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MARYLAND STATE BOARD OF FORESTRY

F. W. BESLEY, State Forester

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THE FORESTS
—OF—
FREDERICK COUNTY

BY
F. W. BESLEY, State Forester

BALTIMORE, MARYLAND
JANUARY, 1922

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PLATE I. FIG. 1.—FIRE OBSERVATION TOWER.
A 50-foot steel tower similar to this is located on an elevation above Foxville.

STATE FORESTER'S OFFICE

815 Calvert Building

BALTIMORE

F. W. BESLEY.....	STATE FORESTER
KARL E. PFEIFFER.....	ASSISTANT FORESTER
JOSHUA A. COPE.....	ASSISTANT FORESTER
SAMUEL CORBIN.....	ASSISTANT FORESTER

NELLIE E. WHITCRAFT.....	SECRETARY
SARA M. REESE.....	CLERK

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The Forests of Frederick County

INTRODUCTION.

The woodlands of Frederick County were carefully studied a few years ago by the State Board of Forestry for the purpose of obtaining accurate detailed information as to the character and composition of the forests, their distribution over the County, their chief uses, together with the amount of timber and wood products derived therefrom. All wooded areas of five acres or more in extent were carefully mapped and classified as to stand of timber. This information will be found on the large forest map on the inside cover at the back of this report, and to this the reader is referred for details.

Frederick, the second largest county in the State, is essentially an agricultural county. The forests which cover 21 per cent. of the total area are very largely confined to the western mountain section, so that its forest resources are considerably centralized. The small percentage of woodland, coupled with the extensive demand for wood products, gives the forests of the County considerable prominence as a valuable resource. It is the purpose of this report to point out the importance of the forests and to indicate how they may be maintained in a highly productive condition to meet present and future needs.

LAND CLASSIFICATION.

Improved farm land.....	301,430 acres	70 per cent.
Wooded area.....	91,117 acres	21 per cent.
Waste land.....	40,583 acres	9 per cent.
<hr/>		
	433,130 acres	100 per cent.

DISTRIBUTION OF THE FORESTS.

The forest area comprises 21 per cent. of the total land area. Two-thirds of the wooded area is in the western half of the County, the remaining portion of the woodland is, for the most part, in small holdings on farms. Many farms have no woodland upon them, and the owners are therefore dependent upon their neighbors for wood, or, as in the case of farmers living just east of the Catoctin Mountains, many of them have small woodlots located in the mountain section, detached from their farm property. The Monocacy Valley, extending north and south through the central part of the County, has the smallest percentage of woodland of any section. The Middletown Valley, along Catoctin Creek, in the southern and southwestern part, is also nearly destitute of woodland. In the western mountain section the woodlands are mostly in large continuous areas, while in the eastern half of the County, along the gently rolling foothills, the woodlands are mainly in small, isolated holdings. Due to the general excellence of the soil for agricultural use, woodlands have been almost entirely cleared away from lands that can be cultivated, and are therefore confined to the mountain ridges and slopes and to the thin soils of the rocky ridges and hill-sides on the farm area.

The second district in which Frederick is located has less than 20 acres of woodland out of a total acreage of more than 14,000, or little more than one-tenth of 1 per cent., while in District No. 10, in the northwest section of the County, 57 per cent. is wooded. Nine of the 26 election districts are less than 10 per cent. wooded, while 5 are more than 40 per cent. wooded, showing the great variation in forest distribution, due to the character of the soil.

It is not likely that there will be any marked changes in forest distribution for many years to come because of the rather clear-cut distinction that now obtains between farm soils and forest soils.

WOODED AREA, STAND AND VALUE OF SAW TIMBER BY ELECTION DISTRICTS.

Dist. No.	Total Land Area.	Wooded Area.	Per Cent. Wooded.	Stand of Saw Timber in Board Feet. All Trees More Than Nine Inches in Diameter.				Stumpage Value.	
				Hardwood M. Bd. Ft.	Pine M. Bd. Ft.	Total M. Bd. Ft.	Hardwood M. \$9.00 per M.	Pine M. \$9.00 per M.	Total
1	32,004	838	3	2,534		2,534	\$22,806		\$22,806
2	14,269	19		76		76	684		684
3	19,656	1,493	8	2,446		2,446	22,014		22,014
4	12,663	756	6	1,636	6	1,642	14,724	\$54	14,778
5	30,303	5,066	17	9,215	19	9,234	82,934	172	83,106
6	16,782	8,494	51	12,487		12,487	112,384		112,384
7	31,405	7,743	25	14,262	38	14,300	128,358	342	128,700
8	14,679	2,174	15	3,474		3,474	31,266		31,266
9	32,130	5,399	17	8,839		8,839	79,550		79,550
10	18,818	10,692	57	10,401		10,401	93,610		93,610
11	17,558	1,342	8	3,303		3,303	29,726		29,726
12	11,655	1,412	12	2,876		2,876	25,884		25,884
13	12,348	2,378	19	3,123		3,123	28,108		28,108
14	16,254	2,892	18	4,520		4,520	40,680		40,680
15	24,558	12,695	52	9,463	198	9,661	85,166	1,782	86,948
16	11,892	3,686	25	5,779		5,779	52,012		52,012
17	17,514	1,405	8	3,068		3,068	27,612		27,612
18	16,280	3,106	19	4,539		4,539	40,850		40,850
19	11,403	1,903	17	3,625		3,625	32,626		32,626
20	19,845	8,366	42	7,264		7,264	65,376		65,376
21	12,127	5,181	43	7,810		7,810	70,290		70,290
22	11,718	1,783	15	3,062		3,062	27,558		27,558
23	8,316	693	8	630		630	5,770		5,770
24	5,040	1,002	20	1,188		1,188	10,692		10,692
25	1,108	25	2	69		69	620		620
26	9,815	574	6	1,001		1,001	9,010		9,010
County	453,130	91,117	21	126,630	261	126,931	\$1,140,210	\$2,350	\$1,142,560

DESCRIPTION OF THE FORESTS.

