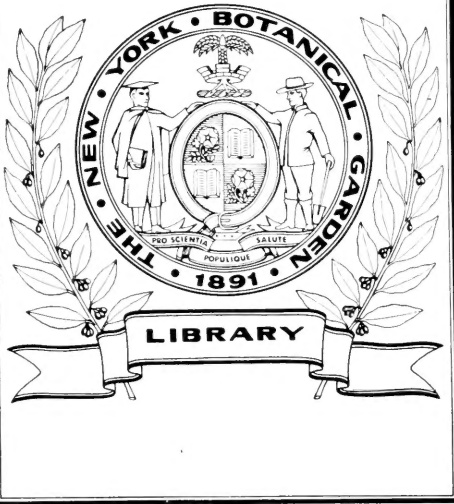
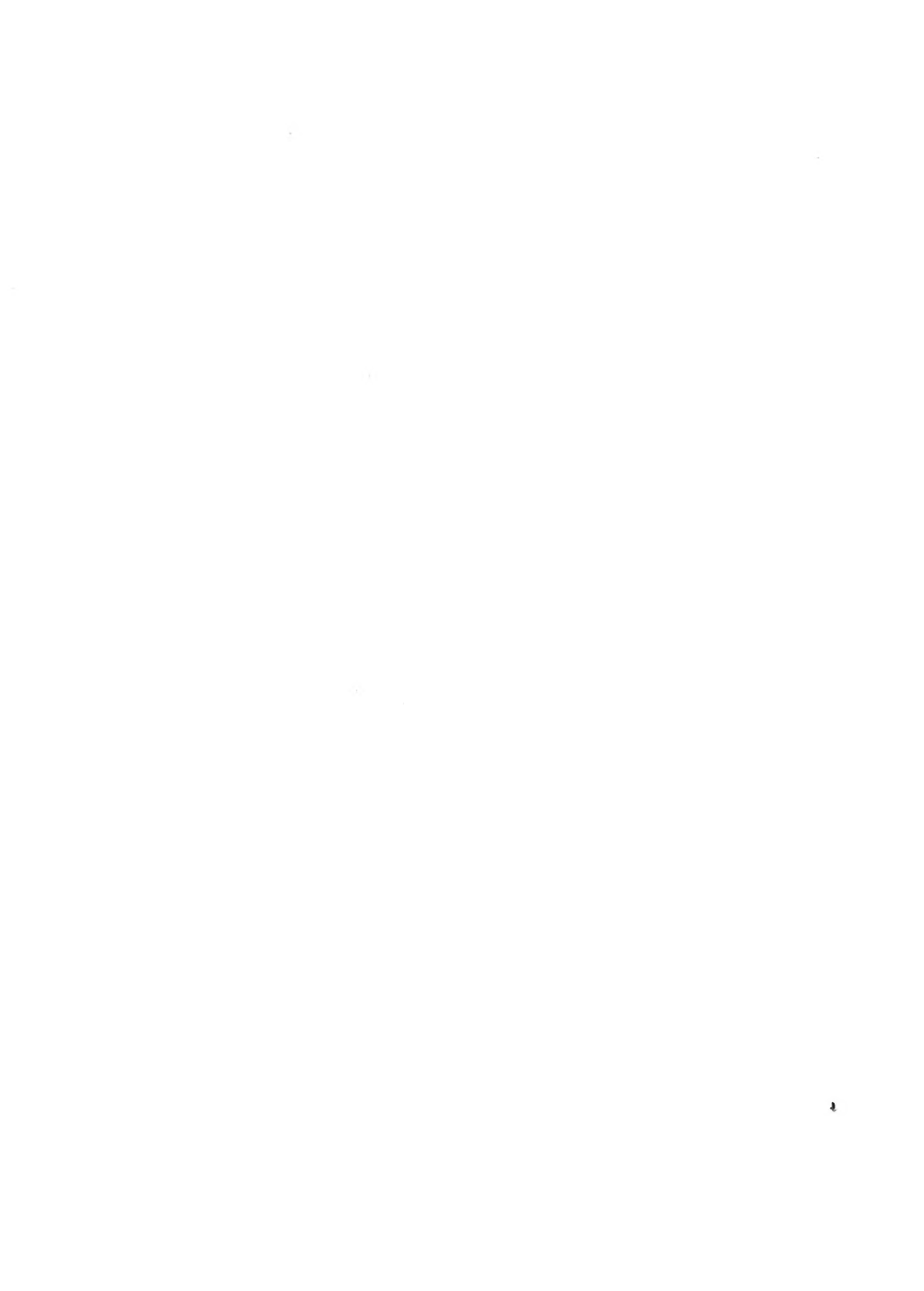


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AMERICAN FORESTRY

THE MAGAZINE OF

THE AMERICAN FORESTRY ASSOCIATION

WASHINGTON, D. C.

