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United States Department of Agriculture,

DVISION OF FORESTRY.

FACTS AND FIGURES REGARDING OUR FOREST RESOURCES BRIEFLY STATED.

The following data regarding the extent, condition, and consumption of our forest resources have been compiled to answer frequently recurring inquiries.

There are no forestry statistics in existence. Even the census figures referring to the lumber industry are avowedly imperfect and based on partial returns. The data given, therefore, are only approximations and must be taken with that reserve.

The *forest area* of the United States (exclusive of Alaska) may be placed at somewhat less than 500,000,000 acres. This does not include much brush and waste land which is, and will remain for a long time, without any economic value. This area is very unevenly distributed; seven-tenths are found on the Atlantic side of the continent, only one-tenth on the Pacific Coast, another tenth on the Rocky Mountains, the balance being scattered over the interior of the Western States.

Both the New England States and the Southern States have still 50 per cent of their area, more or less, under forest cover, but in the former the merchantable timber has been largely removed.

The prairie States, with an area in round numbers of 400,000 square miles, contain hardly 4 per cent of forest growth, and the 1,330,000 square miles—more than one-third of the whole country—of arid or semi-arid character in the interior contain practically no forest growth economically speaking.

The *character of the forest growth* varies in the different regions. On the Pacific Coast, hardwoods are rare, the principal growth being coniferous and of extraordinary development. Besides gigantic red woods, the soft sugar pine and the hard bull pine, various spruces and firs, cedars, hemlocks, and larch from the valuable supplies.

In the Rocky Mountains no hard woods of commercial value occur, the growth being mainly of spruces, firs, and bull pine, with other pines and cedars of more or less value.

The Southern States contain in their more southern section large areas occupied almost exclusively by pine forest with the cypress in the bottom lands; the more northern portions are covered with hardwoods almost exclusively, and intervening is a region of mixed hardwood and coniferous growth. Spruces, firs, and hemlocks are found in small quantities confined to the mountain regions.

The Northern States are mainly occupied by hardwood growths, with conifers intermixed, sometimes the latter becoming entirely dominant, as in the spruce forests of Maine, New Hampshire, or the Adirondacks, and here and there in the pineries of Michigan, Wisconsin, and Minnesota, or in the hemlock regions of Pennsylvania and New York.

A very rough and probably very liberal estimate of the *amounts of timber standing* in the various regions ready for the axe would give the following figures:

	FEET, B. M.
Southern States	700,000,000,000
Northern States	500,000,000,000
Pacific Coast	1,000,000,000,000
Rocky Mountains	100,000,000,000
Total	2,300,000,000,000

The *total annual cut*, including all material requiring bolt or log size, is estimated at 40,000,000,000 feet, B. M. It is made up of the following kinds:

	FEET, B. M.
White pine	12,000,000,000
Spruce and fir	5,000,000,000
Hemlock	4,000,000,000
Longleaf pine	4,000,000,000
Shortleaf and loblolly	3,000,000,000
Cypress	500,000,000
Redwood	500,000,000
All other conifers	1,000,000,000
Total conifers	30,000,000,000
Oak	3,000,000,000
All other hardwoods	7,000,000,000
Total	40,000,000,000

In this cut the various regions participate in the following proportions:

	FEET, B. M.
New England and North Atlantic States	6,000,000,000
Central States	5,000,000,000
Lake Region	13,000,000,000
Southern States	13,000,000,000
Pacific States	4,000,000,000
Miscellaneous	2,000,000,000

The consumption of fuel to the extent of probably 180,000,000 cords, of fence material, etc., the waste in the woods and at the mills, and loss by fire, brings the total annual wood consumption of the United States easily to 25,000,000,000 cubic feet or 50 cubic feet per acre, a figure nearly corresponding to the yield per acre realized in the well-kept forests of Prussia, where reproduction is secured by skillful management.

The consumption increases from decade to decade in greater proportion than the population; and new industries, like the wood pulp industry, add constantly to the demand.

The *value* of forest products used in the census year 1890 was estimated to exceed $1,000,000,000.