Hardwood forests prevail throughout the County. Pine, which is the only soft wood of note, is practically negligible, so far as the stand of timber is concerned. The only areas of consequence are those in the Catoctin Mountains, west of Thurmont, and here the pine is mixed with hardwood. The only pure stands are small patches near the Monocacy River, scattered through the central part of the County. A large number of different species of trees occur in the forest—the relative proportion of the different species forming rather distinctive forest types. These are somewhat clearly defined in the mountain section, such as chestnut oak, along the top and upper portion of the ridges. The chestnut type, along the upper slopes, is often mixed with scarlet and black oak. White oak, red oak, hickory and tulip poplar are the prevailing tree species on the lower slopes.

The original character of the forest has been greatly changed under use and abuse, particularly as the result of frequent and destructive forest fires. Practically the entire forest area of the County has been cut-over. A considerable portion has been cut-over two or three times. At each cutting the more valuable species have been taken and often the undesirable species are left entirely, so that the relative proportion of the inferior species has consequently increased. Originally the mountain forests consisted of about 50 per cent. chestnut. The chestnut blight, a fungus disease attacking only the chestnut, reached this section of the State about 1912, and has now practically destroyed the chestnut as an important timber tree. Its place in the forest is being taken principally by the oaks, although where pure stands of chestnut occurred, which was over a considerable part of the area, replacement is a slow process. The fire damage in the mountains has been particularly severe, resulting in serious deterioration of the stands, not only causing a low timber production, but very greatly reducing the quality of the product.

A large area of the forests in the vicinity of Catoctin Furnace was operated for more than 100 years prior to 1890 for the production of charcoal in supplying the iron furnace at that point. The furnaces required a continuous supply of wood, which was obtained by cutting clean each year a portion of the forest, coming

back again for another cutting at intervals of from 25 to 35 years. This resulted in even aged sprout forests, coming up from the stumps, following cutting. Trees of the greatest sprouting capacity, such as chestnut and the oaks, thrive under this system, and where fires were kept out maximum wood production was maintained. It is interesting today to note the old charcoal beds and the wagon roads built for taking out the charcoal many years ago. The stone walls and other remains of the old Catoctin Furnace are still intact. Outside of the mountain areas, where the woodlands are somewhat isolated, fire damage has been slight, and as a result the woodlands are in better condition, although they have suffered much from destructive methods of cutting and from excessive grazing.

COMMERCIAL TYPES.

The forest survey of the County, made some years ago, resulted in the classification of the forests under certain commercial types, indicating the approximate stand of timber per acre. This is shown clearly on the forest map at the back of the report.

Three classes of hardwoods are distinguished, first, the merchantable class, indicated on the map by the letter "M," which shows the areas upon which there is a sufficient stand of saw timber to justify profitable logging operations. Second, the culled forests, indicated by the symbol "C," are divided into three sub-classes and indicate the areas from which most of the merchantable timber has been cut, but which still have small size material that is rapidly coming into the merchantable class. The third type, "hardwood saplings," indicated by the symbol "HS" on the forest map, show areas containing a young growth of hardwoods still very small. The pine forests, which are found very sparingly, are indicated by the symbol "S," while a combination of hardwood and pine is indicated by appropriate letters, the significance of which have already been explained.

NATIVE FOREST TREES.

There are 77 species of trees found in Frederick County. Practically all are used in some way commercially, but there are some which are rather rare and do not have a commercial rating. A few merely reach tree size and cannot be of any use except as firewood.

The following list contains species native to the County which reach tree size:

CONIFERS.

<i>Common Name.</i>	<i>Scientific Name.</i>
White Pine.....	<i>Pinus strobus</i>
Scrub Pine.....	<i>Pinus virginiana</i>
Pitch Pine.....	<i>Pinus rigida</i>
Table Mountain Pine.....	<i>Pinus pungens</i>
Hemlock	<i>Tsuga canadensis</i>
Red Cedar.....	<i>Juniperus virginiana</i>

HARDWOODS.

<i>Common Name.</i>	<i>Scientific Name.</i>
White Oak.....	<i>Quercus alba</i>
Chestnut Oak.....	<i>Quercus prinus</i>
Swamp White Oak.....	<i>Quercus bicolor</i>
Post Oak.....	<i>Quercus stellata</i>
Red Oak.....	<i>Quercus rubra</i>
Black Oak.....	<i>Quercus velutina</i>
Scarlet Oak.....	<i>Quercus coccinea</i>
Pin Oak.....	<i>Quercus palustris</i>
Scrub Oak.....	<i>Quercus ilicifolia</i>
Overcup Oak.....	<i>Quercus lyrata</i>
Burr Oak.....	<i>Quercus macrocarpa</i>
Shingle Oak.....	<i>Quercus imbricaria</i>
Black Jack Oak.....	<i>Quercus marilandica</i>
Spanish Oak.....	<i>Quercus falcata</i>
Chinquapin Oak.....	<i>Quercus prinoides</i>
Chestnut	<i>Castanea dentata</i>
Chinquapin	<i>Castanea pumila</i>
Tulip Poplar.....	<i>Liriodendron tulipifera</i>
Basswood	<i>Tilia americana</i>
Black Locust.....	<i>Robinia pseudacacia</i>
Mockernut Hickory.....	<i>Carya alba</i>
Pignut Hickory.....	<i>Carya glabra</i>
Shellbark Hickory.....	<i>Carya ovata</i>
Small Pignut Hickory.....	<i>Carya microcarpa</i>

