*	32,000	.01	19.13	612	10,000	22,000
Beech	*Fagus atropunicea*	25,000	.01	20.00	500	25,000	.....
Silver maple	*Acer saccharinum*	20,000	*	16.00	320	20,000	.....
Spruce	*Picea (species)*	13,000	*	34.31	446	.....	13,000
Southern white cedar	*Chamaecyparis thyoides*	11,100	*	30.81	342	10,000	1,100
Black Walnut	*Juglans nigra*	10,000	*	80.00	800	.....	10,000
Red cedar	*Juniperus virginiana*	10,000	*	60.00	600	.....	10,000
Mahogany	*Swietenia mahagoni*	5,500	*	149.64	823	.....	5,500
Lignum-vitae	*Guajacum officinale*	207	*	285.75	60	.....	207
	Total	423,665,507	100.00	$ 14.80	$ 6,271,127	402,471,500	21,194,007

*Less than 1-100 of 1 per cent.

turers in these regions and it is safe to say that a great deal of this material was loblolly and pond pine; it was tabulated as shortleaf because manufacturers so reported it.

Longleaf pine once grew in great quantities on the coastal plain, often forming pure stands, but these have nearly disappeared, and the species now exists only in scattering stands in mixture with shortleaf and loblolly. It is the best of the southern pines for many purposes, but on account of its increasing scarcity it is not locally separated from the others. Loblolly might be classed as inferior to the other pines for some purposes, but it has excellent qualities for many uses, and is a tree of great importance in those portions of the South where it is abundant and develops a good form. It grows more rapidly than longleaf and generally surpasses shortleaf and Cuban pines in sustained rate of growth.

CYPRESS

In 1911 South Carolina stood eighth in the production of cypress lumber. Next to the pines it is the most important tree in the State. It is a wood of good color and pleasing appearance and is prominent as an interior finish material. Its durability recommends it also for outside work such as cornice, siding, and exterior finish. As a shingle wood, it stood in 1911 second only to the cedars in the United States. The bulk of the cypress lumber cut in South Carolina is shipped to the northern markets. Its use was reported by only two industries in the State, and these together used an amount almost equal to the total output. Not all of the material reported, however, was grown in the State. It is a tree of slow growth and long life, and the most valuable lumber comes from the mature timber. It is essentially an inhabitant of swamps and of the flood plains of rivers which frequently overflow.

RED GUM

South Carolina stands seventh among the States in the production of red gum lumber, and the species is the fourth in quantity used by South Carolina's industries. It grows on the drier situations from the Piedmont region to the coast. In late years it has come into use as a finishing wood, especially in furniture manufacture, where it is employed in imitation of more valuable species. Seven industries reported its use in the State.

Figure 5. Virgin Cypress in Richland County.

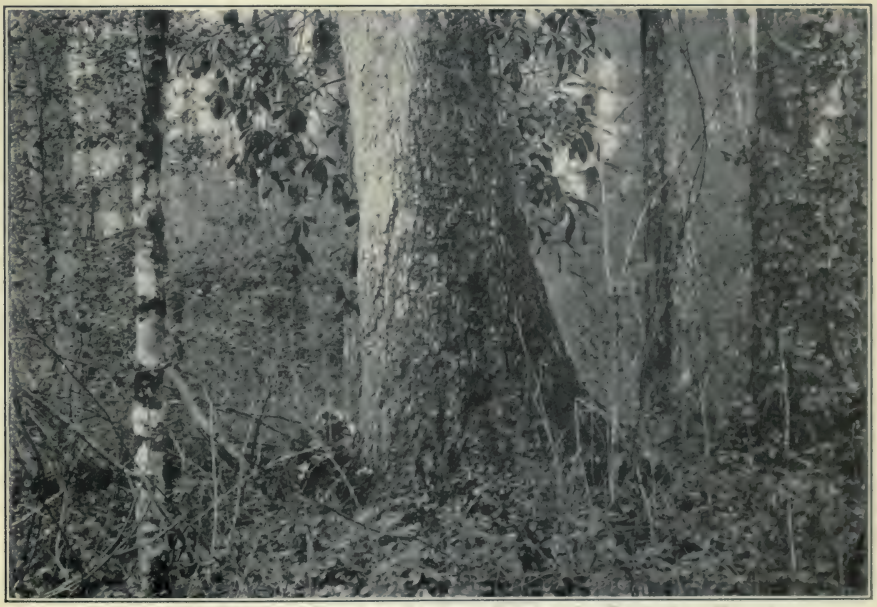

Figure 6. Specimen Trees of Yellow Poplar in Berkeley County.

In other parts of the country it is of great importance as a veneer wood, but very little of this product is made in South Carolina. For many years after the valuable qualities of this wood had become known, its use was much hampered by seasoning difficulties; but these have now been largely overcome, and red gum has taken its place among the valuable timbers of this country. A large market for it exists in Europe where it is known as satin walnut, hazel, or hazel pine. There is no reason for calling it a pine, but it is closely related botanically to witch hazel. It is not even in the same family with black gum or tupelo. The wood is frequently finished in successful imitaton of Circassian walnut.

YELLOW POPLAR

This wood was reported in ten of the fourteen industries in South Carolina and most of that used was grown in the State. It is found principally in the Piedmont region and is cut to some extent on the better drained situations of the coastal region. It was reported in greatest amounts by the planing mill operators, the casket and coffin makers, and the furniture manufacturers. On account of its fine qualities, ease of working, and affinity for paint, it is a desirable wood for use where great strength is not the prime requisite. Magnolia which is found in the coastal region to a small extent is thrown in with yellow poplar on the market. In every part of the country where poplar grows, and far outside of its commercial range, it is a wood of first importance. In smoothness of finish many regard it as the finest wood produced by American forests. It is not important as a timber tree except in the eastern part of the United States.

BLACK GUM

According to available statistics, more black gum is manufactured into finished products in South Carolina than in any other State except Virginia. It is a wood very difficult to season, nor is it easy to work, and its refractory properties long barred it from extensive use for manufacturing purposes. Better success attends modern methods, and black gum is no longer looked upon as a nuisance on the land. The appearance of the wood is severely plain, nor it is strong, elastic, or durable when placed in damp situations. It is closely related to the dogwood, but

attains much larger size, and is inferior to it in hardness and strength.

COTTON GUM

This wood is nearly always spoken of as tupelo, bay, or bay poplar. Cotton gum is a book name, and is seldom or never heard in lumber transactions. The name "bay poplar" was formerly employed when the lumber cut from this tree was sold as yellow poplar. In some parts of the South the name is shortened to "bay." It is seldom sold now as yellow poplar, and it never would have passed for it had examination and inspection been careful. Good heart tupelo somewhat resembles poplar. The wood is difficult to season and its working qualities vary for different trees and situations. Its lack of color causes it to bear the name of white gum. The purpose doubtless is to distinguish this wood from red gum.

THE OAKS

The oaks are found throughout South Carolina, but in the Alpine region only do they form a considerable part of the stand. Though many species occur, the lumbermen designate them all as either white or red and they are sold under these names on the market. On the drier situations and uplands, white, chestnut, post, red, black jack, swamp white, scarlet, shingle, and Spanish oaks all appear, while in the coastal region white, willow, water, Spanish, black jack, cow, live, and laurel oaks form an understory to the pine and cypress. The white oaks are more valuable than the red oaks and are used for a variety of purposes, appearing in eleven out of fifteen industries. They combine beauty with strength and durability and serve for cabinet woods as well as for general construction purposes. Red oak was reported in seven industries, most of it being used for planing mill products, sash, doors and blinds and for finishing and flooring material. The grain of red oak is not as ornamental as that of white oak, but for some purposes, particularly for flooring, its color makes it more desirable. The true red oak (Quercus rubra) is not abundant in the State, and the red oak lumber in the home markets consists of several species in the botanical red oak group. The two groups into which the oaks are usually divided are commonly distinguished by the acorns. The white oaks ripen their acorns in one year, those of the red

oaks require two years. The southern live oak belongs in the white oak gorup; its wood is little used though it possesses some excellent properties.

DOGWOOD

This is a small tree with short trunk and rough bark. A stand of such trees in a forest, foresters call an "understory" because the tree crowns are low and are overtopped by the trees with which they are usually associated. Dogwood is found as an understory to the pines in the sand hill, red hill, and upper pine regions. It was once considered a "weed tree" (a useless cumberer of the ground), but the shuttle manufacturers now use considerable quantities of it for shuttle blocks. The amount used for this purpose in South Carolina is greater than in any other State. Its hardness, toughness and strength, as well as its remarkable wearing qualities, recommend it for shuttles and heads of golf sticks, and it is probable that it could be profitably used for more purposes than it is. Dogwood is not lumbered in the usual manner but sticks of it are cut here and there as they are found, and the small trunks or billets shipped to the factories. It grows slowly and is already scarce in many localities; the shuttlewood supply of the future is by no means assured, so far as it depends on dogwood.

PERSIMMON

This tree is found throughout the coastal plain in South Carolina, and is known by its edible fruit. The trunk is rather small, the wood hard, heavy, and dense, and is valuable chiefly for shuttle blocks, golf heads, and parquet flooring. The shuttle block makers are its principal users in this State. For this purpose, and also for golf heads, the sapwood only is suitable; the heartwood, when present, is dark, dense, and more closely resembles ebony than any other wood in the United States. The forests of South Carolina constitute an important source of supply for this species. It reproduces persistently both as sprouts (from the roots) and from seeds, but grows slowly. Small trees are usually abundant, but larger ones scarce.

WHITE ASH

White ash is one of the most important hardwoods in South Carolina. It grows on the higher dry lands only, but is cut in

considerable quantities. Nine industries reported its use; the planing mills consumed the greatest amount and, as in other States, handle makers, vehicle manufacturers, and agricultural implement concerns were also important users. Its toughness, strength, straight grain, and color recommend it for these purposes. The larger part of the amount reported in Table 1 was grown in the State. The greater part of this was probably green ash, but this wood is not distinguished from white ash in the trade.

MAPLE

Red, silver and sugar maples grow in this region, but of these sugar and silver maple are the only ones reported by the manufacturers. Four industries use maple in comparatively small quantities. More goes to planing mills than elsewhere, but handle makers and manufacturers of vegetable packages find it serviceable.

The country's greatest supply of maple comes from the North, from New England to the Lake States, but some very excellent timber is found in the South. The terms "hard maple" and "soft maple" do not refer to distinct species; almost always "hard maple" means the sugar maple or sugar tree, "soft maple" may mean any one of several species or varieties, but generally refers to silver maple, the only one of the soft maples in the State important as a source of lumber.

HICKORY

South Carolina has six species of hickory, some of it having excellent quality. Some manufacturers, particularly handle makers, insist on using the white sapwood and excluding the red heart. Strong prejudice has long existed against hickory heartwood; yet according to tests made by the United States Forest Service, there is little basis for it. For many purposes the heart is satisfactory, and the inspection rules for hickory stock now recognize that fact. Hickory grows nowhere except in the eastern part of North America, the range extending somewhat west of the Mississippi. It has been called "the indispensable wood" because, for certain uses, no other will answer as well. The greatest demand for it comes from manufacturers of vehicles, handles and agricultural implements, but it has other uses as well. In South Carolina it occurs principally in the Alpine and Piedmont regions, but is nowhere very abundant.