The items making up this grand total may be classified as follows, always keeping in mind that only approximations to actual conditions are here attempted. These figures are based in part on census statistics, in part on other estimates, and remain fairly representative to date (1895):

Mill products, lumber, shingles, implement and furniture stock, etc	$450,000,000
Railroad construction	45,000,000
Export timber	5,000,000
Wood pulp	5,000,000
Miscellaneous bolt sizes	50,000,000
Total materials requiring log and bolt sizes	555,000,000
Fuel and fencing	450,000,000
Charcoal	7,000,000
Dyewood and gunpowder	500,000
Naval stores	8,500,000
Wood alcohol and acetic acid	2,500,000
Tanning material	15,000,000
Maple sirup and sugar	5,500,000
Grand total	1,044,000,000

The *imports* of wood and other forest materials amount to between twenty and thirty million dollars annually, about 25 per cent of which consists of materials which do not grow on this continent. The balance comes mainly from Canada.

The *exports* of forest products and partly manufactured wood materials varies between twenty-five and thirty million dollars, with twelve to fifteen million more of manufactures in which wood plays an important part.

Although many of the great staples have in some regions been entirely exhausted and in others approach exhaustion, *prices* of lumber have not advanced in proportion for various reasons. Competition, stimulated by active railroad building, opening up of virgin fields of supply, improved machinery, systematized methods of logging and of handling and marketing material have tended to keep the price down.

Meanwhile stumpage has increased rapidly for such kinds as show rapid decrease in supply. Thus white pine stumpage more than doubled in ten years, while walnut, tulip poplar, and ash stumpage has increased manyfold as the supply has grown scarcer.

In the markets, while the average price for lumber has advanced but little, the better grades have appreciated disproportionately. From the carefully collected statistics for shipbuilding, which requires all first-class material, the average price per 1,000 feet, B. M., for the country at large for the following kinds appears:

Kind.	Average.	Lowest.	Highest.
White oak	$30.70	$19.00 (Indiana)	$125.00 (California).
Other oaks	34.90	20.00 {Indiana, Kentucky, West Virginia.}	102.00 (California).
Hard pine	24.40	12.00 (Alabama)	42.00 (Iowa).
White pine	34.70	20 00 (Minnesota)	100.00 (Georgia).
Fir	21 00	15.00 (Washington)	80.00 (Mass).
Spruce	20.00	12.00 (Delaware)	50.00 (Washington).
Cedar	40.00	17.00 (Missouri)	55.00 (Connecticut).
Cypress	31.60	18.00 (Mississippi)	50.00 (Delaware).
Average of all	30.00		

Firewood, even in the densely settled parts, remains stationary in price, on account of abandoned farms and culled woodlands producing it in abundance; in fact, in many sections its value has decreased, competition of coal aiding in its reduction.

Census statistics of the employment of capital, persons employed, and wages paid in the minor forest industries are absent. The fact that

many people are only temporarily or incidentally and for a part of the year engaged in the exploitation of the forest would make such enumeration well nigh impossible. Besides the lumber industry and such kinds of exploitation as can be at least approximately enumerated—always remaining below the truth—a large number of industries and manufactures rely upon wood as the principal material, others employing it to a greater or less extent. An attempt has been made to classify these according to the estimated percentage of wood entering into their products and assuming that capital, labor, and value of products add the same proportion to the total as the raw materials used. As a matter of fact, there is probably more labor employed in shaping wood than this percentage would indicate.

Forest industries and manufactures using wood.

Articles.	Capital.	Employees.	Wages.	Raw material.	Value of product.
Forest industries enumerated:	*Thousands*	*Hundreds.*	*Thousands*	*Thousands*	*Thousands*
Lumber and mill products	$496,340	2,862	$87,784	$231,556	$403,668
Timber products not manufactured at mill	61,541	461	11,354	11,007	34,290
Naval stores	4,063	153	2,933	3,506	8,077
Total	561,943	3,477	102,071	245,169	446,034
Manufactures practically all wood:					
Cigar boxes	3,374	55	2,134	3,567	7,092
Packing boxes	13,018	140	6,477	14,245	25,513
Carriage and wagon stock	13,028	109	5,208	1,388	16,262
Carpentering	81,543	1,409	94,524	137,847	281,195
Cooperage	17,817	247	11,655	2,637	38,618
Furniture factory products	66,394	639	34,471	38,796	94,871
Kindling wood	1,300	18	772	1,187	2,402
Lasts	908	8	572	331	1,239
Planing-mill products	120,271	869	48,970	104,927	183,682
Matches	1 941	18	344	935	2,194
Wood, turned and carved	7,826	84	4,267	3,947	10,940
Woodenware	2,712	31	1,237	1,499	3,598
Wood pulp	7,455	28	1,229	2,005	4,628
Wood carpet	333	3	155	214	512
Total	337,908	3,650	212,027	331,523	672,750
Manufactures in which wood represents about 50 per cent of the raw materials:*					
Total	**169,983**	**1,356**	**714,460**	**114,383**	**229,408**
Wood percentage	89,991	687	35,730	57,192	114,704
Manufactures in which wood represents about 33⅓ per cent:†					
Total	**321,059**	**2,143**	**123,588**	**148,578**	**318,218**
Wood percentage	107,619	714	41,196	49,526	106,072
Manufactures in which wood represents about 10 per cent:‡					
Total	**76,841**	**915**	**46,854**	**49,291**	**131,820**
Wood percentage	7,684	92	4,685	4,929	13,182
Manufactures of wood:					
Total	543,402	5,134	293,638	443,170	906,708