<i>Common Name.</i>	<i>Scientific Name.</i>
Big Shellbark Hickory.....	<i>Carya laciniosa</i>
Black Walnut.....	<i>Juglans nigra</i>
Butternut	<i>Juglans cinerea</i>
Red Maple.....	<i>Acer rubrum</i>
Black Maple.....	<i>Acer nigrum</i>
Sugar Maple.....	<i>Acer saccharum</i>
Mountain Maple.....	<i>Acer spicatum</i>
Box Elder.....	<i>Acer negundo</i>
Cucumber Tree.....	<i>Magnolia acuminata</i>
Umbrella Tree.....	<i>Magnolia tripetala</i>
White Ash.....	<i>Fraxinus americana</i>
Black Ash.....	<i>Fraxinus nigra</i>
Red Ash.....	<i>Fraxinus pennsylvanica</i>
White Elm.....	<i>Ulmus americana</i>
Slippery Elm.....	<i>Ulmus fulva</i>
Red Gum.....	<i>Liquidambar styraciflua</i>
Wild Black Cherry.....	<i>Prunus serotina</i>
Fire Cherry.....	<i>Prunus pennsylvanicum</i>
Sycamore	<i>Platanus occidentalis</i>
Trembling Aspen.....	<i>Populus tremuloides</i>
Large Toothed Poplar.....	<i>Populus grandidentata</i>
Silver Poplar.....	<i>Populus alba</i>
Balsam Poplar.....	<i>Populus balsamifera</i>
Sour Gum.....	<i>Nyssa sylvatica</i>
Swamp Gum.....	<i>Nyssa biflora</i>
Red Mulberry.....	<i>Morus rubra</i>
Sassafras	<i>Sassafras sassafras</i>
Alder	<i>Alnus rugosa</i>
Paw Paw.....	<i>Asimina triloba</i>
Shadbush	<i>Amelanchier canadensis</i>
Black Birch.....	<i>Betula lenta</i>
Yellow Birch.....	<i>Betula lutea</i>
Red Birch.....	<i>Betula nigra</i>
Blue Beech.....	<i>Carpinus caroliniana</i>
Hackberry	<i>Celtis occidentalis</i>
Red Bud.....	<i>Cercis canadensis</i>
Dogwood	<i>Cornus florida</i>
Cockspur Thorne.....	<i>Crataegus crus-galli</i>

<i>Common Name.</i>	<i>Scientific Name.</i>
Persimmon	<i>Diospyrus virginiana</i>
Beech	<i>Fagus grandifolia</i>
Witch Hazel.....	<i>Hamamelis virginiana</i>
Hop Hornbeam.....	<i>Ostrya virginiana</i>
Mountain Ash.....	<i>Pyrus americana</i>
White Willow.....	<i>Salix alba</i>
Black Willow.....	<i>Salix nigra</i>
Staghorn Sumach.....	<i>Rhus typhina</i>

INTRODUCED TREES THAT HAVE BECOME COMMON IN THE FOREST.

<i>Common Name.</i>	<i>Scientific Name.</i>
Honey Locust.....	<i>Gleditsia triachanthos</i>
Silver Maple.....	<i>Acer saccharinum</i>
Ailanthus	<i>Ailanthus glandulosa</i>
Osage Orange.....	<i>Maclura pomiferum</i>
Fringe Tree.....	<i>Chionanthus virginica</i>

IMPORTANT TIMBER TREES AND THEIR CHIEF USES.

Practically every species of tree in the County is used in some way, if only as firewood on farms. Commercially, however, the number of species that are sold are limited, although often, as in the case of the oaks, one recognized commercial species will include many different botanical species. The list following contains the most important commercial species in the County.

Oaks.—The species of oak are usually sold in two classes—the red and white oaks, of which the white is more important. Approximately 65 per cent. of the cut of timber from the County is oak.

White Oaks.—The white oak class of timber is one that possesses strength and durability to a remarkable degree. The true white oak is unsurpassed, but there are several different species which are very similar to it and cannot be recognized except by experts. This fact leads to the grouping of the oaks on the market. This group includes, besides the true white oak, which forms 60 per cent. of what is cut, the chestnut oak, about 20 per cent., with the post oak and swamp white oak making up most of the remainder.

The wood of the white oak, because of its toughness and durability, is especially adapted for use as a general construction timber. Much of it is cut for local use on farms. It is also very valuable as a railroad tie, as it can be used in contact with the ground without preservative treatment. It is exported for use as furniture wood, cooperage stock, car construction, framing, ties, and other uses.

Red Oaks.—The red oaks are inferior to the white oaks only in being less durable. This quality, however, affects the sale price. This group will contain the true red oak, black oak, scarlet, and pin oaks, and others less common. The red oak itself is the equal of white oak in all but durability.

The red oaks are cut for general farm timbers in the County, but are not used to the extent that the white oak is. A great amount of red oak is cut into railroad or trolley ties. For this use, however, it is necessary that the wood be given a preservative treatment. Red oak is also in demand for general construction, car stock, planking, furniture, and interior finish.

Chestnut.—This species of tree has been attacked by the chestnut blight to such an extent that its future as a commercial tree in the County seems doomed. At present, because of the presence of the dead or dying trees, an effort is being made to utilize the wood before it becomes valueless. This has resulted in an increased production of chestnut products to such an extent that the cut is nearly equal to any other species cut in the County. The chestnut makes an admirable pole because of its durability in contact with the soil. This is also true when used as a tie, but because of its lightness and softness it cannot be used for heavy traffic. It, therefore, is cut largely for trolley ties and mine ties. There is some general saw lumber produced, mostly used locally on farms, as well as shingles used for the same purpose. In the County there is a special industry, that of making staves from chestnut. The staves are used largely in slack cooperage for lime and cement containers. A great many farmers are utilizing the dead chestnut of their woodlots for making fence rails and posts, but the sale of these is limited. The cut will fall off within a few years because of the exhaustion of the supply.

Tulip Poplar.—This wood enters but little in the production of lumber in the County, largely because of the absence of trees of saw log size. It does, however, make up the largest percentage of wood cut into pulpwood.

THE LUMBER AND TIMBER CUT.

The lumber and timber business in Frederick County in 1920 employed 550 men for varying periods throughout the year. Of these, 250 were employed by the 47 sawmills, 14 of which were year-round operations, while 33 operated only a portion of the year. The remainder were employed in getting out special products, such as railroad and trolley ties, poles, staves, pulpwood, shingles, lath, cordwood, and bark. The lumber and timber cut of the County has fallen off about 20 per cent. in the last seven years. Under present conditions, it is reasonably certain the timber production must fall still lower, because of the depletion of the forests, notwithstanding a 100 per cent. increase in the price of timber products.