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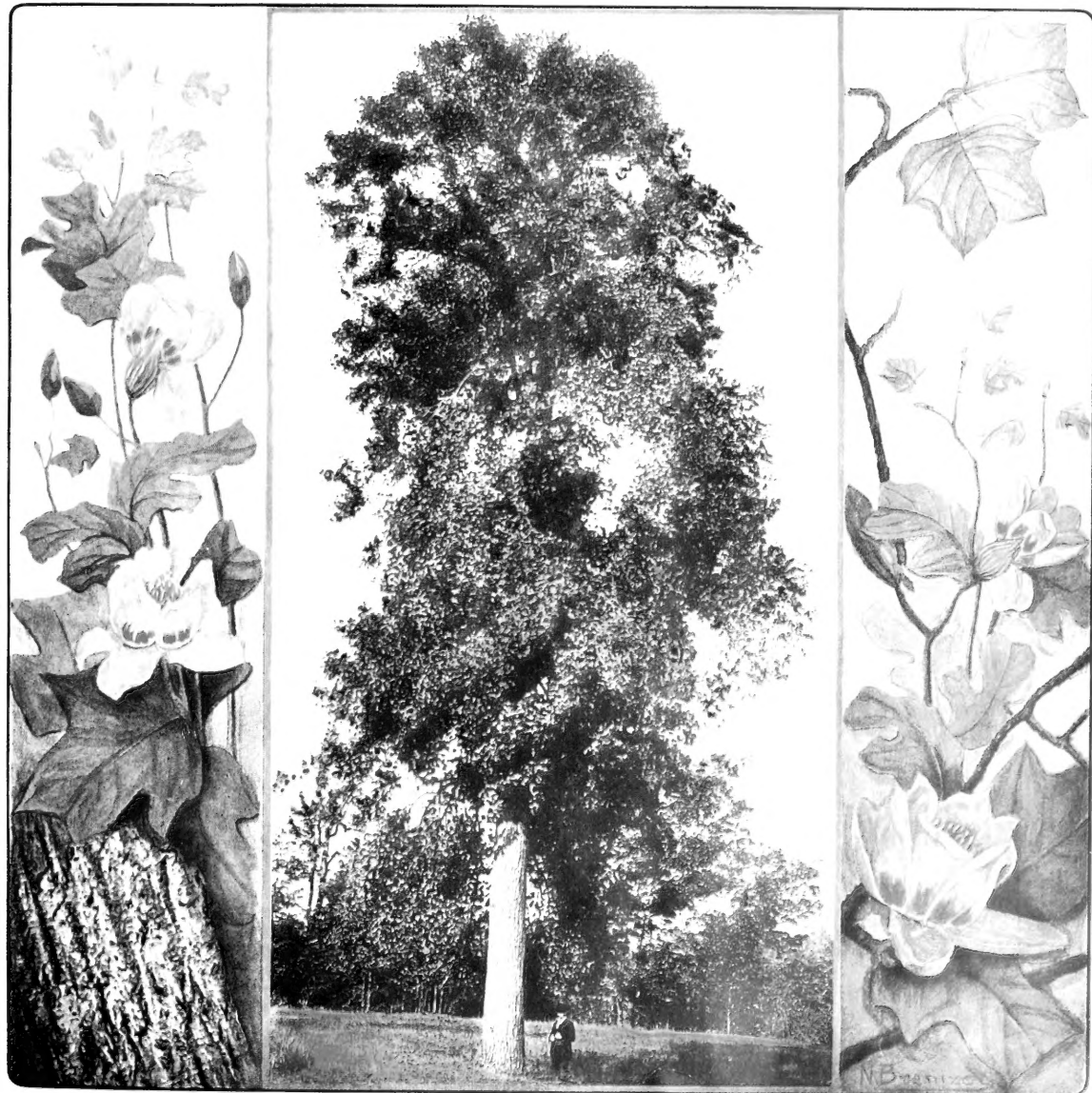
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American Forestry

Vol. 21

AUGUST, 1915

No. 260



THE TULIP OR YELLOW POPLAR

The American Forestry Association

Washington, D. C.

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Declaration of Principles and Policy of *The American Forestry Association*

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

Federal Administration and Management of national forests; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners; non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid to lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

AMERICAN FORESTRY

The Magazine of the American Forestry Association

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American Forestry

VOL. XXI

AUGUST, 1915

No. 8

The Tulip or Yellow Poplar Tree

A General Description for Identification

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THE tulip tree, also erroneously called tulip poplar and yellow poplar, is a large, handsome tree, native of the Eastern United States from northern Florida to Massachusetts and the Great Lakes westward beyond the Mississippi.

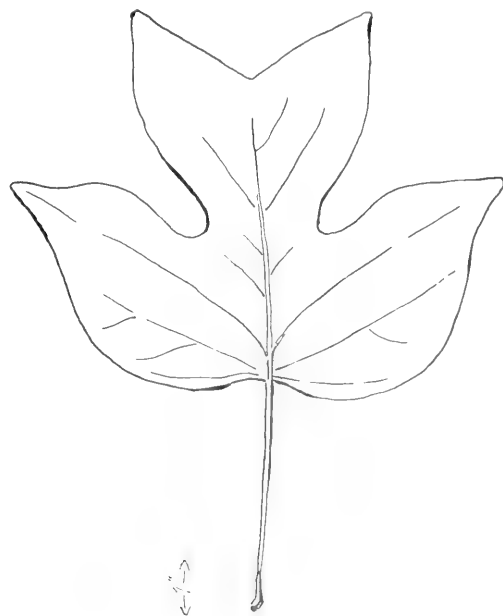
It grows to a height of 80 feet in the open and in a forest to a height of 120 feet, with a tall, straight, unbranched trunk. Its branches are comparatively few and large. The lower ones frequently branch at right angles from the trunk and then turn abruptly upward. Its bark is dark, mottled with gray spots, smooth with shallow lines.