CHESTNUT

Chestnut occurs scattered throughout the Piedmont region of South Carolina, but is used in only one kind of manufacture, that of caskets and coffins. No home grown wood of this tree was reported by any of the wood-using industries. It is a light-weight wood, not very strong, and liable to check, but is very durable and so make a suitable wood for fence posts, sills and railroad ties. In some parts of the country it is used in cabinet making. It is peculiarly suitable as core wood or backing for veneer, because it holds glue remarkably well. A very usual grade of chestnut is "sound wormy." Such wood has been perforated by small boring insects while the tree was living. The holes each the size of a large pin, improve its glue-holding properties, because they afford a grip or anchorage for the glue. Chestnut is one of the leading woods of the country for coffins and caskets, on account of its relative durability and cost.

WHITE PINE

This tree has its extreme southeastern limit of range in the highest points of the Alpine region of South Carolina, but it grows here very sparingly and all the material of the species used by manufacturers in the State was procured elsewhere. It was reported in small amounts by five industries, the total being a little over 150,000 board feet. It is one of the leading house building materials of the country, but in South Carolina its place is filled by the southern pines. The principal supply formerly came from New England, later from New York and Pennsylvania, and in recent years from Michigan, Wisconsin and Minnesota. The supply of white pine is failing rapidly; but certain western woods, notably Idaho white pine, western yellow pine, and California sugar pine, as well as species from the southwest, are taking its place in many regions east of the Rocky Mountains. The western pines have not yet appeared in South Carolina.

BASSWOOD

This wood was used in but two industries in South Carolina, and only a small amount was reported as growing in the State. It occurs very sparingly in the Alpine region, but manufacturers find it more profitable to buy the material outside the State. It is an excellent wood where whiteness, even grain, and ease of working are essential requirements. There are three species of

basswood and probably all of them are represented in the forests of the State. They are so nearly alike that generally their differences are not noticed; they are known as white, downy, and common basswood. The name limetree is sometimes applied to the basswood in South Carolina.

THE ELMS

Two species of elm occur in South Carolina; the lumber from both are used without distinction under the common name elm. One species is the white or American elm, the other is the winged elm. The last name is applied only to the tree, but not to the lumber, and is descriptive of the flattened wings or keels occuring on small boughs. Such twigs are often a half inch or even an inch broad and not much thicker than a heavy knife blade. They are quite conspicuous when the tree is bare of leaves. Twigs of white elm, on the other hand, are slender and delicate, and when not in leaf the two species are easily distinguished. All of the elm lumber used in the State was reported as used for fruit and vegetable packages and as hoops for baskets and veneer barrels. It is tough, strong, and limber, and is the principal wood used for hoops in the United States.

SPANISH CEDAR

This is a foreign wood used in the United States principally for cigar boxes, its only use in South Carolina. The material is received in log form about the size of large telegraph poles and manufactured into veneer at the box factory. Some boxes are made entirely of the cedar, others are made of a different species, often yellow poplar, and are covered by a thin sheet of cedar veneer not much thicker than paper. The cedar is said to give a pleasant flavor and odor to cigars. It grows in the West Indies, Mexico, Central and South America, and is not a high priced wood when it reaches the ports of the United States.

BIRCH

The most abundant birch in the State is that found along the streams and in low ground. It is the river birch, a tree which produces plain lumber, lacking some of the qualities that give value to the wood of the sweet birch and of the yellow birch of the North. These latter species attain their greatest commercial importance in the Lake States, New York, and New England.

Figure 7. Hardwood Bottom in Richland County. Red Gum is in Foreground. Contains 3,000 Ft. B. M.

Figure 8. White Cedar and Loblolly Pine on Border of Swamp in Sumter County.

A limited quantity of sweet birch grows among the mountains in the northwestern part of South Carolina, but little is cut from lumber in that quarter. This is sometimes known as wintergreen birch because of its wintergreen flavor.

SYCAMORE

Sycamore is found in South Carolina along streams in the Piedmont region. It is by no means abundant and the wood appears only in two industries. The wood has unusually complicated crossgrain and it develops beautiful designs when properly manufactured. It is difficult to work, but is valued as a cabinet wood. The tree is identified by its rough "button balls" and its mottled trunk, the latter caused by the shedding of the outer bark in spots, exposing the whitish inner bark. Sycamore shows well in quarter sawing, its pith rays being broad and conspicuous. These are darker in color than the body of the wood, a peculiarity not common with many timbers.

COTTONWOOD

About one-third of the cottonwood used in South Carolina grew in the State, but this was very much more than enough to meet the entire home demand and much of it was sent to outside markets. The tree occurs along the streams in the Piedmont region as far as the upper pine belt. The wood is of excellent quality when trees are large and sound. It seasons easily, works nicely, and is in demand for vehicle bodies, woodenware and for almost all other purposes where white figureless wood can be used. That reported by manufacturers in South Carolina was taken by vehicle makers and by the manufacturers of boxes used for shipment of bottled soft drinks.

BEECH

This tree occurs very sparingly in hollows and coves in the higher parts of South Carolina. The wood was reported used in South Carolina in the manufacture of broom handles, and mattock and pick handles. All of it was grown in the State. Beech is primarily a northern species, though the tree occurs in many parts of the South. The wood is very strong, hard, and is tolerably difficult to season.

SPRUCE

Spruce reaches the southeastern limit of its range in the mountains of northwestern South Carolina. No spruce was reported

as having been procured in the State and it is listed in only a single industry, ship building. It occurs scatteringly at the highest elevations, in mixture with white pine and hemlock. The only species which occurs is red spruce.

SOUTHERN WHITE CEDAR

This is a deep swamp tree that occurs in dense parts where water stands on the ground much of the year. Its range lies near the coast. The wood is light, durable, and fairly strong. It is excellent material for woodenware, particularly small stave vessels, fence posts, shingles, siding for light boats, and for many other purposes where figured wood is not desired. Seagoing vessels formerly made water casks of it, with the belief that the wood by its contact purified the water. Spigots were made of it in the same belief. The wood is clean, sanitary, and suitable for containers in which articles of food are stored or shipped.

BLACK WALNUT

This tree occurs very sparingly in South Carolina and the amount demanded by the wood-using industries was all procured outside the State. It is consumed in general millwork, and in cabinet work. It was for many years important as a furniture wood. Its somber color brought it into use for church furniture and inside finish. At present, however, its greatest use is for sewing machines, gun stocks, and inlaid work. It never occurs in pure forests; its range extends from Ontario to Florida and west to Nebraska and Texas. Most of this species has long since been cut and the trees are now very scarce, bringing a high price. In some parts of the country black walnut is still in demand by manufacturers of cottage organs. The tree grows fairly rapidly, but it must attain middle age and reach considerable size before it is commercially valuable. The heartwood only is used, and this is small in young trees.

RED CEDAR

Red cedar is found throughout western South Carolina. It was reported only by the sash, door and blind manufacturers and was used for special work. It springs up naturally on logged-off lands, forming pure stands. It grows slowly, but a fully stocked tract contains much timber. In many regions in

the South it is more abundant now than when the country was first discovered, because of its habit of taking possession of abandoned land; but the present timber averages much smaller than the trees of the original stand. The old timber has been largely cut for rails, house logs, fence posts, and lead pencil material. Red cedar has a very extensive geographical range in eastern North America, and resists man's encroachment more persistently than almost any other tree. Its reproduction depends almost wholly on seeds planted by birds which feed on the berries.

MAHOGANY

Mahogany was reported for cabinet and finishing material and for the best class of patterns. Its use as a finishing wood is general, and its beauty when polished is well known. It is employed for patterns when they are to be used many times, and when especially durable ones are desired. The smoothness with which it works is also a quality which recommends it for patterns. Mahogany is a foreign wood, growing in the West Indies, Mexico, and on the northern coast of South America. It was formerly lumbered in Florida, and a small quantity is still cut there; but it is no longer of commercial importance in that State. Other woods which pass for mahogany come from many parts of the world, but principally from Africa. The true mahogany grows only in American countries which lie adjacent to the Gulf of Mexico and the Caribbean Sea. It has been used for furniture and finish in this country for more than two hundred years, and is more popular now, perhaps, than ever before. All things considered, it is one of the most substantial, reliable and ornamental woods in the world.

LIGNUM VITAE

Though found to a limited extent in sub-tropical Florida, this wood is essentially a West Indian species. It is very heavy, exceedingly hard, strong and difficult to work; the layers of fibers lie alternately across one another so that the wood crumbles rather than splits. It has no superior for implements that must be true and strong, such as ship tackle and underwater bearings. It is lubricated by water. In South Carolina it was reported only in boat and ship building, and was made into bearings for shafts and into ship tackle.

THE INDUSTRIES

The commodities manufactured wholly or principally of wood in South Carolina have been separated into fourteen main industries, besides a group entitled "Miscellaneous." These fifteen groups use very unequal quantities of material. The first industry—planing mill products—uses nearly seven-eighths of the total wood reported, and the first five industries use over ninety-seven per cent. The groups are arranged according to the quantities of wood listed in each, the largest coming first.

PLANING MILL PRODUCTS

The planing mills are nearly all operated in connection with sawmills. Their products include flooring, ceiling, and siding. The sawmills make rough lumber, which, when properly seasoned, is run through planers and then shipped to market as a finished commodity. Stock sizes, kinds, and patterns are made and no special machinery is needed. This method of doing the planing in connection with the sawing is obviously the most efficient one. The difference in charges for rough and for planed lumber is ofter greater than the cost of planing. Some planing mills, however, operate independently from sawmills.

Nearly all of the timber represented in this industry grows in the State. Usually a single mill converts the log into the finished product, planed ready for use. But most of the other wood-using industries have as their raw material, not logs, but rough or partly manufactured lumber. This is shipped to the factory from a distance, frequently from another State.

What is known as a "combination mill" is a rather important factor in this industry in South Carolina. These gin cotton part of the year until such work becomes slack, then they saw logs and make plain flooring, ceiling and siding.

Of the woods in this industry, sugar maple brings the highest price, and tupelo the lowest. The average price for all species is $14.22 per thousand. This is comparatively low probably because most of the lumber is procured locally. It is not out of proportion with the average price of lumber of like grades in other southern States. The average price in Virginia is $14.71, in North Carolina $12.41, in Alabama $11.72, in Mississippi $11.69, and in Louisiana $11.39.

Figure 9. Parts of Mantels Ready to be Assembled.

Figure 10. Mantels Partly Assembled but Still in the White.

Figure 11. Columns for Mantels and Parts of Tables.

Figure 12. Finished Mantel Ready for Packing.

Longleaf and shortleaf pine bring about the same price, being higher than that of loblolly. As was pointed out on a former page, these three pines are not usually separated in local lumber transactions, and the figures presented in Table 2 for the separate species are merely estimates based upon the best available data.