Lumber.—The lumber cut consists almost entirely of hardwood, of which 65 per cent. is oak, 20 per cent. chestnut, and 15 per cent. miscellaneous, including tulip poplar, hickory and maple. Pine and hemlock represent less than 2 per cent. of the total cut. Chestnut constitutes a larger proportion of the output than does any other single species. It is mostly derived in the nature of salvage from trees which have been killed by chestnut blight. Each succeeding year, the proportion of chestnut will be considerably reduced, and the proportion of oaks increased, until the chestnut finally disappears as a commercial tree.

Most of the timber is cut by portable mills, which operate only a short period during the year, making frequent moves as each tract is cut over. A few of the mills operate by water power, and do a small custom business. The lumber cut for 1920 was 5,996,000 board feet, valued at \$209,860 at the point of shipment.

Railroad Ties.—The cutting of railroad ties constitutes one of the chief wood's operations. The high prices obtained has stimulated tie production, so that much timber that would ordinarily have gone into lumber is converted into sawed ties. The high cost of labor, and the wastefulness of the operation has nearly elimi-

PLATE III. FIG. 1.—HISTORIC CATOCTIN FURNACE.
In which hundreds of thousands of cords of wood were consumed in the iron industry

PLATE III. FIG. 2.—CHESTNUT AND OAK STAVEWOOD AT CATOCTIN.
The cutting of staves is an important industry of Frederick County.

nated hewn ties in favor of sawed ties. A considerable quantity of short boards are derived from the slab cuts. Chestnut, red oak, and white oak were the principal woods used. In all, there were 16,325 railroad ties produced in 1920, which, at an average value of \$1.00, amounted to \$16,325.

Trolley Ties.—The extensive mileage of trolley lines through Frederick County has produced a good local market for trolley ties. Thirty-eight thousand and ninety were sold in 1920 at an average of 60 cents each, valued at \$22,854 delivered at the tracks. Probably 75 per cent. of the trolley ties were chestnut. The remainder consisted of several different species, principally oak.

Poles.—There was an unusually heavy output of chestnut poles during 1920, amounting to 16,825, which, at a value of \$5.00 each at shipping point, amounted to \$84,125. The poles varied in length from 25 to 60 feet. For this purpose, the best specimens of trees that had not seriously deteriorated from chestnut blight were used.

Staves.—The stave business in Frederick County is a comparatively recent enterprise, but there are now several operations under way, which in 1920 produced 13,800,000 staves, valued at \$159,735. Staves are made from bolts which are cut in five-foot lengths in the woods, any hardwoods being used. The wood is sold by the cord, trees as small as five inches in diameter being used. The stave business furnishes an excellent means of utilizing small blight killed chestnut timber.

Pulpwood.—The production of pulpwood is on the increase, as formerly very little was taken. The amount cut in 1920 was 1,748 cords, valued at \$20,976. This consisted mostly of poplar, with a small percentage of butternut. The bark is peeled and the wood cut into five-foot lengths and sold by the cord of 160 cubic feet.

Shingles.—Small portable shingle mills cut 850,000 chestnut shingles in 1920, valued at \$5,100, and used for the most part locally. Shingle wood is cut into short bolt lengths of 16 to 20 inches, blocks of 10 to 16 inches in diameter being preferred.

Lath.—Lath are usually cut in connection with lumbering operations, using slab wood and other parts not suitable for lum-

ber. Two hundred thousands, valued at \$1,200, were produced in the County in 1920.

Cordwood.—In the mountain sections, within easy hauling distances of the towns, where it is used for fuel, and the lime kilns, where it is used in burning lime, a considerable quantity of cordwood is cut each year. This consists, principally, of oak, although chestnut and other species were used to a considerable extent. The amount cut and sold in 1920 was 4,590 cords, valued at \$22,950. This was in addition to the amount of wood cut and used by woodland owners.

Bark.—A small tannery at Frederick, and larger tanneries at Westminster and Williamsport, to the east and west of the County, furnish a ready market for chestnut oak bark. The amount peeled and shipped in 1920, however, was relatively small, 200 cords, valued at \$3,600, and most of it was consumed locally. Where stands containing a large quantity of chestnut oak are cut for lumber, or railroad ties, it is common practice to cut the trees in the spring when the sap is moving, so that bark can be readily peeled.

HOME USE OF WOOD AND TIMBER.

Frederick County consists of 3,817 farms, for the most part in a highly developed condition. A large quantity of wood and timber is required on the farms for building material, fuel wood and fencing. This represents material cut from the forests and utilized for home needs, and is in addition to the amounts sold from the woodlands.

Building Material.—This is in addition to the sawed lumber which is included in the list above, and comprises hewn timbers, or those used in the round for various home buildings, such as barn frames, stables, and other structures on the farm. The annual amount so used is estimated to average 500,000 cubic feet, valued at \$36,000.

Fuel Wood.—Many farms use coal for fuel, but most use wood exclusively, or to a limited extent. This consists, in part, of dead and down wood, but is mostly green, growing timber. The estimated amount for 1920 was 15,500 cords, valued at \$38,750.

Fence Rails.—The high cost of labor has brought about the substitution of wire for rail fences, to a large extent. But there are many stock farms upon which the rail fence is preferred, and others where the abundance of chestnut, killed by the blight, has induced many farmers to salvage the material by working it up into fence rails. It is estimated that 600,000 rails were used in 1920, valued at \$3,600.

Fence Posts.—This includes the posts used for post-and-rail fences, and also those used for wire fences. Where locust is easily obtainable, it is preferred to all other woods. The scarcity of locust and the large amount of chestnut available for the purpose has resulted in chestnut being used to a larger extent than locust. In all, 165,000 posts were used in 1920, valued at \$19,800.

SUMMARY OF WOOD AND TIMBER CUT FOR 1920.