* Includes carriages and wagon factory product, children's carriages and sleds, steam and street cars, coffins and burial caskets, chairs, wheelbarrows, sewing machine cases, artificial limbs, refrigerators, and shipbuilding.

† Includes agricultural implements, billiard tables, railroad and street car repairs, furniture repairs, washing machines and wringers, organs and pianos.

‡ Includes blacksmithing and wheelwrighting, bridges, brooms and brushes, gunpowder, artist's materials, windmills, toys and games, sporting goods, lead pencils, pipes and pumps.

To get at an idea of the significance of the forest resources in the economy of the country and of the comparative position of the industries relying on forest products with reference to other industries the following compilation will serve, being based on census figures for 1890:

Leading industries compared.

[Data from Census 1890, in round numbers.]

	Capital involved.	Employes.	Wages.	Raw materials.	Products.
	Millions.	*Thousands*	*Millions.*	*Millions.*	*Millions.*
Agriculture	15,982	8,286	.....	.....	2,460
Forest products, total	.....	.....	.....	.....	1,044
Forest industries, enumerated	562	348	102	245	446
Forest products, not enumerated (estimated)	+	+	+	.....	598
Manufactures using wood (see table above)	543	513	294	442	907
Mineral products, total	.....	.....	.....	.....	610
Coal	343	300	109	.....	160
Gold and silver	486	57	40	.....	99
Iron and silver	414	176	96	327	479
Manufactures of iron and steel	86	60	32	79	131
Leather	102	48	25	136	178
Leather manufactures	118	186	88	153	289
Woolen manufactures	297	219	77	203	338
Cotton manufactures	354	222	70	155	268

From this table it appears that agriculture, standing first in capital, persons employed, and value of products, the industries relying upon forest products stand easily second, exceeding in the value of products the mining industries by more than 50 per cent. The industries relying directly or indirectly on forest products employ readily more than one million workers (enumeration being imperfect), producing nearly two billion dollars of value. The manufactures relying on wood wholly or in part more than double the value of the lumber or wood used, giving employment to more than half a million men and about equaling the combined manufactures of all woolen, cotton, and leather goods in persons employed, wages paid, and values produced.

The *loss by fire* varies from year to year, but is enormous especially in the Western mountains, where it is impossible to ascertain the extent. An estimated annual loss of $25,000,000 in value seems in some years to be far exceeded. A recent careful canvass places the loss for Pennsylvania alone at $1,000,000 for the year; an estimate for the fire losses in Minnesota during 1894 places them at $12,000,000.

The principal *centers of production* of the leading commercial timbers of the United States may be briefly described as follows:

The *white pine* is distinctively a Northern tree, reaching its best development in Michigan, Wisconsin, and Minnesota, where it is the dominant species. It was once the leading commercial species of Pennsylvania, New York and northern New England, but there it has been largely exhausted. In the South it is found only on the higher elevations of the Alleghenies and in limited quantities. The principal sources of supply at present are northern Wisconsin and Minnesota. In Michigan there are small tracts of virgin white pine forests, but over by far the greater part of the State not even a valuable second growth of white pine can be found.

Red pine, or Norway pine, is found associated with the white pine in its more northern habitat and until lately was sold with the latter without distinction, although the lumber is very different, resembling more nearly the Southern shortleaf pine.

The *bull pine* (Pinus ponderosa) of the Rocky Mountains and the Pacific Coast forms the main supply of hard pine for local use in the

West, while the gigantic sugar pine of Oregon and California furnish desirable soft pine material. Scattered here and there in small areas throughout the Western country, notably in Idaho, is found the mountain white pine (*Pinus monticola*), which is capable of being substituted for the other soft pines.