TABLE 2.—PLANING MILL PRODUCTS.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Shortleaf pine	232,096,000	63.02	$ 14.06	$3,262,696	226,596,000	5,500,000
Longleaf pine	86,710,000	23.54	14.08	1,221,079	81,710,000	5,000,000
Cypress (bald)	12,783,000	3.47	17.68	225,952	12,783,000	.....
Loblolly pine	10,750,000	2.92	12.83	137,950	10,750,000	.....
Red gum	10,696,000	2.90	13.47	144,075	10,696,000	.....
Yellow poplar	4,626,000	1.26	17.18	79,489	4,626,000	.....
Black gum	4,616,000	1.25	13.18	60,850	4,616,000	.....
White oak	2,341,000	.64	18.42	43,120	2,341,000	.....
Ash	1,155,000	.32	19.72	22,775	1,155,000	.....
Sugar maple	1,005,000	.27	20.00	20,100	1,005,000	.....
Cotton gum	1,002,000	.27	11.51	11,531	1,002,000	.....
Red oak	521,000	.14	12.09	6,300	521,000	.....
Total	368,301,000	100.00	$ 14.22	$5,235,917	357,801,000	10.500,000

SASH, DOORS, BLINDS AND GENERAL MILLWORK

Millwork includes a miscellaneous group of articles, of which doors, sash, and blinds are the most important. Usually one or two of these products constitute the bulk of the output from any single factory. Among the principal things included are stairwork, (including newel posts, balusters, railing and steps); interior trim and finish, (consisting in part of molding, brackets, panels, chairboards, baseboards, capitals, ornaments, and shelving); and porch work, (including columns, spindles, posts, railing, and lattice). The products included in Table 3 and in Table 2 overlap to some extent, but the main distinguishing features are clear enough. The flooring, ceiling and siding in Table 2 are made according to general patterns and are not usually manufactured for particular buyers or markets; much of the millwork represented in Table 3, however, is made to order. Machines for making these products must be designed for a greater variety of work than the simple ones in a planing mill which makes only a few commodities.

Seventeen species were used in this industry and approximately 26,000,000 feet of lumber consumed. Shortleaf pine comprised over 50 per cent. of the total, cypress coming second with 20 per cent. The three southern yellow pines, and bald cypress combined, constituted 95 per cent. of the total. Mahogany brought the highest price and loblolly pine the lowest. The cypress went into doors, interior finish and exterior work such as cornice, window frames, house trim and porch balusters. The pines were used for sash, doors, blinds, window frames, door frames, casing, stair work and general millwork. The hardwoods were made into interior finish, cabinet work, mantels and stairwork. A little less than 85 per cent. of the entire amount used in this industry was grown in South Carolina. All of the shortleaf and loblolly pine, red gum, and sycamore were homegrown, while the white pine, basswood, maple, hickory, birch, walnut, cedar, and mahogany came from outside the State.

The woods listed in Table 3 average nearly 50 per cent. higher in price than those in Table 2. The prices of seven of the seventeen were $50 or over per thousand. The comparatively low price of shortleaf pine, and the large quantity used, lowered the general average cost.

TABLE 3.—SASH, DOORS, BLINDS, AND GENERAL MILLWORK.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Shortleaf pine	13,990,000	53.94	$ 16.92	$ 236,880	13,990,000	.....
Cypress (bald)	5,155,000	19.88	31.04	160,025	1,555,000	3,600,000
Longleaf pine	4,486,000	17.30	16.94	75,996	4,386,000	100,000
Loblolly pine	1,020,000	3.93	13.74	14,012	1,202,000	.....
Yellow poplar	324,000	1.25	28.19	9,135	174,000	150,000
White oak	289,000	1.11	38.32	11,064	119,000	170,000
Red oak	208,000	.80	34.71	7,220	108,000	100,000
Red gum	110,000	.46	18.41	2,025	110,000	.....
White pine	104,000	.40	95.19	9,900	.....	104,000
Basswood	80,000	.31	50.00	4,000	.....	80,000
Sugar maple	50,000	.19	40.00	2,000	.....	50,000
Hickory	50,000	.19	50.00	2,500	.....	50,000
Birch	25,000	.09	50.00	1,250	.....	25,000
Sycamore	20,000	.07	18.00	360	20,000	.....
Black walnut	10,000	.03	80.00	800	.....	10,000
Red cedar	10,000	.03	60.00	600	.....	10,000
Mahogany	5,000	.02	150.00	750	.....	5,000
Total	25,936,000	100.00	$ 20.76	$ 538,467	21,482,000	4,454,000

Figure 13. Interior View of Fruit and Vegetable Package Factory.

Figure 14. Interior View of Fruit and Vegetable Package Factory With Rotary Cut Veneer Machine and Basket and Stave Machine.

Figure 15. Vegetable Barrels.

FRUIT AND VEGETABLE PACKAGES

The entire fruit and vegetable package industry in South Carolina is concentrated along the coast from Charleston south into Beaufort county. This concentration is due in great part to the demand of the truck farmers in that region. Most of the wood represented in Table 4 was used for baskets and veneer packages, such as cucumber baskets, bean baskets, and similar articles. The staves are made almost entirely of shortleaf pine, black gum, yellow poplar, and red gum, while the other woods listed go into hoops. Pine comprises nearly two-thirds of the total. Though listed in the table as shortleaf, there is doubtless a considerable amount of loblolly pine included.

In the manufacture of veneer packages the logs are first cut with a dragsaw into bolts of the desired length. The bolts are softened in steam and hot water from 12 to 24 hours, and the bark removed by hand spuds. The bolt is then put into the stave machine, a rotary cut veneer apparatus equipped with a cylinder containing knives. As the log revolves the knives cut the face of the bolt legnthwise to the depth of the veneer slice. The staves come from the machine in finished condition and go directly to the assembling department.

The cores are sawed into thin lumber pieces, several of which are joined together with cleats to make a square board, cut round on a machine, and are then made into bottoms and lids. In some factories the baskets are nailed by machinery, but in most they are still nailed by hand.

The hardwoods and waste pieces of stave material go into the hoops which are made from veneer slices split to the required widths. The finished baskets are piled in the open to dry and later stored under cover in stacks.

All the wood employed in this industry was home grown. The most costly species was white oak, bringing $20 a thousand, and the cheapest, shortleaf pine, costing $12.88. High priced woods cannot be profitably used in producing containers of this kind. By cutting much of it into veneer, which is thin stuff, the comparative cost was kept very low, since a thousand feet, log measure—will make six or eight thousand feet of veneer. Much of the elm, birch, and maple was made into hoops or bands for baskets.

TABLE 4.—BASKETS, FRUIT AND VEGETABLE PACKAGES.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Shortleaf pine	5,120,000	65.64	$ 12.88	$ 65,935	5,120,000	.....
Black gum	1,045,000	13.39	13.11	13,695	1,045,000	.....
Yellow poplar	620,000	7.95	12.61	7,820	620,000	.....
Red gum	545,000	6.99	14.94	8,145	545,000	.....
Hickory	215,000	2.76	14.14	3,040	216,000	.....
White oak	115,000	1.47	20.00	2,300	115,000	.....
Elm	100,000	1.28	12.00	1,200	100,000	.....
Birch	20,000	.26	16.00	320	20,000	.....
Silver maple	20,000	.26	16.00	320	20,000	.....
Total	7,800,000	100.00	$ 13.14	$ 102,775	7,800,000	.....

BOXES AND CRATES

Ten species of wood were used in the manufacture of packing boxes, crating and cases in South Carolina. Sixty per cent of the total amount used was made up of the three gums, red, black and tupelo. Most of the material went into cases for packing yarn and other cotton goods produced at the textile factories. These woods were formerly held in so low esteem in the State that they were left standing in the forests when pines were cut. Greater demand, and a better knowledge of the good properties of these woods, have brought them into use. Tupelo leads the two other gums in quantity, but the black and the red aggregate more than a millon feet of box lumber. Sometimes a wood employed as box ends, on which the printing or stenciling is to appear, brings a higher price, because it must be of clear stock, and of good color, in order to show the lettering.

Loblolly pine is lowest in price, but all the woods are low. Box lumber nearly always consists of the lower grades, but some factories which produce nothing but boxes, turn the whole log run into this commodity.

Baskets and boxes are tabulated as separate industries in this State. In some other regions they are considered as one industry. The two combined in South Carolina have an output of a little less than 14,000,000 feet per year. This is greatly exceeded in many States because of greater manufacturing or more extensive fruit growing or truck gardening. Some of South

Figure 16. Parts of Vegetable Barrels and Their Manufacture.

Figure 17. Air Drying Vegetable Baskets.

Figure 18. Air Drying Lids and Barrels.

Carolina's most valuable crops do not go to market in crates or baskets—cotton and rice, for example. The extent of the box business is not, therefore, always a reliable basis on which to judge of what a region is sending to market.

TABLE 5.—BOXES AND CRATES, PACKING.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Cotton gum	2,525,000	40.99	$ 13.02	$ 32,875	2,512,500	12,500
Shortleaf pine	1,915,000	31.08	11.13	21,316	1,915,000	.....
Red gum	975,000	15.83	14.54	14,175	837,500	137,500
Black gum	265,000	4.30	19.72	5,225	132,500	132,500
Longleaf pine	250,000	4.06	15.00	3,750	.....	250,000
Loblolly pine	105,000	1.70	10.00	1,050	105,000	.....
Yellow poplar	60,000	.97	15.00	900	50,000	10,000
Sycamore	25,000	.41	15.00	375	12,500	12,500
Ash	20,000	.33	15.00	300	10,000	10,000
Cottonwood	20,000	.33	15.00	300	10,000	10,000
Total	6,160,000	100.00	$ 13.03	$ 80,266	5,585,000	575,000

SHUTTLES, SPOOLS AND BOBBINS

The manufacture of cotton goods has in late years developed with great rapidity in South Carolina and it is to be expected that the manufacture of shuttles, spools, and bobbins should, therefore, be of considerable importance. However, the number of establishments engaged in their manufacture is not great, though in quantity of dogwood and persimmon used for shuttles, South Carolina leads all other States. Dogwood and persimmon are the leading species for this commodity in the United States, on account of their hardness, excellent wearing qualities, and freedom from warping when seasoned. Most of the material from these woods presented in Table 6 consisted of logs or bolts made into shuttle blocks, the form in which shuttle makers purchase their raw material; and in converting the bolts into blocks, 75 per cent, it is stated, is waste. Though nearly two-thirds of the block material was shipped in from other States, the price per thousand feet is comparatively low. Red and black gum is used in the manufacture of bobbins and of spools of large size.