Its leaves are markedly different from all others, and once recognized will never be confused with any other.

scales appearing like an empty pod. By early winter the seeds are all gone, but the empty scales remain erect on the tree all winter, giving an easy means of winter identification.

The tulip is one of our handsomest shade trees, being symmetrical when young and maintaining its symmetry

| Various Names | |
|------------------------|-----------------|
| Tulip tree. | Whitewood. |
| Yellow Poplar. | Tulip Poplar. |
| White Poplar. | Hickory Poplar. |
| Blue Poplar. | Popple. |
| Cucumber tree. | Canoe-wood. |
| Old Wife's Shirt tree. | Saddle-wood. |



TULIP OR YELLOW POPLAR LEAF

The leaf is quite different from all others and when once recognized is never confused with any other. It is angular, has four points, a sharp lobe on each side, and where the apex should be there is a sharp indentation.

It appears as though half of the leaf were cut away by cutting the apex off, leaving the remaining portion notched. At each side also is a sharp lobe. This makes an angular leaf having four points and where the apex should be there is an indentation. The leaves are pale green or yellowish green, nearly alike on both sides and when fully developed they have a tremulous motion. In early autumn they turn bright yellow.

The name of the tree is suggested by its conspicuous flowers that come soon after the leaves. They are tulip shaped, greenish yellow, with darker yellow and deep orange on the tip of the petals. As they are borne on stout stems they stand erect above the foliage and are conspicuous against the pale green background. When in full bloom these trees are showy and attractive. The flowers are complete and perfect. The fruit is a cone containing thin narrow scales attached to a common axis. Each scale has a seed attached to a thin membranous wing. They begin to ripen in October and one by one as they ripen they blow out, leaving the outside or lower

well. A mature tree is imposing from its size and apparent strength of parts. The foliage is of pleasing color and form. It thrives best on rich, deep soils. Although successful for street planting as a young tree on deep soil in suburban conditions, it does not succeed so well on narrow streets, or where surrounded by much asphalt and concrete. Under these conditions it is apt to drop many leaves all through the season.

Though comparatively free from serious insect pests, it is subject to the tulip tree spot gall. These are brown spots covering the leaves in midsummer, causing the leaves to have an unhealthy appearance.

The tulip is the sole survivor of a group of plants plentiful in past ages. It is, however, closely related to



BARK OF THE TULIP OR YELLOW POPLAR

the Magnolias which it resembles in many of its characteristics. It has the same fleshy roots that make it hard to transplant. These roots are easily bruised and dry quickly when out of the ground. Therefore, they require special care in handling. They can only be suc-

cessfully transplanted in spring, and earliness is an important factor. Success is much more likely in sizes under 6 feet. Because of their rapidity of growth, little is gained by attempting larger sizes. If in transplanting the top should die and the root should put out a vigorous shoot, it is usually better to make a new top from that shoot than to plant a new tree.

In transplanting extra pains should be taken to perform each operation carefully. In digging the tree all the roots should be secured without bruising. As the roots are large and fleshy, this takes extra care. Then too extra care is needed to keep the roots from drying out. They should be kept continually covered with wet burlap and should be packed in wet moss or chaff when shipped. In taking to the planting place the roots should be kept thoroughly protected. The hole should be made considerably larger than the spread of the roots and 2 feet deep. This hole should then be filled with good top soil thoroughly mixed with well rotted manure and ground bone. If the hole has a capacity of 2 or 3 cubic yards the tree will be given an excellent start. If planted on a street the hole should under no circumstances be smaller than this. When the hole is prepared, the tree should be set an inch or two deeper than it stood in the nursery. The roots should be spread out in their natural position and be separated with layers of soil. After being well covered they should be thoroughly tramped and a little loose soil spread over the surface.

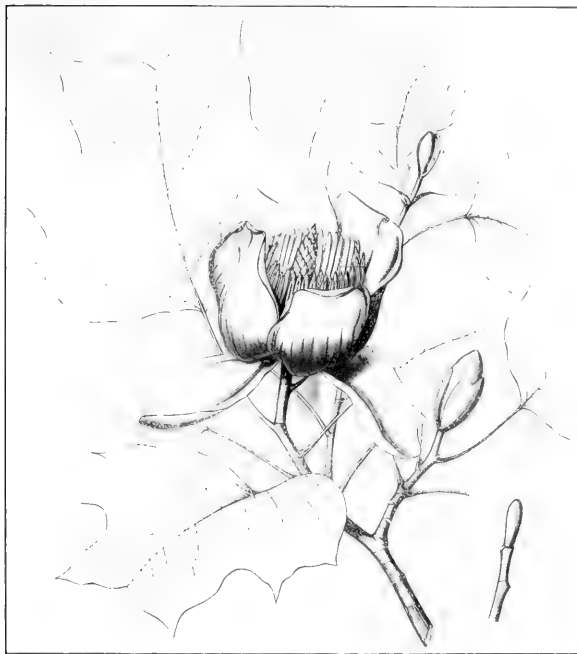
The wood is soft, fine grained, with light yellow heartwood and white sapwood. It is light in weight, easily worked, readily bent and does not split easily. It is called poplar and tulip poplar in the East and whitewood in the West, though whitewood is a name also given to basswood. Other names are Lynn, or saddle tree, hickory-poplar, saddle-leaf, canoe-wood.