The data collected in 1920 and enumerated above, shows that the total value of forest products cut from the forests of the County in 1920, including that used on the farms, amounted to \$660,475. This comprises 3,017,601 cubic feet cut and sold, while the amount used on farms and not sold constitutes 2,155,000 cubic feet, making a total of 5,172,601 cubic feet cut from the forests of the County in a single year. It is estimated from the most reliable data obtainable, that the annual growth in forests of the County is but 3,600,000 cubic feet, showing that the annual cut from the forests each year is 44 per cent. more than the yearly growth. With the present depleted condition of the forests, the present timber cut cannot be maintained, and measures must be taken immediately to increase the growth, if the annual wood production is to be brought up to the amount consumed.

FOREST PRODUCTS CUT AND SOLD, 1920.

<i>Product.</i>	<i>Amount.</i>	<i>Value at Shipping Point.</i>
Lumber.....	5,996,000 bd. ft.	\$209,860
Railroad Ties.....	16,325 pieces	16,325
Trolley Ties.....	38,090 pieces	22,854
Poles	16,825 pieces	84,125
Staves	13,890,000 pieces	159,735
Pulpwood	1,748 cords	20,976
Shingles	850,000 pieces	5,100
Lath	200,000 pieces	1,200
Cordwood	4,590 cords	22,950
Bark	200 cords	3,600
		<hr/>
		\$546,725

FOREST PRODUCTS CUT FOR HOME USE.

<i>Product.</i>	<i>Amount.</i>	<i>Value.</i>
Building Materials.....	500,000 cu. ft.	\$36,000
Fuel Wood.....	15,500 cords	38,750
Fence Rails.....	240,000 rails	19,200
Fence Posts.....	165,000 posts	19,800
		<hr/>
		\$113,750

Total value of forest products for 1920, \$660,475.

WOOD-USING INDUSTRIES.

A study of the wood-using industries of the State, made in 1917, prior to the disturbance of industrial conditions, due to the war, brought out some interesting facts regarding the wood-using industries of Frederick County.

While there are not many industries, it is shown that no less than sixteen different kinds of wood are used for the various purposes to the extent of more than 10,000,000 feet annually, resulting in a valuable output. Pine, beech and douglas fir are the most important woods used, and although Frederick has 21 per cent. in forest, practically none of the wood manufactured in Fred-

erick City is locally produced. It is evident, however, that as outside sources of supply are removed by exhaustion of their timber resources, as is taking place rapidly, the wood-using industries must be more and more sustained by raw material derived from local sources.

Frederick City is well located for manufacturing of any kind, and brushes, cooperage and planing mill products, and to some extent, baskets, which are the chief output, enjoy an active demand, and are of much importance to City, County and State.

AMOUNT OF WOOD USED, SOURCE AND COST 1916.

Kind of Wood.	Maryland.	United States.	Foreign.	Total Bd. Ft.	Per Cent. of Whole.	Av. Cost Per M. at Factory.	Total Cost F. O. B. Factory.
1. S. yellow pines		3,060,000		3,060,000	30	\$26.40	\$80,800
2. Beech		2,500,000		2,500,000	25	21.50	53,750
3. Douglas fir.....		2,000,000		2,000,000	20	31.50	63,000
4. Cypress		550,000		550,000	5.4	39.82	21,900
5. Sugar maple.....		500,000		500,000	5	23.50	11,750
6. Birch species		500,000		500,000	5	21.00	10,500
7. E. white pine.....		350,000		350,000	3.5	37.00	12,950
8. Chestnut		175,000		175,000	2	43.33	7,563
9. Oak species.....		110,000		110,000	1	44.09	4,850
10. Redwood		100,000		100,000	1	45.50	4,550
11. Tulip poplar.....	10,000	50,000		60,000	.6	44.67	2,680
12. W. white pine.....		60,000		60,000	.6	65.00	3,900
13. Eastern spruce		40,000		40,000	.4	27.50	1,100
14. Hemlock		40,000		40,000	.4	25.00	1,000
15. Basswood	10,000			10,000	.1	17.00	170
16. Mahogany			3,000	3,000		200.00	600
Totals.....	20,000	10,035,000	3,000	10,058,000	100	\$27.94	\$281,063

FOREST PROTECTION.

The woodlands of Frederick County are today producing less than half of a full timber crop, because of destructive agencies, which for more than 150 years have been operating in the forests. Chief among them are forest fires, destructive cutting methods, excessive grazing, and the ravages of insects and fungus diseases. At least three-fourths of this damage is preventable, and it is high time that all forest owners and users of the forest (which includes

every resident of the County) should co-operate to protect the forest and to bring it up to its highest productive capacity.

Forest Fires.—The forest fire damage in Frederick County is very much intensified by reason of the fact that the great bulk of the woods is in a continuous body along the mountains. These areas get very dry during the spring and fall, and forest fires, once started, gain rapid headway and are difficult to control.

The fire record for 1920, a year somewhat below normal, shows that 12 fires occurred during the year, burning over 598 acres, causing a direct damage of \$1,906. It cost the State and County together \$198 to extinguish the twelve fires, or an average of \$16 per fire. Of the twelve fires, five were caused by brush burning, two from wilful setting of fire, one from hunters, one from railroads. For the remaining three the causes were unknown.

The State maintains a fire protective organization in the County, consisting of a number of forest wardens, forest patrolmen, and two lookout towers for quickly detecting forest fires. The locations, addresses and telephone numbers of the forest wardens, patrolmen and lookout watchmen, as corrected to December 1, 1921, are given below.