The shuttle has an interesting history. It has come down from the old hand-loom shuttle which was thrown by one hand and

caught by the other. At that time nearly any wood that was smooth would answer. But the power loom throws the shuttle by violent strokes with a stick, and few woods will long stand the blows. The life of the best shuttle is measured by hours, not years. Formerly Turkish boxwood was used almost exclusively, and it still has no known equal, but its use by the roller skate factories at high prices, took it out of the shuttle market years ago. The world has been ransacked for other woods. Persimmon and dogwood are the two most satisfactory, when all things are considered, but scores of others have been tried. Some quickly wear through, some become rough, others burst or break in a few minutes or within an hour or two. Some are too heavy, others too light. Steel cannot be used for this purpose; when made sufficiently light the metal shell buckles and kinks. Dogwood, the diminutive tree which once had practically no use, except as gluts for splitting rails, and as distaffs for spinning wheels, has now become the most important wood in this country for the particular and highly important use of shuttle making.

TABLE 6.—SHUTTLES, SPOOLS, AND BOBBINS.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Dogwood	3,050,000	59.80	$ 21.97	$ 67,000	550,000	2,500,000
Persimmon	1,550,000	30.40	18.06	28,000	550,000	1,000,000
Red gum	250,000	4.90	20.00	5,000	250,000	.....
Black gum	250,000	4.90	20.00	5,000	250,000	.....
Total	5,100,000	100.00	$ 20.59	$ 105,000	1,600,000	*3,500,000

CASKETS AND COFFINS

Six woods, aggregating over three and a half million feet, supply material for this industry in South Carolina, but yellow poplar furnishes more of it than the five others combined. All of the poplar is cut in the State, and the low average cost results from local purchases. The casket makers are here able to buy their poplar at several dollars per thousand less than the average mill price for the whole United States. The wood is employed as cores or backing for veneers with which it is overlaid. Chestnut is also used in this way. Longleaf pine finds its

Figures 19 and 20. Side View of Street Car in Process of Construction, With and Without Roof.

Figures 21 and 22. End View of Street Car in Process of Construction, With and Without Roof.

most important place as material for outer boxes. These articles are included in the industry, and nearly as much material is required for their construction as for caskets.

Though the industry includes caskets and coffins, the coffin is almost out of use in the form in which it once was common, and its place has been taken by the casket. The cheap article is sometimes called a coffin, though it may not have the well known "coffin shape." All of the shortleaf pine shown in the table was manufactured into coffins for paupers. It was the cheapest wood on the list. Oak was the highest, but the quantity was very small. An equal amount of white pine was used.

Long-continued custom is responsible for the large demand for chestnut for coffins, since other woods will do quite as well.

TABLE 7.—CASKETS AND COFFINS.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Yellow poplar	2,254,000	62.48	$ 15.01	$ 33,838	2,254,000	.....
Shortleaf pine	750,000	20.79	10.00	7,500	750,000	.....
Chestnut	401,000	11.12	20.01	8,026	.....	401,000
Longleaf pine	200,000	5.57	16.00	3,200	200,000	.....
White oak	1,000	.02	40.00	40	.....	1,000
White pine	1,000	.02	30.00	20	.....	1,000
Total	3,607,000	100.00	$ 14.59	$ 52,634	3,204,000	403,000

CAR CONSTRUCTION

Seven woods were used in South Carolina for the manufacture of street cars, railway passenger and freight cars. Longleaf pine headed the list in amount, and was placed as car sills, frames, floors, and the heavier timber parts of both railway and street cars. The shortleaf furnished siding, ceiling, and decking of freight cars. The white oak was quartered and converted both into finish and into the exposed parts of street and railway passenger cars; red oak was employed in the same way, some of it also going into freight cars. Ash and yellow poplar were finish woods and were used mostly in street car vestibules and for sides, finish and panel work in railway passenger cars. The birch was all made into finish for passenger cars. Over 99 per

cent of the material was grown in South Carolina. The highest priced wood was birch and was procured in Pennsylvania. Longleaf pine cost less than shortleaf because the material was procured in large amounts and in dimension sizes, while the shortleaf was good grade material, sawed into small lumber.

The average price of car stock in this State is $16.56 per thousand and the amount used annually is under one and three-fourths million feet. In contrast, the State of Illinois may be cited. This is the largest car-manufacturing State of the Union, and the price for car material at the factory is $30.44, almost twice as high as in South Carolina. Conditions are not exactly comparable, however, because Illinois builds more passenger cars and uses a proportionately larger quantity of expensive cabinet woods.

TABLE 8.—CAR CONSTRUCTION.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Longleaf pine	1,020,000	63.08	$ 16.08	$ 16,400	1,020,000	.....
Shortleaf pine	371,500	22.97	16.70	6,204	371,500	.....
Red oak	194,200	12.01	14.15	2,747	194,200	.....
Yellow poplar	14,000	.87	37.14	520	10,000	4,000
Ash	7,000	.43	36.43	255	5,000	2,000
White oak	7,000	.43	60.43	423	2,500	4,500
Birch	3,400	.21	65.00	221	.....	3,400
Total	1,617,100	100.00	$ 16.56	$ 26,770	1,603,200	13,900

FURNITURE

The furniture manufacturing business in the State is small, and most of the best furniture used in South Carolina is made elsewhere. Table 9 embodies statistics of the industry in the State. Church and office furniture are not included in the table. The most remarkable thing shown is the cheapness of the lumber manufactured into finished commodities. In some instances, it is below the average mill value for the whole country. This is true of yellow poplar, oak and ash. The average factory cost of furniture lumber in Virginia is $22.13 per thousand feet, in North Carolina $18.23, and in Tennessee $22.34. The average in South Carolina is $13.46. Virginia makes twelve times as much

furniture as South Carolina, Tennessee twenty-five times as much, and North Carolina sixty times. The furniture manufacturing business in South Carolina may, therefore, be considered as only in its infancy.

The State supplies every foot of the lumber used. Yellow poplar goes into drawer bottoms and sides, mirror backs, veneer backing panels, and various other places; white oak is the most expensive of the woods and is used in the best positions, as in bureaus, chairs and dressers. White ash is used for bed slats, though a cheaper material would do just as well. Tables are made of red gum and bed rails of pine.

TABLE 9.—FURNITURE.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Yellow poplar	1,205,000	79.38	$ 12.52	$ 15,090	1,205,000	.....
White oak	150,000	9.88	18.99	2,849	150,000	.....
Red gum	145,000	9.55	15.59	2,260	145,000	.....
Shortleaf pine	13,000	.86	11.23	146	13,000	.....
Ash	5,000	.33	18.00	90	5,000	.....
Total	1,518,000	100.00	$ 13.46	$ 20,435	1,518,000	.....

VEHICLES AND VEHICLE PARTS

Table 10 presents statistics of the vehicle manufacturing business in the State. Repairs are included. Repairs perhaps call for nearly as much wood as new vehicles and this business is carried on all over the country. A few wagons are made and many are repaired in small shops which cannot be called factories. Some of these small shops are represented in the accompanying table, but not all of them, since they were too widely scattered. The result is that Table 10 shows part only, but doubtless the largest part, of the vehicle making and repair business in South Carolina. The table is, however, as nearly complete as similar statistics collected in other States.

The average cost of the material is rather high. Yellow poplar is largest in amount. It is made into wagon beds and bodies of other vehicles. One of its highest recommendations is its property of holding paint. Hickory's chief use is found in small

vehicles where it occurs in spokes, felloes, poles, shafts, and singletrees. White oak is used for the wheels and the running gear of heavy wagons. It is the most costly wood listed in the industry. Ash is all-round vehicle wood, midway in importance between oak and hickory, but lower in cost than either of them. For bodies of heavy trade wagons ash is sometimes preferred to any other wood, since for this purpose it outwears oak. In wagon making cottonwood has about the same uses as yellow poplar, and for some purposes it is as satisfactory. Yellow pine is employed principally for bodies of small trade wagons, though it is quite satisfactory for the bottoms of farm and road wagon beds.

A little more than one-third of the material reported was brought into the State.

TABLE 10.—VEHICLES AND VEHICLE PARTS.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Yellow poplar	193,000	24.61	$ 31.53	$ 6,085	68,000	125,000
Hickory	125,500	16.00	27.13	3,405	88,000	37,500
Shortleaf pine	125,000	15.93	19.60	2,450	125,000	.....
White oak	109,050	13.90	39.00	4,254	94,050	15,000
Ash	98,000	12.50	21.12	2,070	8,000	90,000
Longleaf pine	92,750	11.83	19.84	1,840	92,750	.....
Red oak	29,000	3.70	30.00	870	29,000	.....
Cottonwood	12,000	1.53	26.00	312	.....	12,000
Total	784,300	100.00	$ 27.15	$ 21,286	504,800	279,500

SHIP AND BOAT BUILDING

In Table 11 nine woods are listed in the manufacture of small boats, lighters, launches, and ships. The reports which were received were all from Charleston and vicinity. It is probable that a considerable additional amount of material is used by local boat builders along the coast, but it was impossible to reach them because there are no available lists or other information showing their existence. Eighty-four per cent of the total amount of wood used in this industry was longleaf pine. The white oak listed in the table includes live oak and probably other species which went into flooring and planking of small

boats and launches and into ship furniture. The southern yellow pines were used for planking, keels, and for almost all other parts of small boats and ships.

The southern white cedar was all used in the manufacture of small boats and the white pine for ship furniture. All the spruce was employed for dry dock staging, the black gum for launching rams, white ash for benches and ship tables, and the lignum vitae for sheaves and bearings in ship and boat tackle. Lignum vitae leads in price paid per thousand and all of this wood reported in the State was consumed in this industry. Shortleaf pine was lowest in price. Fifty-five per cent. of all the material shown in Table 11 was grown in the State. Live oak, which here is listed as white oak when used at all, was formerly one of the most important ship timbers in America or in the world, and South Carolina furnished some of the best of it. That time was before iron ships were built, when the enormous crooks formed by the junction of root or limb with the trunk, were hewed into form for ship knees. The largest war vessels and merchantmen used them because nothing superior could be had. That use is now nearly unknown, and the boat builders in the State do not even list live oak by name.

TABLE 11.—SHIP AND BOAT BUILDING.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Longleaf pine	635,900	84.11	$ 30.27	$ 19,251	385,900	250,000
White oak	61,600	8.15	46.59	2,870	14,700	46,900
White pine	21,900	2.90	106.89	2,341	.....	21,900
Spruce	13,000	1.72	34.31	446	.....	13,000
Shortleaf pine	10,000	1.32	18.00	180	10,000	.....
Southern white cedar	6,100	.81	39.67	242	5,000	1,100
Ash	4,000	.53	78.46	293	.....	4,000
Black gum	3,300	.43	35.00	115	3,300	.....
Lignum-vitae	207	.03	287.75	60	.....	207
Total	756,007	100.00	$ 34.12	$ 25,798	418,900	337,107

HANDLES

Table 12 represents the timber used for pick, axe, mattock, shovel, hatchet, broom, and other tool handles. It probably does not show all the material that went into these commodities,

for many are made locally by the consumers themselves and there is no way of finding out how much material is used in this way. The table, however, shows the consumption by the factories in the business of making handles. As in other States, hickory is the principal wood used, amounting to over 36 per cent of the total. Ash and sugar maple are demanded in equal amounts, while white oak holds the least important place. The maple and beech go into broom handles. Most of the axe, pick, and hatchet handles are of hickory noted for being strong, tough and resilient. The smoothness of this wood, which renders it agreeable to the hand, is also one of the qualities which makes it a favorite for certain kinds of handles. It is properly described as smooth-grained. Ash is a handle wood for farm tools, like spades, shovels, forks, hoes and rakes. It is strong and stiff. The handles of these tools must be rigid as well as strong, and ash is preferred to all other woods, enormous quantities of it being employed in this country. Broom handles require weight and strength, as well as moderate smoothness, and beech and sugar maple are ideal for this purpose. White oak is widely used as handles for plows and cultivators. It is the highest priced of the five woods in Table 12, and is demanded in smallest quantity.