The *longleaf* or Georgia yellow pine, occupies the coast plain from North Carolina to eastern Texas, being the dominant species over 100,000 square miles of territory. It reaches its greatest development in western Louisiana and eastern Texas.

The *Cuban* or slash pine, occupying a comparatively small territory near the Southern coast, is cut and sold without distinction with the longleaf pine.

The *shortleaf* pine region is adjacent to the longleaf pine region on the northern side, the two species intermingling where their areas join. The shortleaf pine, also known in the markets as North Carolina pine, has its botanical northern limit in Kentucky and Missouri, and on the Atlantic Coast in New York, being there, however, of no commercial value. It reaches its highest development in Arkansas. High grade shortleaf pine lumber is cut in southern Missouri on a comparatively limited area. The principal centers of production are North Carolina, northern Alabama, northwest Louisiana, northeast Texas, and Arkansas. It occupies an area of about 70,000 square miles, but occurs scatteringly over a much greater area, and is of commercial importance in all the Southern States except Florida.

Loblolly, or Virginia pine, occurs throughout the longleaf region and the southern part of the shortleaf area. It is the principal species in Virginia and eastern North Carolina, and occurs in abundance along the Gulf Coast. It is the "old field" pine of the Southern States. Thus far it has been of much less importance as a source of lumber than the other Southern pines, but it is now extensively cut and often mixed with other pine lumber, the principal market being Norfolk, Va.

Spruce and fir.—Maine, New Hampshire, and northern New York are the principal sources of these timbers. Spruce occupies also considerable areas in the Alleghanies as far south as West Virginia. It forms, together with fir, part of the forest in the Black Hills and the Rocky Mountains. The lumber has taken the place of pine for joists and other light construction. Five-sixths of the annual cut of 1,500,000,000 feet in Maine is of spruce; 500,000,000 feet is used in the paper pulp industry yearly. Since 1853 the lumber industry has completely reversed its output. In that year the cut of pine on the Penobscot was 133,000,000 feet, and of spruce 78,000,000 feet. In 1892 the cut of pine was 29,000,000 feet, of spruce 120,000,000 feet. In New York of a total cut of 447,000,000 feet in the Adirondacks 334,000,000 feet were spruce and about 28,000,000 feet pine.

Douglas spruce (red fir, yellow fir) is the dominant species in the dense forest of western Washington and Oregon, forming about seven-eighths of the entire growth. It also occurs in quantities along the Rocky Mountains, especially in Idaho. Standing timber of all kinds in Washington is estimated at 410,000,000,000 feet, covering 23,500,000 acres. The cut of the State in 1892 was 1,440,135,000 feet, of which over 275,000,000 feet was in lath and shingles. Over 100,000 feet of lumber was shipped by rail to the East. The principal market is San Francisco, and over 100,000,000 feet was sold in 1892 to Australia, Hawaii, and South America.

Hemlock.—Pennsylvania and New York furnish the principal supply of hemlock lumber. The bark is used in tanning, and the logs are sawed into lumber, for which there is a constant demand as a substitute for white pine in rough construction. Hemlock is found throughout the Alleghanies as far south as North Carolina and Tennessee.

Bald cypress occupies limited areas extending throughout the Southern States. The most extensive cypress region is in southern Louisiana and along the Mississippi and Yazoo rivers in Mississippi, in the vicinity of Mobile, Ala., around Appalachicola, Fla., and along the South Atlantic coast. A limited quantity of cypress lumber is also cut in the lowlands of south Missouri, western Kentucky, and Tennessee and Arkansas.

Red cedar.—This tree has the greatest range of any American species, occurring from Florida to the State of Washington. The principal sources of supply are the forests of central and eastern Tennessee, northern Alabama, and Florida. The wood is used for hollow ware and the manufacture of lead pencils, and the mature trees are being rapidly thinned out. Five million feet of red cedar is used annually in the bucket factories. The pencil factories use about 500,000 cubic feet of soft clear material. No considerable area of red cedar for these manufactures exists anywhere in the country that has not been culled.

Redwood is found exclusively in the Coast Range of California, where the standing timber of this kind is estimated at less than 25,000,000,000 feet, B. M.