Name.	Location.	Address.	Telephone.
J. W. Andrews.....	Eyler Valley.....	Emmitsburg	Call Emmitsburg 48 F 3
Karl M. Brown.....	Foxville	Lantz	Smithsburg 37 F 4
Earle Brown.....	Lantz	Lantz	Smithsburg 37 F 4
S. P. Bussard.....	1 mile S. W. Lantz..	Lantz	Smithsburg 37 F 22
James Delauter.....	Sands Flat.....	Smithsburg R. F. D. None	
A. J. Easterday	Wellsville	Myersville R 2	Myersville 22 F 3
E. B. Feaga	Indian Springs	Yellow Springs	Call Frederick 855 F 4
M. H. Freshman	Blue Mt. Siding	Thurmont	Thurmont 44 F 13
A. L. Haupt	Foxville	Lantz	Smithsburg 11 F 14
Chas. E. Klein	Braddock	Frederick	Frederick 854 F 2
L. T. Lewis	Middlepoint	Smithsburg R. F. D. Call	Myersville 26 F 12
Sylvester Moss	Mountaindale	Frederick R. D. 6.....	Frederick 830 F 31
G. W. Ramsburg.....	Lewistown	Thurmont Box 177..	None
G. A. Willard.....	Catoctin Furnace Cr.	Smithsburg	None

The forest wardens are regularly commissioned officers, with full authority to employ assistance, and use any means that may be necessary for controlling forest fires. Each landowner is required to do all he can to control fires on his own lands, but where he is unable to do so, the local forest warden should be promptly notified, so that measures may be taken without delay for preventing the spread of the fire to other property, or causing unnecessary damage on the property where it originated. Everyone should co-operate with the forest wardens in suppressing forest

fires, which is the chief enemy of the forest. In Frederick County three-fourths of the fires are the result of carelessness, or deliberate intent to burn. It is only by enlisting the support of all woodland owners in fire protection that this public menace may be abated.

Destructive Methods of Cutting.—It has been the practice for generations on the part of most woodland owners, to cut over their woodlands at frequent intervals, taking out the best and most saleable products, with little or no thought to the succeeding growth and future productiveness of the woodlands. This repeated cutting has resulted in forests of inferior value, made up of a large proportion of inferior species, and the defective and crippled trees have been left to take possession of the ground, to the exclusion of more valuable growth. This process is still going on with its resultant injury to the forest. A radical change in the method of handling the forest is necessary before increased production and improvement of quality are possible. The native species of trees in the County, and the conditions of growth, are excellent for timber production, if these natural conditions are only given a fair chance. To restore production it will be necessary to work for the reproduction in the forest of the more valuable species, the elimination of the crooked and defective trees and the species of less value. This can be accomplished by improvement cuttings, which while producing considerable revenue in low-grade material, will greatly improve the character and composition of the forests. The damage occasioned by surface fires, resulting in a large percentage of fire scarred trees, which give no promise of valuable timber production, is accountable, in a large measure, for the low timber production. The removal of these fire damaged trees is essential to any improved system of management.

Timber owners, who sell stumpage to timber buyers, often express their inability to control the operation in a way that will insure a good regrowth. It must be admitted that the owner of the land has it within his power to control any and all operations on his own land. It is simply a question of determining what the timber operator may do and what he may not do on the land of the owner. The State Forester has worked out a plan which limits the cutting to certain specified trees, or to trees up to a certain

size, with proper provision for protecting the young growth from unnecessary damage. This plan has been in practice for several years, with very satisfactory results, and is recommended to all those who contemplate the selling of timber. The plan is fully described in leaflet 18 of the State Board of Forestry.

Grazing.—It is common practice among the farmers of the County to include the woodland in the permanent pasture. This is particularly true in those sections of the County where the woodlands are in small areas, such as the eastern and southwestern portions. Pastured woodlands are never in the best condition for timber growth, because the soil becomes hard and dry from the constant trampling of the cattle, the seed bed is destroyed, and the growth of the trees seriously checked, if not altogether stopped. Under these unfavorable conditions, the woodland becomes open and very much understocked, due to the destruction of young growth and unfavorable conditions for the germination of seed. This, if continued, will ultimately result in reducing timber production to a minimum. The small amount of pasture is poor pay for the loss in the production of timber. Since the woodland is usually on rocky ridges, or steep slopes with thin soil not suited for grass land, or farm land, pasturing, if permitted at all, should be so regulated as not to disturb the forest cover, which results in irreparable damage.

Insects and Fungus Diseases.—There have been no serious insect attacks affecting the forest trees in recent years. Some years ago, and at intervals since that time, the black locust has suffered somewhat from the attacks of an insect, one of the leaf miners, which works between the epidermal layers of the leaf, eating away the leaf tissues and causing the leaf to turn a rusty brown. This occurs usually in late summer, after the trees have made their principal growth of the season, so that the danger is not serious, although the discoloration and dropping of the leaves is rather alarming at the time.

There has been more or less defoliation of trees by caterpillars, but usually the danger from this source in the forest is very slight, the chief damage being done to shade trees, and even there the natural enemies of such insects usually hold them in check.

The most serious tree disease that has ever occurred in the

PLATE II. FIG. 1.—FIRE IS THE WORST ENEMY OF THE FOREST
An example of a thrifty stand of young timber destroyed

PLATE II. FIG. 2.—THE CHESTNUT IS NEARLY GONE
Blight-killed chestnut in the Catoctins.

County, or in the State, is the chestnut blight (*Endothia parasitica*), which attacks the inner bark and cambium wood of the tree, first appearing as a small canker which spreads horizontally, as well as vertically, until the portion of the tree attacked, whether it be a branch, or the trunk itself, is completely girdled and the circulation cut off. This causes the death of the tree beyond the girdle, and when a large number of these cankers appear on the same tree, it is certain death, although the complete death of the tree may not result for two or three years. While the disease is fully known and its method of attack fully ascertained, there is no known method of control. There appears to be no hope of saving the chestnut, the disease already having gone to the extent of killing, or seriously affecting, practically all the chestnut trees in the County. The loss is tremendous because of the fact that the chestnut in Frederick County constituted a larger porportion of the forest than any other single species, and, in addition, was probably the most useful tree of all, because of its adaptability to many purposes, its durability, and its special use for telephone and telegraph poles, for which there is no local substitute. The effect of the chestnut blight has hastened the cutting of the chestnut, in order to utilize it before it was completely destroyed, and consequently, chestnut products reached a comparatively low price in relation to other species. Now, with the chestnut nearly all gone, its value is much more appreciated, and higher prices will no doubt obtain in a very few years. The blight does not injure the wood for any uses, provided it is utilized before natural decay sets in.