Much of the handle wood reaches the factory in billet form, rather than in logs or lumber. This is split in the woods and is often measured by the cord.

TABLE 12.—HANDLES.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Hickory	246,500	36.17	$ 19.50	$ 4,807	246,500	.....
Ash	200,000	29.35	18.00	3,600	200,000	.....
Sugar maple	200,000	29.35	18.00	3,600	200,000	.....
Beech	25,000	3.66	20.00	500	25,000	.....
White oak	10,000	1.47	40.00	400	10,000	.....
Total	681,500	100.00	$ 18.94	$ 12,907	681,500	.....

FIXTURES

Fixtures as they are considered in Table 13 include office, store, church, and school furniture, telephone cabinets, and all

household effects not readily movable. Furniture usually refers to movable effects. Seven woods are listed. Longleaf pine, which is largest in amount, goes into church pews, pulpits, store counters, show cases, and office furniture; the oaks go into show cases, office fixtures, telephone cabinets, and pulpits, while the white pine provides shelving, and some of the yellow poplar forms the bottoms of show cases. The remainder of the yellow poplar and all of the red gum finds its place in office furniture.

Fixtures are usually of large size, with broad panels and wide shelves. The wood must be thoroughly seasoned and carefully worked or the finished article will warp out of shape or the joints pull apart. Woods which season nicely, as well as those which look well, are selected for fixture material. The high average cost of the woods shown in Table 13 is proof that no large proportion of mediocre grades were included. Red gum brings the lowest price and white oak the highest.

The annual output of fixtures in the State is small compared with many other regions. This fact indicates that many users of these commodities are buying them from outside of the State, although South Carolina has abundance of material for first-class fixtures.

TABLE 13.—FIXTURES.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Longleaf pine	150,000	55.15	$ 30.00	$ 4,500	110,000	40,000
White oak	48,000	17.64	51.04	2,450	6,000	42,000
Shortleaf pine	25,000	9.19	20.00	500	25,000	.....
Red oak	20,000	7.36	45.00	900	5,000	15,000
Yellow poplar	14,000	5.15	47.14	660	5,000	9,000
White pine	10,000	3.68	30.00	300	.....	10,000
Red gum	5,000	1.83	20.00	100	5,000	.....
Total	272,000	100.00	$ 34.59	$ 9,410	156,000	116,000

AGRICULTURAL IMPLEMENTS

The comparatively small amount of wood employed in the manufacture of agricultural implements, as Table 14 shows, makes it apparent that many plantations in South Carolina are equipped with machinery bought in other States. Virginia, for example,

manufactures more than fifty times as much farm machinery as South Carolina, while Illinois makes thirty-five times as much as Virginia.

Red oak, which as here used, doubtless includes a number of Southern oaks, exceeds in amount the three other woods of Table 14 combined, and the whole quantity of oak is converted into plow beams. The makers of cotton stalk cutters took all the longleaf pine used in this industry. Grain cradles are comparatively important. The cradle is a hand tool for cutting oats, wheat, and other small grains. Cradle makers take all the white oak and part of the ash. The remainder of the ash is plow beam wood. The three agricultural implements thus shown to be manufactured in the State are plows, cradles, and cottonstalk cutters.

TABLE 14.—AGRICULTURAL IMPLEMENTS.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Red oak	25,000	54.35	$ 30.00	$ 750	25,000	.....
Longleaf pine	10,750	23.37	19.53	210	10,750	.....
Ash	8,000	17.39	33.25	266	8,000	.....
White oak	2,250	4.89	20.89	47	2,250	.....
Total	46,000	100.00	$ 27.63	$ 1,273	46,000	.....

PATTERNS AND FLASKS

The "flasks" here referred to are the rough boxes filled with sand, which are employed in foundries to contain the moulds for casting metal. Patterns are of different kinds. The foundry pattern is embedded in the sand within the flask. After the sand is tamped hard the pattern is removed, and the form left becomes the hollow or mold into which the molten metal is run. Other patterns are for quite different purposes. They are simply models or copies of some object which is to be manufactured. No casts of such patterns are made in the sand. White pine is the country's best pattern wood, because it cuts easily and is little inclined to warp out of shape. Yellow poplar is much employed for patterns, but is not listed in South Carolina. Cheaper work is done with loblolly and shortleaf pine. Fine models or patterns, where cost is not important, are of mahogany.

Pattern makers pay a higher average price for their wood than any other manufacturers in the State.

TABLE 15.—PATTERNS AND FLASKS.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
White pine	30,000	74.07	$ 75.73	$ 2,272	.....	30,000
Loblolly pine	5,000	12.35	14.00	70	5,000	.....
Shortleaf pine	5,000	12.35	30.00	150	5,000	.....
Mahogany	500	1.23	145.00	73	.....	500
Total	40,500	100.00	$ 63.36	$ 2,565	10,000	30,500

MISCELLANEOUS

Table 16 presents statistics of wood consumed by miscellaneous industries of minor importance. An article made by only one or two persons or firms in the State, though manufactured in large amounts, is not tabulated as a separate industry. This would reveal the individual operations of manufacturers, which is contrary to the policy pursued in compiling State wood-using reports. In accordance with assurances given when statistics are solicited, figures submitted by individuals are not revealed.

Cigar boxes are included in the miscellaneous table. All of the Spanish cedar reported was worked into this commodity, which is pre-eminently the chief use of this wood in the United States. The cost, as given in Table 16, is uncommonly high because it was computed from veneer prices, which include allowance for waste and cost of production.

A large part of the yellow poplar in the table was cigar box material, and much of it was converted into cores or backing for the cedar veneers. Poplar is an all-round wood and most industries use some of it. More than three-fourths of the wood listed under "Miscellaneous" is yellow poplar, and none of it grew in the State.

Sawmill machinery, which is made wholly or partly of wood, is listed in this table; likewise looms and other textile machines and appliances (except shuttles). Tanks, silos, kitchen furniture, safes, excelsior, and a number of other articles are included.

With the exception of Spanish cedar, the extraordinary cost of which has been referred to, the most costly wood in the miscellaneous table is basswood, at $42 per thousand. The average cost of all woods was $34.05, which was somewhat high; but nearly all of the material was shipped into the State.

TABLE 16.—MISCELLANEOUS.

KIND OF WOOD.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Yellow poplar	825,000	78.86	$ 24.87	$ 20,515	.....	825,000
Basswood	85,000	8.13	42.00	3,570	.....	85,000
Spanish cedar	75,000	7.17	140.00	10,500	.....	75,000
Shortleaf pine	29,000	2.77	15.00	435	29 000	.....
Ash	21,000	2.00	19.29	405	21,000	.....
Southern White cedar	5,000	.48	20.00	100	5,000	.....
Longleaf pine	5,000	.48	15.00	75	5,000	.....
Sugar maple	1,100	.11	21.82	24	1,100	.....
Total	1,046,100	100.00	$ 34.05	$ 35,624	61,100	985,000

SUMMARY OF WOODS USED BY INDUSTRIES.

Table 17 is a summary of all the previous tables. The planing mill industry has by far the largest output which is more than six times as much as that of all the other industries combined. The making of patterns and flasks is credited with the smallest amount of material but with the highest cost per thousand feet, while boxes and crates take lumber of the lowest average price. The total cost of all wood consumed by the industries was more than six million dollars. Over 90 per cent. of this expenditure went to the producers of lumber in the State. The last two columns of the table show that 95 per cent. of all wood used was grown in South Carolina. The total lumber cut in the State in 1911 was about 585 million feet; of this 402 million is accounted for in the wood-using industries, the other 183 million must, therefore, have been shipped out of the State to other markets.

The difference in the average cost of the wood demanded by the different industries is accounted for by a number of factors. The chief cause lies in the grades of lumber and in the form in which the material is received at the factory. Logs which cost the same in the woods reach factories at varying distances and

so have quite different values there. Raw material may arrive at the handle factory, for instance, still in the rough log; in another case it may go to the carriage factory and arrive in the form of split and partly manufactured spokes. In each case the factory would list the material as it was received—the log worth probably $15 a thousand, the club spokes valued at three or four times that amount; yet both are raw material and might be the same kind and grade of wood. The handle factory in this case, must put much work on the log before it is converted into finished products; but the spokes, already partly manufactured when they arrive, are quickly and cheaply finished.

A list of prices, representing the cost of wood laid down at the factories of various industries, conveys comparatively little meaning unless the information is accompanied by other facts showing the factors which go to make up the cost.

TABLE 17.—SUMMARY BY INDUSTRIES OF WOOD USED IN SO. CAROLINA.

INDUSTRY.	Quantity used annually.		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in South Carolina. Feet b. m.	Grown out of South Carolina. Feet b. m.
	Feet b. m.	Per cent.				
Planing mill products.....	368,301,000	86.93	$ 14.22	$ 5,235,917	357,801,000	10,500,000
Sash, doors. blinds, and general millwork	25,936,000	6.12	20.76	538,467	21,482,000	4,454,000
Baskets, fruit and vegetable packages	7,800,000	1.84	13.14	102,775	7,800,000	.....
Boxes and crates, packing...	6,160,000	1.45	13.03	80,266	5,585,000	575,000
Shuttles, spools, and bobbins	5,100,000	1.20	20.59	105,000	1,600,000	3,500,000
Caskets and coffins	3,607,000	.85	14.59	52,634	3,204,000	403,000
Car construction	1,617,100	.38	16.56	26,770	1,603,200	13,900
Furniture	1,518,000	.36	13.46	20,435	1,518,000	.....
Vehicles and vehicle parts..	784,300	.19	27.15	21,286	504,800	279,500
Ship and boat building.....	756,007	.18	34.12	25,798	418,900	337,107
Handles	681,500	.16	34.02	12,907	681,500	.....
Fixtures	272,000	.06	34.59	9,410	156,000	116,000
Agricultural implements.....	46,000	.01	27.63	1,273	46,000	.....
Patterns and flasks.....	40,500	.01	63.36	2,565	10,000	30,500
Miscellaneous	1,046,100	.24	34.05	35,624	61,100	985,000
Total	423,665,507	100.00	$ 14.80	$ 6,271,127	402,471,500	21,194,007

COST OF WOODS BY INDUSTRIES.

Table 18 shows the costs of the woods used in the different industries. Quantity is not taken into consideration. Scarcely any two industries pay the same prices for a particular wood. Ten industries buy yellow poplar, all at different average cost;

TABLE 18.—COST OF WOODS USED IN SOUTH CAROLINA BY INDUSTRIES.