Oak.—Among the fifty species of oak included in our forest flora only about a dozen are commonly cut for timber and these are sold in the market under two names—white oak, of which *Quercus alba*, the species, is the type, and red oak, of which *Quercus rubra* is the typical form. According as the other commercial species more nearly resemble one or other of the species named, they are classed as "white" or "red." Formerly only the white oak was cut, as the wood was used almost exclusively for construction and for cooperage. Of late years oak has become a fashionable wood for furniture making and interior finish, and the red oaks are found quite as useful for these purposes and now have a recognized standing in the markets, though commanding a lower price than the white oaks. The red and white oaks are found in all American forests east of the Rocky Mountains, and originally large trees were common everywhere. The northern forest has been more heavily culled than the southern, so that now the principal sources of supply are the mixed forests south of the Ohio and Missouri rivers, with Kentucky, Tennessee, and West Virginia probably in the lead. Arkansas forests are rich in oak, and the States of Minnesota, Wisconsin, Michigan, and Indiana supply a large demand. On account of the number of species, and the fact that the oaks only grow in mixed forests, no estimate of the standing timber can be made. The present annual cut is estimated at 3,000,000,000 feet, B. M., of which more than half comes from States south of the Missouri and Ohio rivers.

Hickory.—This wood is used principally in bolt sizes for wagon stock. Like the oaks, several species are sold under the one commercial name, and the genus has a wide distribution throughout the Eastern forests. The principal sources of supply are Kentucky and Tennessee, though much good hickory is cut in Arkansas and West Virginia. The forests of Indiana, once the principal center of the hickory trade, are now largely exhausted. The annual cut is estimated at 250,000,000 feet.

Ash.—The principal source of supply of ash timber is western Ten-

nessee and Kentucky, though tracts rich in ash are found in the rich mountain valleys of the eastern parts of these States and in West Virginia. Much ash is also cut in the hardwood forests of Michigan and Wisconsin. Memphis is the leading market for ash. The present annual cut is estimated at 350,000,000 feet, considerably less than was manufactured fifteen years ago.

Poplar.—The principal centers of poplar production are Kentucky, Tennessee, and West Virginia, though it occurs in greater or less abundance throughout the hardwood forests of the Ohio valley. It never makes a pure forest, being scattered among other broad-leaved kinds, and reaching its best development in the rich, moist valleys of western Tennessee. About 500,000,000 feet is cut annually.

Cottonwood.—The cottonwood attains its highest development in the moist, fertile bottom lands of western Tennessee and Mississippi, and in Arkansas. This species has the widest range of any broad-leaved economic tree of the American forest, but commercially it is only important in the lower Mississippi valley. Cottonwood has only recently made its appearance in the lumber trade, and much of it is still sold as poplar, there being a prejudice against the wood because of its great tendency to warp under old systems of drying. As placed on the market to-day its merits give it a recognized standing. The cut is estimated at between 150,000,000 and 300,000,000 feet.

Other hardwoods.—Among other hardwoods which have a place in commercial lists, birch, cherry, black walnut, maple, gum, sycamore, and elm are cut for lumber, while there is a steady market for dogwood and persimmon for spool and bobbin stock. Birch is a common tree throughout the Alleghanies and the Northern Lake region, the principal sources of supply being the West Virginia mountains, northern Michigan, New York, and Maine. Black birch (*Betula lenta*) is the principal species used. The growing popularity of birch furniture has increased its importance in the trade. Black wild cherry is widely distributed in the forests of the East, but the principal lumber supply is found in the mountain valleys of West Virginia and Tennessee. It is seldom the dominant tree over any extent of forest, occurring in mixture with other broad-leaved trees. It is largely used in the manufacture of cabinet work and furniture. Black walnut, once common in the rich bench lands of the Mississippi Basin, has been so largely cut as almost to have disappeared from market quotations. A considerable quantity yet remains in Kentucky, Tennessee, and Missouri, but it is now sold by the individual tree. Sweet gum is a tree of the swamps, and reaches its highest development in the Yazoo Delta, Mississippi, and the swamp lands of Arkansas. It is a valuable furniture and veneer stock. Sycamore and elm are common in all the low lands along the streams of the Ohio and lower Mississippi valleys. Maple has a greater northern range than most of the trees of this group. It attains its highest development in the forests of Michigan. It is largely used for flooring, furniture, and interior finish. The annual cut of these hardwoods of minor importance, although small for each species, in the aggregate equals nearly that of the leading commercial hardwoods.

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Approved:
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