It is used for furniture, cabinet making, interior finishing, boat building, wooden ware and small articles of household use. Where a wood is wanted that will not impart taste or odor to food it is second choice, basswood being first.

Commercial Uses of Tulip or Yellow Poplar

OUR lumbermen, as well as many others interested in the tulip tree, have not been content to call our tree by its correct name, but quite generally have bestowed upon it that of yellow poplar. No doubt they have given it this name because its individual leaves, like those of the true poplars, flutter in a gentle breeze—its leaf stem, being triangular, causes it to vibrate in the wind, as does the flat one of the poplars—and because the color of the heartwood, in most cases, is somewhat yellow, hence the prefix "yellow" was attached, making it yellow poplar, to distinguish it from the wood of the genuine poplars which is white.

Then, again, because its bark, when the tree is small and thrifty, closely resembles that of a young and vigorous hickory and the wood in young trees is harder than in mature ones, it is called hickory poplar by some. Where the heartwood is white, as is the case in some localities—arising, probably, from soil or climatic conditions—it has been called whitewood; and, further, for the reason that the Indians made their long and large canoes from the straight, but slightly tapering stem, which was soft, easily worked, and light, others have given it the name of canoe-wood. A few other names have been given it, but among them all only tulip tree is appropriate, and that is eminently so because of the



OUTLINE OF LEAF, BUD AND FLOWER OF TULIP OR YELLOW POPLAR TREE

The flowers are tulip-shaped, greenish-yellow, with darker yellow and deep orange on the tip of the petals. They grow on stout stems that stand erect above the foliage and are complete and perfect.

close resemblance of its flowers in form to that of the tulip of our flower gardens; and, besides that, tulip tree is the scientific or botanical name also.

But the lumbermen of the country have fixed upon yellow poplar and there is no more prospect of its name being changed by them than there is in their calling liquidambar by its correct name instead of designating it red gum, when it is no more a gum than is the tulip tree a poplar. In this portion of the article on tulip it will be referred to as the yellow poplar—the lumberman's name for it.

Aside from the great sugar pine, or redwood, of the Pacific slope, there is no tree from which the lumberman can secure such broad boards and planks of clear stuff that have so great an economic value for so many purposes, and which is so close to the wood of the white pine in character and general utility, as he can get out of the mature yellow poplar, and for many purposes it is fully equal to the pine. It is true it is not so soft or so strong, or so easily worked, nor is it as durable when exposed to the weather, but it shrinks little when seasoning, does not warp, "stays in its place," as the workman says, does not split when a nail is driven near the end, takes glue and stain well, and actually presents a better surface for paint than pine, for it has no pitch to stain or disfigure the paint, and, because of a slight roughness of the surface, paint does not scale or peel off. In fact it is one of the best paint-holding woods in commercial

use. It has no odor or offensive smell to injure any article that may be enclosed in a receptacle made from it.

But the big trees have their drawback. The wood in these is brittle and unless great care is taken in felling them—and such care does not always insure success—such trees will break when striking the ground. Of course the chopper will select, if possible, some less valuable tree to fall his big yellow poplar against, thus converting the poorer one into a sort of buffer, but it is generally done to the more or less damage of the innocent tree selected, and both may be more or less injured. Great care should be taken in felling large trees that they do not strike stumps or logs, for if they do they are almost certain to break, and, frequently, in more than one place.

The quantity of yellow poplar in the forests before the first settlers disturbed it, and the quantity still remaining, are not known. Experienced lumbermen who buy and sell stumpage figure that for uncultured woods a yellow poplar stand of 1,000 feet to the acre is a good average. Assuming that to have been the average before lumbermen and settlers disturbed it, and assuming further that the region of good poplar covered 300,000 square miles, the total stumpage was about 190 billion feet. Compared with that, the remaining amount is small. The region north of the Ohio River, and States north of

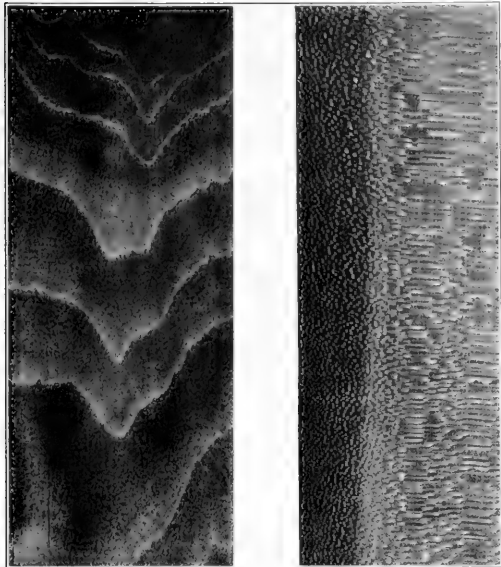


By courtesy the Manna, Arts Press

AREA OF TULIP OR YELLOW POPLAR

Showing the States in which it grows. Most of the trees cut and made into lumber during the past few years have been from West Virginia, Tennessee and Kentucky, these States furnishing more than half of the total cut.

West Virginia, have little. The bulk of it is in West Virginia, Kentucky and Tennessee. They furnished over one-half of the total cut in 1913, and Virginia alone nearly one-fourth. If it be assumed that the cut in a State is in proportion to the quantity growing there, a basis is found on which to estimate, approximately, the country's total stumpage. An estimate of Kentucky's yellow poplar stumpage in 1908 placed it at 1,819,950,000 feet. The cut



By courtesy The Manual Arts Press

YELLOW POPLAR BOARDS

Tangential or bastard cut section of yellow poplar, showing annual growth rings as wavy lines, referred to commercially as grain.