KIND OF WOOD.	Planing mill products.	Sash, doors, blinds & general mill work.	Baskets, fruit and vegetable packages.	Boxes and crates.	Shuttles, spools, bobbins.	Caskets and coffins.	Car construction.	Furniture.	Vehicles and vehicle parts.	Ship and boat building.	Handles.	Fixtures.	Agricultural implements.	Patterns and flasks.	Miscellaneous.
Ash	$ 19.72	$.....	$.....	$ 15.00	$.....	$.....	$ 36.43	$ 18.00	$ 21.12	$ 78.46	$ 18.00	$.....	$ 33.25	$.....	$ 19.29
Basswood	.....	50.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42.00
Beech	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20.00	.....	.....	.....	.....
Birch	.....	50.00	16.00	.....	.....	.....	65.00	.....	.....	.....	.....	.....	.....	.....	.....
Black gum	13.18	.....	13.11	19.72	20.00	.....	.....	.....	.....	35.00	.....	.....	.....	.....	.....
Black walnut	.....	80.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chestnut	.....	.....	.....	.....	.....	20.01	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cottonwood	.....	.....	.....	15.00	.....	.....	.....	.....	26.00	.....	.....	.....	.....	.....	.....
Cotton gum	11.51	.....	.....	13.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cypress (bald)	17.68	31.04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dogwood	.....	.....	.....	.....	21.97	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Elm	.....	.....	12.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hickory	.....	50.00	14.14	.....	.....	.....	.....	.....	27.13	.....	19.50	.....	.....	.....	.....
Lignum-vitae	.....	.....	.....	.....	.....	.....	.....	.....	.....	287.75	.....	.....	.....	.....	.....
Loblolly pine	12.83	13.74	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.00	.....
Longleaf pine	14.08	16.94	.....	15.00	.....	16.00	16.08	.....	19.84	30.27	.....	30.00	19.53	.....	15.00
Mahogany	.....	150.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	145.00	.....
Persimmon	.....	.....	.....	.....	18.06	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Red cedar	.....	60.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Red gum	13.47	18.41	14.94	14.54	20.00	.....	.....	15.59	.....	.....	.....	20.00	.....	.....	.....
Red oak	12.09	34.71	.....	.....	.....	.....	14.15	.....	30.00	.....	.....	45.00	30.00	.....	.....
Shortleaf pine	14.06	16.92	12.88	11.13	.....	10.00	16.70	11.23	19.60	18.00	.....	20.00	.....	30.00	15.00
Silver maple	.....	.....	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Southern white cedar	.....	.....	.....	.....	.....	.....	.....	.....	.....	39.67	.....	.....	.....	.....	20.00
Spanish cedar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	140.00
Spruce	.....	.....	.....	.....	.....	.....	.....	.....	.....	34.31	.....	.....	.....	.....	.....
Sugar maple	20.00	40.00	.....	.....	.....	.....	.....	.....	.....	.....	18.00	.....	.....	.....	21.82
Sycamore	.....	18.00	.....	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
White oak	18.42	38.32	20.00	.....	.....	40.00	60.43	18.99	39.00	46.59	40.00	51.04	20.89	.....	.....
White pine	.....	95.19	.....	.....	.....	30.00	.....	.....	.....	106.89	.....	30.00	.....	75.73	.....
Yellow poplar	17.18	28.19	12.61	15.00	.....	15.01	37.14	12.52	31.53	.....	.....	47.14	.....	.....	24.87

ten purchase white oak, and only two pay the same amount; seven buy red gum, and six prices are paid; eleven buyers of longleaf pine pay ten different prices, and a similar condition applies to the other industries. The variation in the price of the same wood is great. Box and crate makers buy ash at $15 per thousand, boat builders pay $78. Basket makers buy hickory at $14.14, but door makers pay $50. Planing mills procure red oak for $12.09, but fixture makers pay $45. Sugar maple ranges from $20 to $51.04. A study of records like these shows how impossible it is for anyone to name a fair average price for any one wood, even in a single State or in one city. So many circumstances must be considered that each case must be decided independently of all others. Average prices mean very little unless time, place, grade and use are all taken in account.

THE WASTE PROBLEMS.

The usual waste problems are present in the forests and factories of South Carolina. Conditions are no worse there than elsewhere, and not much better. In lumber operations the cutting of high stumps is still common, and the practice of abandoning felled tops, good for one or more logs, continues more generally than it should. The blighting influence of forest fires continues to be felt, and, considering the injury to soil and to reproduction, this source of waste is the greatest of all.

What is properly classed as waste under some situations may not be so classed under others. Where markets are convenient and prices good, the cuttings in the woods can be profitably utilized much more closely than in remote districts where there is no money in anything but the high class stuff. All that reasonably can be expected of any lumberman is to sell and save only what will pay the cost of lumbering and a little more. The man who leaves in the woods that only which has no profit in it, cannot be justly charged with wasting resources. A crooked log which will not make lumber, but which may be sold for conversion into something else, should not be abandoned; but if no one will buy it, the lumberman who abandons it cannot be charged with committing willful waste.

The same principle applies with regard to shops and factories. When the superintendent has converted into commodities everything for which he can find a market, he has done his best.

Obviously it is not economy to expend two dollars in labor to save an article worth less than two dollars. The manufacturer who keeps abreast of the times watches for opportunities for closer utilization, and takes prompt advantage of such opportunities as they come.

Large slabs and serviceable scraps go to the burners in South Carolina factories less frequently now than formerly. Such material is made into laths, shingles, boxes, molding, and other salable articles. Sawdust is generally used for fuel, though about rural sawmills and planing mills the old-time heaps of sawdust are still common.

The only commercial plant in the United States manufacturing ethyl alcohol from sawdust is located in South Carolina. The success of the enterprise is being watched with great interest, for important conservation problems are believed to be in process of solution.

In the manufacturing of handles and vehicles there takes place some of the closest utilization of material reaching the factory; but frequently great waste is committed in cutting and in shipping the stock. The making of shuttles and shuttle blocks is still attended with much waste, but ways are being found for using the small cuttings for other things, notably for knife handles and for loom speeders in textile mills. Some are made into cross-cut saw handles. The Forest Service recently carried out an investigation for the purpose of finding uses for the waste incident to the manufacture of shuttles.

SUPPLEMENT.

The statistics and data in the foregoing pages of this report were collected by the Forest Service in 1912. Certain industries were not studied because they are covered annually by the Bureau of the Census in co-operation with the Forest Service. These are discussed below. The statistics shown for turpentine and rosin were collected in 1909; those for the other industries were taken in 1911.

NAVAL STORES

Longleaf pine, and to some extent other pines, constitute a source of great wealth as producers of turpentine, rosin, and related products, grouped under the general term, "naval stores." The trunk of the standing tree is scarified and resin exudes from the wound. When this is distilled it produces spirits of turpentine, and the residue is rosin. The former is a clear liquid, the latter an opaque, yellowish solid. The collection of the resin from which these products are made is an important industry in the longleaf pine region of the South.

Long before the War of the Revolution the British navy procured stores in South Carolina. Attempts had been made previously to make them from white pine in New England and from shortleaf and loblolly pines in Virginia, but these attempts had little success. The output of longleaf pine, however, was found wholly satisfactory both in amount and quality, and its use for naval stores has gradually increased.

The Southern pine has little competition in the naval stores field on the world's market, though the pines of Europe are turpentined to some extent about the Baltic Sea and in France.

Too often very little care has been taken of the naval store orchards in the South. Trunks have been deeply boxed, and chipping has been deep and wide. Such wounds weaken the trunks, and storms throw them by thousands. Fires have done enormous injury by charring the wounds and killing the trees. It has long been the rule for the operator to exhaust his trees, and move on to new grounds. The old orchards are abandoned to fire and storm, and during past decades the destruction has been very great.

The turpentine output of South Carolina has been declining for a good many years, and there is no prospect that it will increase, because the virgin pine forests have been largely depleted by turpentining and by lumbering. Orcharding is still carried on, however, to a limited extent. Formerly no one thought it worth while to box any except mature trees; now poles as small as three inches in diameter are bled.

The quality of the wood probably is impaired very little by moderate turpentining; but there can be no two opinions as to the injury done the living trees by excessive turpentining under the old style boxing method. Though the tree may live long it must finally succumb—if not to pathological influences, then to physical injury due directly or indirectly to the turpentining process. The conditions of old, abandoned orchards are proofs of this; the standing timber is in all stages of damage and death, and prostrate logs lie criss-crossed in hopeless confusion. Such formerly was the typical condition when lumbermen did not, as now, follow the turpentine operators.

Improved methods of orcharding have come into use. Instead of cutting deep notches in the trees for collecting and holding the resin, it has been found that an earthen pot or a galvanized iron trough, fastened beneath a slight wound in the trunk, will collect the resin and greatly lessen the injury to the trunk. Reforms, however, come in slowly, and the new "cup-and-gutter" and "apron" methods have not yet gained much foothold in South Carolina. The greatest yield of turpentine is near the coast. Statistics of output have not been compiled since 1909. That year the State produced 460,000 gallons of turpentine, valued at $205,000; and 15,000 barrels of resin, equal to 3,080,000 pounds, valued at $199,000. South Carolina produces a little more than 1½ per cent. of the naval stores supply of the United States. The values of the spirits of turpentine and rosin in the leading naval stores States in 1909 were as follows: Florida, $11,905,000; Georgia, $6,929,000; Alabama, $2,468,000; Mississippi, $1,572,000; Louisiana, $1,379,000; North Carolina, $711,000; South Carolina, $404,000; total, $25,231,000.

COOPERAGE

Tight cooperage consists of barrels and kegs capable of holding liquids; slack cooperage is for dry articles. No tight cooperage is manufactured in South Carolina and the production of

Figure 23. Longleaf Yellow Pine Boxed for Turpentine in Berkeley County.

slack cooperage is small. The principal species reported for the manufacture of this commodity were yellow pine and oak. The entire production of staves was only 665,000, representing a consumption of approximately 517,000 board feet. The production of slack heading was 29,000 sets, about 240,000 board feet. Beside staves and heading, 70,000 hoops were manufactured, representing 50,000 board feet. The total consumption of material for slack cooperage, including staves, heading and hoops is about 813,000 board feet annually.

SOFTWOOD DISTILLATION

The wood distillation industry is divided into two parts—hardwoods and softwoods. Hardwoods are distilled to obtain charcoal, oils, acetates, alcohol, and other commodities; softwoods are distilled chiefly for turpentine and charcoal. Softwood distillation only is important in South Carolina. The centers of hardwood distillation are in the North. South Carolina stands second among the States in softwood distillation, Florida alone surpassing it by only a small margin. The growth of the industry in the State has been rapid. In 1909 it stood fifth. Its plants in 1911 consumed 38,136 cords of wood, equivalent to about 20,000,000 board feet. Longleaf pine is the principal wood in demand, because of its richness in resin. Much experimenting has been done in distilling mill and forest waste. Plants doing this work are usually large, and three of them are now operating in the State.