FOREST MANAGEMENT.

The 91,000 acres of woodland in the County, constituting 21 per cent. of the total land area, is sufficient to supply all the timber needs, if it were fully productive. Natural conditions of growth are exceptionally good, and the species represented in the forest are among the most valuable species growing in the State. There is a good demand for timber, with excellent transportation facilities and good markets.

A study of the conditions in the County has shown that the products cut and sold from the forest lands amount to 3,017,600 cubic feet annually, valued at \$546,725, as based on 1920 production.

In addition to this, is the large amount of wood and timber cut and used on the farms and not offered for sale. This increases the cubic feet used by 2,695,000, valued at \$113,750, making a total of 5,712,600 cubic feet of wood and timber cut in the County, valued at \$677,275 for a single year. The forest products of the County are second only in value to those derived from agriculture.

When we turn, however, to the annual growth production of the forests, we find that, due to forest fires in the past, and to those annually recurring, together with destructive methods of cutting, excessive grazing and the ravages of the chestnut blight, the forest lands are producing on an average less than 40 cubic feet of wood per acre, per annum, whereas they should be producing at least 90 cubic feet of wood per acre per annum. This high production can be secured and maintained on lands protected from fire, and properly managed. This, in short, is what forestry is seeking to accomplish.

The destructive agencies enumerated above have been operating so long, and with such deadly effect, that it will take many years in the case of the badly abused woodland, to bring it back to full production. Certain steps will be required, and should be instituted without delay, in orderly fashion, to restore full productiveness. In the first place, the fire menace must be reduced to a minimum by carrying out the recommendation made in regard to forest fire protection. Where open and unproductive places occur in the woodland they must be restocked so that every square foot of land will be productive. Where the woodlands, due to past mismanagement, and the damage from fires, consist of a large proportion of fire scarred, or crooked and defective trees, or those of poor species, these must be eliminated, and replaced by good specimens of more valuable species. This process will ordinarily be a gradual one, rather than accomplished in one operation. No two woodlands are exactly alike, and the treatment of each must be regulated to the conditions and purposes of management. It is better to have an examination made of the woodland by an expert, and a plan of management worked out on the ground calculated to give the best results.*

The haphazard methods of cutting practiced in the past must give way to a cutting system that will keep the forests continuously

*The State Forester, 815 Calvert Building, Baltimore, will, upon request, examine the woodlands of anyone and give advice as to the best system of handling them.

productive. Where timber is sold there should be a specific contract between the seller and the buyer as to just what trees may be cut and what trees are to be reserved by the owner. Timber is increasing so rapidly in value and the young immature growth, which must be preserved and protected for the next timber crop, is of high prospective value, a fact which should be fully recognized in making the timber contract. A plan that has been in successful operation for several years enables the forest owner to sell his timber for a good price, and at the same time protect the future productiveness of the woodland. It is outlined in leaflet 18, which may be had upon application.

FOREST PLANTING.

The forest survey of the County, made some years ago, showed that there were 40,583 acres of waste land, comprising 9 per cent. of the total land area. This waste land comprises areas upon which there is no crop of value now growing. With the exception of a small percentage suitable for permanent pasture, most all of it is better adapted for timber growing than for any other purpose. Under present conditions, it is not coming back in timber growth, except very slowly, and must be planted in forest trees to secure its highest usefulness, and bring it back to immediate productiveness. Some of this land represents rocky ledges, gullied hillsides, or swampy portions of the farms which would support a good tree growth, if planted in suitable species. Of the great variety of native trees indigenous to the County, species may be found suitable for any condition that exists, and profitable timber crops can be produced on lands that are not productive for other purposes. Some of the farms in the valleys, upon which there is no timber, would be made more valuable by planting a small woodlot, which often can be located on the windward side of the farm house and barns, so as to give, in addition to a supply of wood for the farm, the added protection of a windbreak—a valuable asset to any farm. Often the plantation may include species suitable for fence posts and other farm timbers, in addition to the use of the woodlot for fuel wood.

Forest planting need not be confined to the waste lands on the farm, but frequently the existing woodland is very much understocked. There are open, unproductive areas on which the planting of trees, or of tree seeds, is needed in order to insure full production.

For this purpose, it is necessary to use such species of trees as will grow under the shade of other trees, like the white pine, Norway spruce, oaks and sugar maple.

TREES FOR FOREST PLANTING.

Black locust (*Robinia pseudacacia*), also called yellow locust, or simply "locust," is a native tree of rapid growth, producing a heavy, hard, durable wood, highly prized for fence posts, and for this purpose exceeds in value any other species. It casts so little shade that grass and weeds will grow under the trees and compete for moisture and soil fertility. For this reason, and also because of possible attack from the locust borer, it is advised to plant with some other species of somewhat slower growth, that will endure shade, and at the same time more completely shade the ground, such as white pine, or red oak. The trees should be spaced 6x6 feet in alternate rows, with a row of white pine or red oak, whichever is used in the mixture, on the outside of the plantation. On good soils the locust will grow 2-4 feet in height each year. Fence posts will be produced in about 15-20 years, leaving the other species to produce a timber crop some years later. One-year-old locust seedlings should generally be used for establishing the plantation. On open land no previous preparation of the soil is necessary for the planting.

White pine (*Pinus strobus*) is a native tree growing naturally in the mountain section, but it is adapted for planting in most any section of the County. It is a rapid growing tree, averaging from one to two feet in height each year, and produces a soft, even-grained wood, useful for many purposes. It will produce saw timber in 30 or 40 years on good soil. It should be planted, ordinarily, in pure stands 6x6 feet apart, and small trees from 4-6 inches in height may be used.