Radial or quarter sawed section of yellow poplar, showing pith rays (streaks and flecks running across board). Dark portion is heartwood and light portion sapwood.

in that State in 1907 was 205,671,000 feet, or about 11 per cent of the stand. In that year the whole country's cut of yellow poplar was 862,849,000 feet. If the same ratio of cut to stumpage applies, as in Kentucky, the yellow poplar stand in the United States at the close of 1907 was a little less than eight billion feet.

What white pine has been in the softwood lumber industry, yellow poplar has been among the hardwoods. While it was plentiful it was used to the exclusion of many others. During the time when both white pine and yellow poplar were plentiful they came into direct competition, and the pine crowded poplar out of some lines. But the former rose in price first, and poplar recovered its lost ground and held it until cheaper woods took its place as a common lumber.

In regions where yellow poplar grew it was early put to such uses as the first settlers could find for it. They made canoes of it almost exclusively, and the dugout played an important part in frontier development. Travelers utilized it upon long and short journeys. It was the pioneer's ferryboat. As a means of extending settlements and facilitating communication, it was a close second to the pack-horse. It went out of use gradually as roads were

Properties of Wood

Light, soft, weak, brittle, very close, straight-grained, compact, easily worked, medullary rays prominent, color light yellow or brown, thin sapwood, nearly

and for mangers and feeding troughs. The same wood served for trays, dishes and bowls and was fitted for that use, because the wood is odorless, tasteless and will not stain or spoil articles of food brought in contact with it.

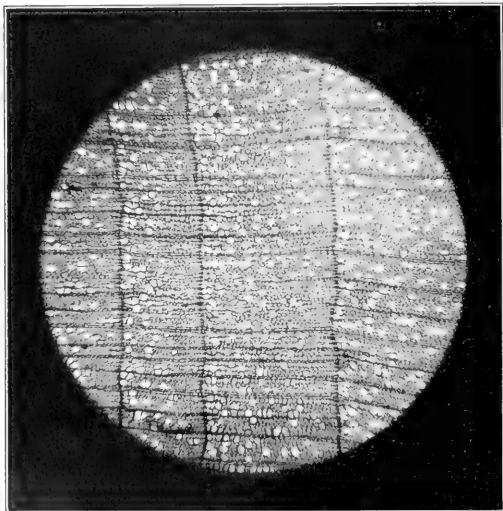
Commercial Range

| | |
|------------|-----------------|
| Alabama, | Mississippi. |
| Arkansas, | Missouri. |
| Delaware, | New Jersey. |
| Florida, | North Carolina. |
| Georgia, | Ohio. |
| Indiana, | Pennsylvania. |
| Illinois, | South Carolina. |
| Kentucky, | Tennessee. |
| Louisiana, | Virginia. |
| Maryland, | West Virginia |

made and bridges built, but to this day the canoe is occasionally seen on the rivers where it has done service since white men settled the country, and where it was the Indian's water-craft long before.

Yellow poplar was peculiarly fitted for canoes. Its trunk was long, sound and shapely; the wood light and easily worked. It was strong enough to stand the hard knocks of rocky rivers; sufficiently durable to give from ten to thirty years' service, barring accidents. The cost in labor of making a canoe was from \$2 to \$5. A safe load was from 600 to 1,000 pounds, but records exist of canoes large enough to carry twenty men.

The early settlers used yellow poplar for troughs of various kinds and sizes. In that portion of its range where maple sugar was made, its wood was hewed into



By courtesy The Manual Arts Press

MAGNIFIED CROSS-SECTION OF YELLOW POPLAR

This shows the annual rings, the fine dark lines marking the limit of the annual growth. There is no change in structure by warping or shrinking in wood which has been properly dried.

troughs of 4 to 6 gallons capacity, to catch the sap that dripped from the maples. Trough makers preferred trees 12 to 18 inches in diameter for the purpose, but they made large troughs, sometimes of 15 barrels capacity, in which to store the maple sap after it was hauled to the camp to be boiled. Poplar served for other farm troughs, including those for watering stock, storing meat, grain, soap, and other domestic products,



YELLOW POPLAR AS A VENEER

Here is shown a particularly fine specimen of rotary cut yellow poplar veneer, one-eighth of an inch thick, 10 feet wide and 30 feet long. It is to be used as a ceiling panel for an electric street railway car.

Builders of log houses and barns used some yellow poplar, but it was not considered better than many other timbers for that purpose. Its straight trunk was attractive, but oak was usually most convenient and was oftener taken. Nor was poplar a favorite fence rail material, though sometimes used. It was too brittle, and in splitting was apt to break across the grain. Oak and chestnut were better. It was due to that fact that many noble poplars remained on the borders of farmlands until the days of sawmills. The wood was never extensively used as fuel. If in small pieces, it burns too quickly; if in large billets, there is little blaze after the surface becomes charred.

It has held its place for nearly three centuries as the favorite wood for tobacco hogsheads. Before the days of railroads and steamboats, and to some extent, after, tobacco trade and transportation were peculiar. The commodity was bulky, and its carriage from the plantation to the wharf or market was a serious problem. The necessities of the case developed the hogshead as the receptacle for storing and vehicle of transportation. It was rolled to market between two shafts, fixed by pivots like the wheel of a wheelbarrow. A horse harnessed between the shafts did the work. The warehouse in Maryland and Virginia was a "rolling house," known almost exclusively by that name in colonial statutes and trade literature.