VENEER

The veneer industry is widely distributed throughout the United States. Thirty-three States reported the manufacture in 1911. Veneer has come into use not only for finish wood in cabinet making, furniture, and products requiring a pleasing exterior, but also for other purposes in which built-up lumber can be used in place of rough lumber. South Carolina stands twenty-sixth among the States in the amount of material used for veneers. Red gum and yellow pine are most used in South Carolina, while black gum and tupelo, oaks and yellow poplar are in less demand. The total consumption of all species for veneer in the State in 1911 was 2,874,000 feet, log scale. This represents less than 1 per cent of the total consumption for the

United States. The industry does not hold a very important place in the State at present, but the large amount of timber available for veneer may make it more important in the future.

LUMBER, LATH AND SHINGLES

In 1911 the sawmill cut of lumber in the State was 584,872,000 feet. Twenty-one States ranked above this. These figures were compiled by the Bureau of the Census in co-operation with the Forest Service. The quantity of each species, or group of species, reported was as follows:

	Board feet.
Yellow pine	533,552,000
Cypress	18,426,000
Red gum	15,117,000
Oak	7,679,000
Yellow poplar	4,490,000
Tupelo	2,270,000
Ash	1,652,000
Hickory	337,000
Maple	302,000
Cedar	218,000
Chestnut	209,000
Hemlock	203,000
Elm	140,000
Cottonwood	101,000
Walnut	32,000
Sycamore	28,000
Beech	13,000
Birch	2,000
All others	101,000
Total	584,872,000

South Carolina mills produced 10,292,000 lath and 55,848,000 shingles in 1911.

The Uses of Wood Reported by South Carolina Manufacturers.

Ash, White.

Beams, plow.
Bent posts, chairs.
Ceiling, house construction.
Crates, bottle.
Cupboards, kitchen.
Door frames, electric cars.
Doubletrees.
Flooring, house construction.
Frames, buggy bodies.
Frames, carriage bodies.
Frames, cot.
Frames, light delivery wagon bodies.
Frames, surrey.
Grain, cradles.
Handles, axe.
Handles, hatchet.
Handles, pick.
Handles, shovel.
Interior finish, electric cars.
Interior finish, passenger coaches.
Mess benches, ship.
Mess tables, ship.
Posts, chair.
Rungs, chair.
Seats, electric cars.
Singletrees.
Tables, kitchen.
Window frames, electric cars.

Basswood.

Cabinet work.
Reed Ribs, loom.
Shafts, loom harness.

Beech.

Handles, broom.

Birch.

Crates, vegetable.
Hoops, vegetable baskets.
Hoops, baskets.
Hoops, fruit packages.
Hoops, fruit and vegetable packages.
Interior, house construction.

Cedar, Red.

Cabinet work.
Chests, clothes.

Cedar, Southern white.

Planking, boat.
Planking, motor boat.
Planking, outriggers.
Planking, yacht.
Tanks.

Cedar, Spanish.

Boxes, cigar.

Chestnut.

Caskets.
Coffins.
Rough boxes, burial.
Shells, casket.

Cottonwood.

Crates, bottle.
Panels, buggy bodies.
Panels, carriage bodies.
Panels, light delivery wagon bodies.
Panels, surrey bodies.
Panels, wagon bodies.

Cypress.

Ceiling, house construction.
Cornice, house construction.
Corner blocks, house interior trim.
Interior finish, house.
Pickets, fence.
Sash, house construction.
Shelving.
Siding, house construction.

Dogwood.

Shuttle blocks.

Elm.

Baskets, fruit.
Baskets, vegetable.
Crates, fruit.
Crates, vegetable.
Hoops, fruit and vegetable packages.
Hoops, slack cooperage.

Gum, Black.

Baskets, fruit.
Baskets, vegetable.
Boxes, fruit.
Boxes, vegetable.
Crates, fruit.
Crates, bottle.
Flooring, house construction.
Fruit and vegetable packages.
Hoops, fruit and vegetable packages.
Interior trim, house construction.
Rams, boat launching.
Staves, slack cooperage.

Gum, Cotton.

Box shooks.
Boxes, bottle.
Crates, cantaloupe.
Flooring, house construction.

Gum, Red.

Baskets, fruit.
Baskets, vegetable.
Bedsteads.
Bureaus, exterior.
Box shooks.
Boxes, packing.
Cabinet work.
Crates, bottle.
Crates, fruit.
Crates, vegetable.
Casing, door, house construction.
Casing, window, house construction.
Crating.
Flooring, house construction.
Fruit and vegetable packages.
Interior finish, house.
Sideboards, exterior.
Stair work, house construction.
Staves, slack cooperage.
Tables.
Washstands, exterior.

Hickory.

Axles, farm wagon.
Gear woods, light vehicles.
Handles, axe.
Handles, fruit and vegetable packages.
Handles, hatchet.
Handles, pick.
Handles, shovel.
Handles, tool.
Hoops, fruit and vegetable packages.
Spokes.
Spokes, buggy.
Shafts, light vehicles.
Tongues.

Lignum Vitae.

Bearings, ship construction.
Sheaves, ship tackle.
Tackle blocks, ship.

Mahogany.

Cabinet work.
Interior finish, house construction.
Patterns, foundry.

Maple, Silver.

Hoops, fruit and vegetable packages.

Maple, Sugar.

Handles, broom.
Posts, chairs.
Rungs, chairs.

Oak, Red.

Beams, plow.
Handles, tool.
Implements, agricultural.
Interior finish.
Interior finish, house.
Tongues, wagon.

Oak, White.

Axles, farm wagon.
Bedsteads.
Bureaus, exterior.
Cabinet work.
Cabinets, telephone.
Casing, door, house interior trim.
Casing, window, house interior trim.
Ceiling, house construction.
Felloes, wagon.
Flooring.
Flooring, boat.
Gear woods, farm wagon.
Gear woods, wagon.
Grain cradles.
Hoops, fruit and vegetable package.
Interior finish, electric cars.

Oak, White.

Interior finish, house.
Legs, table.
Mantels.
Poles, farm wagons.
Pulpits, church.
Reaches, wagon.
Sideboards, exterior.
Show cases.
Spokes, heavy vehicles.
Spokes, wagon.
Timbers, launch.
Tops, table.
Washstands, exterior.

Persimmon.

Shuttle blocks.

Pine, Loblolly.

Blinds, house construction.
Cases, yarn.
Ceiling, house construction.
Crating.
Doors, house construction.
Flasks, foundry.
Flooring.
Frames, house construction.
Interior trim, house construction.
Moulding, house construction.
Rough horses, stair work.
Sash, house construction.
Siding, house construction.

Pine, Longleaf.

Balusters, house construction.
Base corners, house interior trim.

Base blocks, house interior trim.
Base moulding, house interior trim.
Blinds, house construction.
Bottom boards, wagon bodies.
Boxes, packing.
Boxes, wagon.
Cabinet work.
Cases, hosiery.
Cases, yarn.
Casing, window, house interior trim.
Caskets.
Carpet strip, house interior trim.
Carved ornaments, house construction.
Ceiling, freight car.
Chair rail, house interior trim.
Church pews.
Coffins.
Columns, porch.
Crates, packing.
Doors, house construction.
Fixtures, store and office.
Flooring, electric cars.
Frames, cotton stalk cutters.
Frames, door, house construction.
Frames, electric cars.
Frames, window, house construction.
Lining, freight car.
Moulding, house interior trim.
Outer boxes, casket.
Partition, house construction.
Pickets, fence.
Planking, boat.
Planking, launch.
Planking, lighters.
Rough horses, stair work.
Sash, house construction.
Screens, door.
Screens, window.
Seats, electric car.
Sides, wagon boxes.
Siding, freight car.
Siding, house construction.
Sills, electric car.
Sills, freight car.

Pine, Shortleaf.

Barrels, fruit.
Baseboards, house interior trim.
Baskets, fruit.
Baskets, veneer.
Blinds, house construction.
Boxes, fruit.
Boxes, wagon.
Beds, wagon.
Cases, packing.
Casing, door, house interior trim.
Casing, window, house interior trim.
Ceiling.
Ceiling, freight car.
Ceiling, house, interior trim.
Crates, fruit.
Crates, vegetable.
Excelsior, mattress stock.
Fixtures, store and office, hidden work.
Flasks, foundry.
Flooring.
Frames, cabinet work.
Frames, cot.
Frames, door, house construction.
Frames, window, house construction.
Furniture, kitchen.
Interior trim, house.
Legs, table.
Lining, freight car.
Moulding, house interior trim.
Packages, fruit.
Planking, lighters.
Packages, vegetable.
Rails, bed.
Roofers, car.
Roofing, house construction.
Safes, kitchen.
Sheathing.
Sheathing, house construction.
Shingles.
Siding, freight car.
Tables, kitchen.
Tops, table.
Vehicle parts.

Pine, White.

Blinds, house construction.
Cases, casket.
Cornice, house construction.
Doors, house construction.
Furniture, ship.
Outer cases, casket.
Patterns.
Sash, house construction.
Shelving.
Shelving, showcases.
Show cases.

Poplar, Yellow.

Backing, desk.
Backing, furniture.
Backing, mirror.
Bottoms, drawer.
Bottoms, showcases
Boxes, cigar.
Boxes, packing.
Bureaus, enameled.
Cabinets, medicine.
Cabinets, toilet.
Cabinet work, enameled.
Casing, door, house construction.
Casing, window, house construction.
Caskets.
Ceiling, house construction.
Coffins.

Crates, bottle.
Crates, packing.
Cupboards, kitchen.
Dressers, enameled.
Fruit and vegetable packages.
Furniture, enameled.
Interior finish, electric car.
Interior work, electric cars.
Interior finish, house construction.
Interior finish, railway passenger coaches.
Hoops, fruit and vegetable packages.
Mantels, enameled.
Moulding, picture.
Outer cases, casket.
Panels, automobile bodies.
Panels, buggy bodies.
Panels, light delivery wagon bodies.
Panel work, electric cars.
Panel work, railway passenger coaches.
Panels, surrey bodies.
Panels, farm wagon boxes.
Seat boxes, buggy.
Sides, drawer.
Siding, electric cars.
Siding, house construction.
Tables, kitchen.
Washstands, enameled.

Sycamore.

Blinds, house construction.
Casing, door, house interior trim.
Casing, window, house interior trim.
Crates, bottle.
Doors, house construction.
Interior finish, house.
Sash, house construction.

Spruce.

Deck staging, ships.
Dock shores.
Staging, dry dock.

Walnut, Black.

Cabinet work.
Interior trim, house.
Moulding, picture.

Directory of Wood Using Manufacturers.

Agricultural Implements.

T. N. Cox.....Denmark
E. R. Barton.....Elloree
J. T. Wilson.....Fairfax
J. C. Count & Son.....Prosperity

Boxes and Crates.