Red oak (*Quercus rubra*) is one of the most valuable hardwoods for forest planting. It is a native tree, the most rapid growing of the oaks, producing a heavy, hard, strong wood, very useful on the farm for general construction purposes and for fuel wood. The red oak is fairly tolerant of shade, and therefore useful for underplanting in woodlands in need of reinforcement. The best method of

propagation is by planting the seeds, two in each hole, where the trees are needed, afterward thinning to one tree. In establishing a plantation, a spacing of 5x5 feet is recommended when seed is used, and 6x6 feet when seedlings are planted. One-year-old seedlings are sufficiently large for forest planting. Red oak should not be planted on thin, dry soil.

White ash (*Fraxinus americana*) is a tree of rapid growth on rich, moist soil, producing a wood of high value. It is especially adapted for planting on bottom lands, subject to overflow, which would render them unfit for agricultural crops, and may be planted in a pure stand, using one-year seedlings, spacing them 6x6 feet. The wood is very heavy, elastic, tough, and straight grained. It is generally used in the manufacture of agricultural implements, tool handles, sporting goods and vehicles, and is saleable in small size bolts, which can be grown on a comparatively short rotation.

SHADE TREES.

While the care and protection of shade trees is not generally associated with forestry, in Maryland the public shade tree work is handled by the State Board of Forestry, under what is generally known as "The Roadside Tree Law," Chapter 824, Acts of 1914. The Board of Forestry conducts a shade tree department which gives advice and prepares plans for planting and care of trees on the home grounds, along the roadsides, and in other public places.

The planting and care of shade and ornamental trees on the home grounds is of the highest importance in increasing comfort and attractiveness. The planting of windbreaks, already alluded to, is one of the most important measures for protecting the home and other farm buildings, and in sheltering the live stock from the excessive sweep of the winter winds. For this purpose there should be two or three rows of evergreen trees planted on the windward side of the buildings. The best species for the purpose is Norway spruce or white pine. If the former is used, they should be planted in rows 10 feet apart, and the trees planted 8 feet apart in the rows. If white pine is used, the spacing should be 10 feet apart in the rows, so as to allow more normal development of the trees.

In the planting of the home grounds, there is a wide selection

of trees to draw upon, sufficient to satisfy every taste and every requirement.

There are two things to remember in home planting:

First, do not plant trees too close to the house. They must be given sufficient room to grow without crowding, and it is always best to have plenty of air space around the building.

Second, in selecting the trees for planting, look for permanent results. The most rapid growing trees are often the least desirable when fully grown, and likely to deteriorate rapidly after maturity, when they are the most needed. To this class belong the Carolina poplar, silver poplar, willow and ailanthus, and to a somewhat lesser extent, silver maple and red maple. Among the best trees to plant are the American elm, sugar maple, sycamore maple, red oak, white pine, Norway spruce, oriental plane, gingko and white ash.

The State Board of Forestry, 815 Calvert Building, Baltimore, maintains a State Forest Nursery from which trees suitable for forest and roadside planting are furnished at cost. A State nursery list is obtainable upon request.

FREDERICK COUNTY REPORT

SUMMARY.

The forest area of Frederick County is 91,117 acres, which is 21 per cent. of the total land area—an amount sufficient to supply all of the wood and timber needs if it were in a highly productive condition.

The forest lands are producing, on an average, a growth of less than 40 cubic feet of wood per acre per annum, whereas a full yield should be not less than 90 cubic feet of wood growth per acre per annum. The present low production of less than one-half of average maximum yields for the County, is due to damage from forest fires, destructive cutting methods, effects of grazing and the chestnut blight.

Forest products cut and sold in 1920 amounted to \$546,725, while the value of wood and timber cut for home use was \$113,750, making a total value of \$660,475. A total of 5,172,600 cubic feet of wood was required.

There are 77 different species of trees native to the County, of which the larger number are of commercial importance.

Protection of the forests from fire is the greatest immediate need. Much has been accomplished by the local forest wardens in reducing fire damage, but more care and closer co-operation of woodland owners and forest users is necessary to prevent fires. Three-fourths of the fires are caused by carelessness or deliberate intent to destroy.

The chestnut blight, in ten years, has killed nearly all of the chestnut trees, and forced on the market immense quantities of chestnut timber of small size, in the nature of salvage.

There are 40,583 acres of waste land in the County, upon which no crop of value is being produced. Practically all of it is capable

of growing timber, and a large part of it should be planted in forest trees to secure its highest productive use.

Improved methods of forest management, with adequate fire protection, will increase forest yields more than 100 per cent., and with increasing timber prices, the corresponding yield value increase may easily reach 300 per cent.

MAP
OF
FREDERICK COUNTY
SHOWING THE
FOREST AREAS
BY
COMMERCIAL TYPES

PREPARED BY
F. W. BESLEY

MARYLAND BOARD OF FORESTRY
WM. BULLOCK CLARK **F. W. BESLEY**
EXECUTIVE OFFICER STATE FORESTER

1913

- TYPES**
- Merchantable Hardwoods
3rd class
 - Cutted Hardwoods
1st, 2nd and 3rd class
 - Hardwood saplings
 - Cutted Hardwoods and
Scrub Pine
 - Hardwood saplings and
Scrub Pine
 - Scrub Pine
2nd and 4th class

STANDARD OF SAW TIMBER PER ACRE IN MILES PER:

M ³	5,000-6,000
C ¹	2,000-3,000
C ²	1,000-2,000
C ³	500-1,000
H ¹	500-1,000
C ⁴	500-1,000
S ¹	1,000-14,000
S ²	500-1,000

R. B. Marshall, Chief Geographer.
Frank Sutton, Geographer in Charge.
Topography by Robert Muldrow, A. M. Walker,
J. H. Wheat, W. Carroll Hall, L. C. Hatcher,
J. S. B. Dinsinger, W. O. Telford, S. B. Flood,
and R. L. Harrison.

Potomac River by Coast and Geodetic Survey.
Control by C. & G. S. George T. Hawkins,
E. L. McFar, C. B. Kendall, F. J. McLaughlin,
W. R. Whitson, J. M. Harris, Sledge Tatum,
and C. H. Semper.
Surveyed in 1908-1910.

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