Yellow poplar, as the tobacco hogshead wood, played an important part in the industrial development of several States. Heads and staves were poplar, but the hoops were usually oak or hickory. In early times the lumber was sawed and worked by hand, but small saw-mills gradually came in and supplied the trade. The custom of selling tobacco often necessitated knocking down and setting up the hogsheads a number of times, and they met hard usage. At the place of sale, the hoops were cut, and the staves lifted away to expose the tobacco to view. If not sold, the hogshead was set up again to await the next sale day. This was repeated until a sale was made. The same staves and headings were used each time, but new hoops were required.

Before high prices barred it, poplar was employed in rough construction. Shingles lasted well, and laths were extensively used. Forty or fifty years ago carpenters preferred it for rafters, joists, plates, and upper portions of houses because it was light. Many old houses, particularly in New York and Pennsylvania, were made that way. Oak, walnut, chestnut, locust or some other timber considered more durable in damp situations went into sleepers, sills, floors near the ground, and foundations. In those days carpenters often used larger and more numerous timbers than durability and safety required,

and they put the light wood above to lessen the weight on the lower parts.

MANUFACTURE OF YELLOW POPLAR

The drain upon yellow poplar began when sawmills sought, cut and sold it to meet the popular demand. No exact time can be mentioned as the commencement of that trade, but it followed white pine in regions where both grew because builders preferred pine.

Yellow poplar is surpassed in size by no eastern tree, and this has been one of its chief advantages in holding its ground in competition with cheaper lumber. It yields the longest, clearest planks of all American hardwoods. This is due to its habits of growth. It goes straight up

and became so great that he could not command the capital to carry on the business, wealthy companies took it up. They bought tracts or stumpage, built railroads and mills and worked on a large scale. Some made a specialty of yellow poplar; others took it out with other kinds. Perhaps more culling from other timber has been done to procure poplar than any other wood except black walnut.



Size of planks is not the only property which commends yellow poplar to many uses. It is soft and easily worked; it is light; its color is handsome; it polishes nicely, does not warp



A TYPICAL YELLOW POPLAR BOARD

This is 16 feet long and 30 inches wide and was made from timber cut in the low Appalachian Mountains. The picture was furnished by Mr. P. S. Underhill, of Wistar, Underhill & Nixon, of Philadelphia, and was taken in the firm's lumber yard at Basic City.

to the light over the tops of other trees with which it is associated, and early in life gets rid of all unnecessary branches. The wood laid on year by year is clear of knots, or nearly so. The tree is seriously damaged by no insect pests, and is remarkably free from windshake and frost cracks. Though sensitive to fire, its preference for damp cover has in a measure saved it from injury, because forest fires are slow there. The logs are sawed in wide, first-class stuff, which goes to choice markets. Boards 18 inches wide are not unusual with mills making a specialty of poplar, and twice that width and more are occasionally put on markets which demand them.

Sometimes a yellow poplar, by reason of growing in unfavorable soil, develops peculiarities of wood, and lumbermen call it white or hickory poplar. The wood is coarse-grained, tough, decays quickly, and the trunk is largely sapwood.

The first lumber operations which handled yellow poplar were on a small scale. Farmers cut convenient trees and hauled or rafted the logs to the mills, satisfied if they made a little more than cost of labor, and continuing until the convenient supply was exhausted. Then the small lumberman entered the woods. He went farther back from the streams and bought stumpage, and delivered the logs. After convenient supplies were worked out and distance to the timber

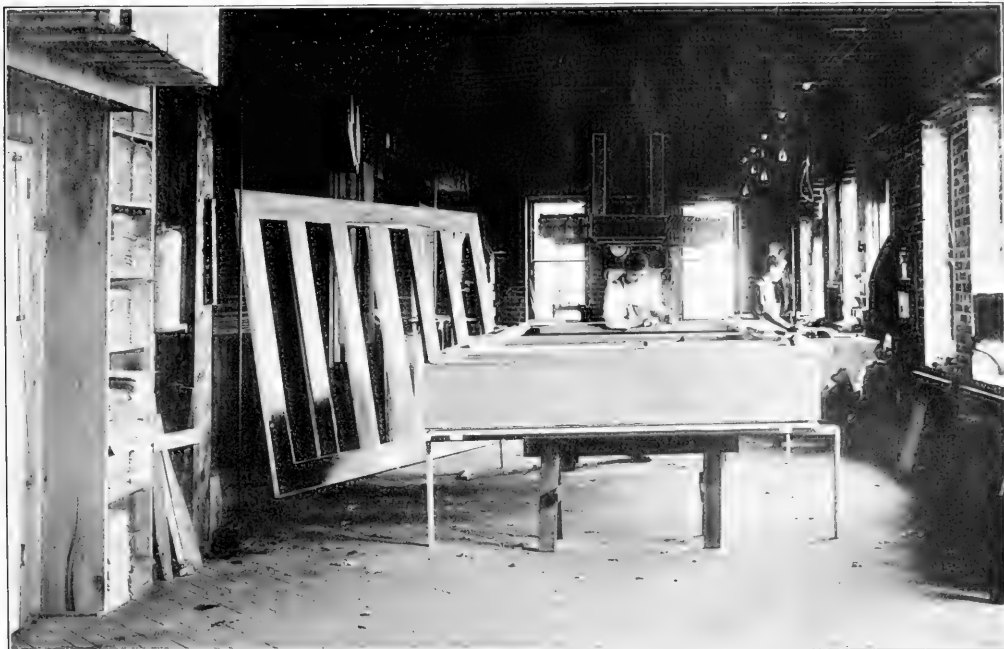
or shrink badly, and holds nails well. But equal or superior to its other good qualities is its ability to hold paint. In that respect it stands in the very first rank of woods. Poplar does not need repainting often, and it holds the finest and the cheapest pigments. It is an ideal wood for bodies of sleighs, carriages, and automobiles, and for finish for steamer staterooms, cabins and interior finish of sleeping cars, where high-class painting is required. It is dented less easily than sheet metal, and many prefer it for panels. That is one of its uses from which high price has not been able to drive it.