Dorchester Lumber Co.....Badham
Leaphart Lumber Co.....Charleston
Seidenberg & Co. (Charleston Branch) .....Charleston (Main office New York City.)
Woodstock Hardwood Spool Co., ... Charleston
Cheraw Box Co.....Cheraw
Pelham Mills .....Greer
North Augusta Box & Crate Works, ...North Augusta
Fox Lumber Co.....Pageland
Rock Hill Buggy Co.....Rock Hill
Anderson Loom Reed and Harness Works..... Spartanburg
Rowland Buggy Co.....Sumter
Sumter Telephone Mfg. Co...Sumter
Excelsior Knitting Mills.....Union
Union Iron Foundry.....Union

Car Construction.

E. F. Woodward.....Barnwell
Columbia Railway, Gas & Electric Co..... Columbia
Southern Railway Co.....Columbia

Caskets and Coffins.

Branchville Casket & Novelty Co., ... Branchville
J. M. Connelly & Co.....Charleston
Leesville Coffin & Casket Co., ... Leesville
Witherspoon Bros. & Co.....Sumter

Fixtures.

H. D. Anderson.....Fortner
Davenport Lumber Co...Spartanburg
Green River Land & Lumber Co., ... Spartanburg
Sumter Telephone Mfg. Co...Sumter

Fruit and Vegetable Packages.

Beaufort Veneer & Package Co., ... Beaufort
Anderson Lumber Co.....Charleston
Clement Ross Mfg Co.....Cheraw
M. J. Hethington.....Ravenels
W. B. Rast.....Swansea
John M. Hethington..Yonges Island
Hollywood Mfg Co....Yonges Island

Furniture.

J. M. Hook.....Batesburg
Werner & White Mfg. Co...Cameron
Clement Ross Mfg. Co.....Cheraw
H. D. Anderson.....Fortner
Pee Dee Furniture Co.....Hartsville
Glassy Mt. Furniture Factory, ... Pickens

Handles.

E. R. Barton.....Elloree
Sumter Broom & Handle Factory, ... Sumter
N. R. Wilson (Mill in S. C.) .....Saluda, N. C.

Patterns and Flasks.

U. S. Navy Yard.....Charleston
Southern Iron & Foundry Co., ... Columbia
Standard Iron Works...Spartanburg
Sumter Machinery Co.....Sumter
Union Iron Foundry.....Union

Planing Mill Products.

George Lumber Co.....Aiken
Trexler Lumber Co.....Allen
J. E. Barton.....Anderson
W. L. Brissey Lumber Co...Anderson
H. C. Townsend.....Anderson
Dorchester Lumber Co.....Badham
G. E. Hutto & Sons.....Bamberg
D. B. Rawl.....Batesburg
Scott Lumber Co.....Bennettsville
Jones Lumber Co.....Blacksburg
J. W. Ott.....Bowman
B. F. Smoaks.....Branchville
Brunson Lumber Co.....Brunson
Spartanburg Lumber & Mfg. Co., ... Brunson
Tucker & Tucker Lumber Co., ...Calhoun Falls
J. W. Davis.....Camden
W. F. McLeod.....Camden, R. D.
Carter-Evans Lumber Co., ...Cartersville
The Vosburg Co.....Cashs Depot
J. E. Koon.....Chapin
Anderson Lumber Co.....Charleston
E. P. Burton Lumber Co...Charleston
Grimball-Whaley Co.....Charleston
Halsey Lumber Co.....Charleston

Leaphart Lumber Co.....Charleston
S. M. Parker.....Charleston
O. C. Seis & Bro.....Charleston
A. C. Tuxbury & Co.....Charleston
C. E. Welling.....Charleston
Hicksen Lumber Co.....Cheraw
Meiklejohn Lumber Co.....Cheraw
Daniel Harvey .....Cherokee
S. M. Lee & Co.....Cherokee
Singletary Bros.....Chicora
H. H. Williams.....Cleora
B. P. Parrish.....Clio
Barre Lumber Co.....Columbia
N. H. Driggers.....Columbia
N. S. McDuffie & Co.....Columbia
McIver Bros. Lumber Co...Columbia
Shand Builders' Supply Co.,
..... Columbia
Conway Lumber Co.....Conway
Daniel Lumber Co.....Darlington
Long & Walker.....Denmark
Bethea Lumber Co.....Dillon
Parker Lumber Co.....Dillon
Keystone Lumber Co.....Drake
J. H. Wren.....Due West
P. L. Jefford.....Ebenezer
D. J. Schumpert.....Edmund
Dargan Lumber Co.....Effingham
E. R. Barton.....Elloree
O. H. Folley & Co., Inc.....Elloree
Estill Planing Mill.....Estill
Santee River Cypress Co...Ferguson
H. D. Anderson.....Fortner
George Taylor.....Gaston
Atlantic Coast Lumber Corporation,
.....Georgetown
Winyah Lumber Co.....Georgetown
Mallard Lumber Co.....Greelyville
W. J. Snead Lumber Co..Greenwood
Green Lumber Co.....Greer
W. F. Cummings.....Hampton
Lightsey Bros.....Hampton
J. C. Lightsey.....Hampton
J. F. Coburn.....Hardeeville
Fitzhugh Lumber Co.....Hartsville
B. F. & M. E. Halley.....Hawthorne
Jno. C. Dyches.....Hilda
R. E. Price.....Johnston
M. T. Turner.....Johnston
Kershaw Lumber Co.....Kershaw
Self & Penn.....Kirksey
B. O. Garvin.....Kitchings Mills
Deep River Lumber Co....Lake City
R. E. Smith.....Lake City
D. T. Wells.....Lake City
Moore Lumber & Mfg. Co..Lancaster
Finger Lumber Co.....Landrum
Landrum Lumber Co.....Landrum
Leesville Mfg. Co.....Leesville
P. H. Brown.....Leo
Roof & Bane Lumber Co..Lexington
H. B. Bowen Lumber Co....Liberty
D. T. McKeithan Lumber Co.Lumber
Blackman & Davis.....Lydia
Robert Spencer.....Madison
J. B. Bramlett.....Marietta
Carolina Yellow Pine Co....Marion
Marion County Lumber Co...Marion
C. C. Osborn Lumber Co.Mt. Croghan
Mullins Lumber Co.....Mullins
B. G. Smith.....Mullins
Nichols Lumber Co.....Nichols
H. M. McCullum.....Olanta
P. H. Starr.....Olar
Fox Lumber Co.....Pageland
Pee Dee Lumber Co.....Pee Dee
Danville Lumber & Mfg. Co..Pelion
J. D. & E. C. Wingard.....Pelion
The Pickens Lumber Co.....Pickens
J. C. Count & Son.....Prosperity
Hunter & Saner.....Prosperity
Belton Long & Bro.....Prosperity
D. H. Wall.....Ridgeland, R. D.
D. E. Thrower.....Ridgeville
W. D. Fountain,
.....Riverdale, Darlington Co.
Catawba Lumber Co.....Rock Hill
Tucker Lumber Co.....St. Matthews
Tilghman Lumber Co.....Sellers
E. B. Ramsay.....Seneca
J. F. Horton.....South Lyncburg
Secostee Joint Stock Co.....Stalvey
J. F. Prettyman & Sons,
..... Summerville
Chas. M. Betts Lumber & Supply
Co. ..... Sumter
J. B. Harper.....Timmonsville
Charlie Crouch.....Trenton
G. W. Camlin.....Trio
Troy Lumber Co.....Troy
Turbeville Milling & Ginning Co.,
..... Turbeville
J. S. Huggins, Jr.....Venters
W. C. Reaves & Son.....Vina
S. R. Smith.....Wagener
J. E. Gaines.....Westminster
Brown Lumber Co.....West Union
Bullington Supply Co.....Woodruff
J. J. Keller & Co.....Yorkville

Sash, Doors, Blinds and General Mill Work.

J. M. Hook.....Batesburg
Branchville Casket & Novelty Co.,
..... Branchville
J. E. Koon.....Chapin
A. H. Fisher & Co.....Charleston
Hacker Mfg. Co.....Charleston
King Percival Co.....Charleston
L. Wetherborn & Son....Charleston
Cheraw Sash, Door & Lumber Co.,
..... Cheraw

Technical School.....Clinton
Columbia Lumber & Mfg. Co.,
..... Columbia
H. Weinsel Cabinet Works,
..... Columbia
O. E. Emerson.....Georgetown
Greenville Lumber Co....Greenville
Greenville Mantel & Mfg. Co.,
..... Greenville
W. L. Hallman.....Greenville
W. J. Snead Lumber Co..Greenwood
D. T. McKeithan Lumber Co.Lumber
C. C. Davis.....Newberry
Williamston Lumber Co.,
..... Williamston
Pageland Mfg. Co.....Pageland
Glassy Mount Furniture Factory,
..... Pickens
Syleecan Mfg. Co.....Rock Hill
Davenport Lumber Co..Spartanburg
P. B. Ross.....Spartanburg
Sumter Building & Supply Co.,
..... Sumter
Sumter Sash & Blind Factory,
..... Sumter

Ship and Boat Building.

U. S. Navy Yard.....Charleston
H. G. Tyler Corporation..Hartsville
W. A. Coleman.....Mount Pleasant
E. O. Hall, Jr.....Mount Pleasant
Stevens Line Co.....Yonges Island

Shuttles, Spools and Bobbins.

Hampton Shuttle Block Works,
..... Camden
Woodstock Hardwood Spool Co.,
..... Charleston
Andrews Loom, Reed & Harness
Works ..... Spartanburg
Norris Bros.....Westminster

Vehicles and Vehicle Parts.

C. D. Franke Carriage Works,
..... Charleston
Benjamin & Copeland.....Clinton
T. N. Cox.....Denmark
E. R. Barton.....Elloree
J. T. Wilson.....Fairfax
J. W. Goddard.....Greenville
Markley Hardware & Mfg. Co.,
..... Greenville
H. B. Lindler.....Peak
Rock Hill Buggy Co.....Rock Hill
Dunbar Bros.....Spartanburg
Spartan Wagon & Buggy Co.,
..... Spartanburg
Bullington Supply Co.....Woodruff
N. R. Wilson.....Saluda, N. C.
(Mill in South Carolina.)

MISCELLANEOUS.

Chairs.

I. Killingsworth.....Denmark
S. Killingsworth.....Denmark

Cigar Boxes.

Seidenberg & Co.....Charleston
(Charleston Branch.)
(Main Office, New York City.)

Excelsior.

Werner & White Mfg. Co..Cameron

Machine Construction.

Sumter Machinery Co.....Sumter

Refrigerators and Kitchen Cabinets.

Werner & White Mfg. Co..Cameron
Pee Dee Furniture Co.....Hartsville

Tanks and Silos.

H. G. Tyler Corporation..Hartsville

LEGISLATIVE LIBRARY REGULATIONS

1. Books (other than 7-day books) are lent for a period not exceeding two weeks, with the option of renewal for an additional two weeks if no other application is fyled. All books are lent at the discretion of the Librarian and are subject to recall at any time.

2. The borrower assumes full responsibility for the value of the same in case of loss or injury.

3. Not more than two books may be borrowed at one time