Where cheaper paints are employed, it serves equally well; in weatherboarding, for example. In 1902, the H. C. Frick Coke Co., at Mount Pleasant, Pa., tore down an old grist mill whose yellow poplar siding was sound and bright though repainted but once in fifty-three years. Poplar siding that had served more than sixty years at Evansville, Ind., was again used on a new house.

Increased cost of poplar has retired it from some of the ground once held in the box trade, particularly boxes for shipping lard, starch, butter and similar commodities, which boxes, a generation ago, were often made with bottom, side and top each a single piece. Poplar

Principal Uses

| | |
|--------------------------------|-------------------------------|
| Sash Doors and Blinds; | Store and Office Fixtures; |
| General Mill Work; | Furniture; |
| Tobacco Hogsheads; | Agricultural Implements; |
| Packing Boxes; | Billiard Tables; Hidden Work; |
| Candy Boxes; | Picture Frames; |
| Cigar Boxes; | Mantles; |
| Tobacco Boxes; Pyrography; | Matches and Toothpicks; |
| Toys and Novelties; | Desks, Pianos and Organs; |
| Kitchen Utensils; | Trunks, Posts and Columns; |
| Bungs and Faucets; | Veneer, Coffins and Caskets; |
| Fruit and Berry Crates; | Pressed Pulp Ware; |
| Wagon Beds and Vehicle Panels; | Papier Maché, Excelsior; |
| Car Finish; Boats; | Artificial Silk; |



YELLOW POPLAR USED IN AN ORGAN FACTORY

In this industry woods which are least liable to warp are desired and for this reason yellow poplar is highly prized for use in the manufacture of wind chests, bellows and other similar parts. The steadily advancing price is, however, compelling manufacturers to look for a satisfactory substitute.

was preferred for this trade, because it left no taint on the enclosed articles. Confectioners continue its use for candy boxes, and it is a substitute for expensive cedar in cigar boxes. It is in demand for pyrography, and toy and novelty makers draw largely upon it for sleds, wagons, blocks, houses, games, and similar things for children, and for such useful articles as broom handles and small kitchen and pantry utensils, and for fruit and berry crates and baskets.

Most wagon beds were formerly made of it, and many still are, in spite of increased cost. A difference of eight or ten dollars a thousand feet is paid for poplar for that purpose. It does not easily warp or split, and is light, with good painting qualities—just what is wanted for wagon bodies. In laboratory tests of woods for this use, yellow poplar is taken as the basis of comparison for cross-breaking, abrasion, shearing and end-compression. In this line, cottonwood is the poplar's closest competitor, not because it is as good, but because it is fairly good and is cheaper. For small panel work, poplar's closest competitors are buckeye, gum and basswood. Boat building formerly absorbed much poplar, but less now, because of increased cost.

It has long been a favorite material for furniture, though for highest grades it is not in the same class with mahogany, cherry, walnut and maple. Its paint-holding qualities, and the polish which may be given it, have led to its use in imitation of more costly woods,

and the width of clear stuff which poplar supplies gives it an advantage in furniture making. Billiard table makers use some of the best. The list of articles of furniture and finish into which it enters would include almost every piece in a well-furnished residence, school, office, or church, including chairs, mantels, benches, desks, tables, bedsteads, pianos, organs, bookshelves, trunks, molding, paneling, porchwork, turned posts, columns, shelves and many more. In some of these it is the outside exposed material which receives the polish or paint; in others it is the framework over which other woods are laid. It is an excellent backing for veneer, because it retains its shape and holds glue well, and is also an excellent veneer in the highest grade work, such as the interior of palace cars and steamers. Broad, thin panels are bent to the required form. They are sometimes made up of two or three layers glued together, and occasionally are 2 feet wide, or more. Bent poplar has been much used for finish in circular rooms. Manufacturers claim that the best grades for fine veneering and finish come from West Virginia. The sap is thinner and the grain finer than in poplar farther south.

The pattern maker bases his preference for poplar upon its easy-working properties, and its rigidity. Cheaper woods have not lessened its use for that purpose. The coffin and casket makers, too, are slow to adopt substitutes for it in their trade, and the excelsior maker finds it good material in his line.

Yellow poplar is exported to nearly all civilized countries. Practically the world's whole supply comes from the United States, and regular shipments go to Great Britain, France, Germany, Sweden, South America, South Africa, West Indies, Mexico, and Central America. Export logs are usually 8 to 16 feet long, but planks form the bulk of foreign shipments. If thin pieces go, they are cleated or bound in bundles to lessen risk of damage. Very thin and very wide pieces find foreign sale at highest prices.

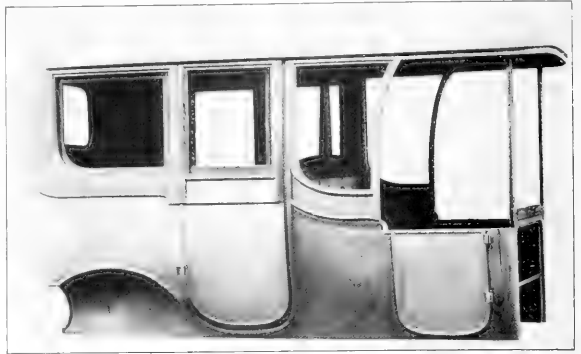
Yellow poplar is well adapted to preservative treatment, but it has not been extensively used in that way because cheaper woods take its place.

THE BY-PRODUCTS

Yellow poplar is not much employed in distillation, and its by-products along that line do not figure largely in commerce. The bark contains a bitter principle, known as *liriodendron*, which has been used as a medicine for malaria since the days of the Indian doctors. It is not regarded as the equal of quinine. In the mountain regions where yellow poplar grows, the people make medicine by pounding the bark, mixing it with dogwood bark, and soaking the mixture in water eight days. Some claim that whisky is a more efficacious solvent, and the mountaineers prefer it. The mixture

is given as a remedy for rheumatism as well as for intermittent fevers.

Yellow poplar enters into the manufacture of pulp and is used in paper-making, pressed pulp ware, papier maché, and artificial silk.



FOR AUTOMOBILE LIMOUSINES

This shows the metal covering of yellow poplar, which is much in demand for this kind of work and is also used extensively for wagon bodies.

[AMERICAN FORESTRY is indebted to the United States Forest Service, Office of Industrial Investigations, for much of the information contained in this article on commercial uses of yellow poplar.]

Characteristics and Seeding of the Tulip Tree

By S. B. ELLIOTT

AWAY back in the dim past, millions of years ago it must have been, for it was in what is geologically known as the Cretaceous and Tertiary ages, there grew several species of trees which were closely allied, if not the actual progenitors, to two species now to be found growing on our planet. The remains of these ancient trees can be seen in some of the rocks of the periods named, and they make clear to us what Elpenor enjoined Ulysses to provide for him; that is, a record that they "had lived." Botanists have given our modern species the name of *Liriodendron*, a term composed of two Greek words meaning tulip tree in our vernacular, and have likewise added the Latin affix *tulipifera*—which has the same meaning as the Greek name—rendering its full technical name *Liriodendron tulipifera*. One of these modern species is indigenous to China and the other to that part of the United States bounded by a line drawn from central New York to Michigan on the north, and the Gulf of Mexico on the south, and from some two or three hundred miles west of the Mississippi River on the west to the Atlantic Ocean on the east.

While it was found, here and there, over a large part of the territory indicated as its natural range it was rarely, or never beyond a few acres in extent, found in a pure stand. It grew along with oaks, chestnut, hickories, cherry, ash, maple, and other broad-leaf trees, but

seldom with hemlock and pine as near neighbors. It was to be seen in its greatest abundance and in its best development along the valleys of the Ohio River and its tributaries, and on the slopes of those valleys and on the slopes and crests of the Appalachian Mountains.

Of all the broad-leaf trees of the United States none attains its grandeur and magnificence of form or vies with it in length, uniformity, or symmetry of stem; and only the sycamore can compete successfully with it in diameter, while that tree utterly fails to equal it in all other attributes of greatness or economic value. It was not unusual, and it may be so still, to find trees 6 to 8 and even 10 feet in diameter, with a stem clean of limbs for 80 to 90 feet and a crown of foliage reaching at the apex 150 or even 200 feet from the ground.

Except in its infancy it is emphatically light-demanding, or, as the foresters say, an "intolerant" tree. When grown in the open it will then throw out limbs close to the ground and assume a rounded sort of a crown with many specialized limbs reaching out from the center a distance equal to fully one-half the height of the tree; but if grown in a dense stand, or in a stand approximating such a condition, with competitors for light at all equal to it in rapidity of growth, it will shoot up a sharp-pointed conical crown, drop all its lower limbs for



YELLOW POPLAR IN THE EXCELSIOR INDUSTRY

This wood is eighth in importance in the making of excelsior. The picture shows various grades of the product ready for baling.

want of light, and grow a straight, tall, slightly tapering stem with few or no limbs on its lower half. If it fairly outstrips its competitors in the race for light, it will then send out specialized limbs above these competitors' heads and the leader will lessen in rapidity of growth until the large limbs become enveloped in the shade of its persistent companions, when it will again shoot upward leaving the large limbs to their fate, which is generally that of death; and these dying and dropping off give fungi access to the wood and decay in the stem sets in. There is seldom any decay in the stem unless brought about by such conditions. It has no known insect enemies, and appears to be free from attacks of any sort of fungi except as noted. So insistent is it for light after its babyhood, that when grown in the open, and largely so when grown in a dense stand, the leaves will nearly all be found on or near the outer ends of the limbs, leaving the interior of the crown practically destitute of them.

The tulip tree is a prolific seed-bearer. When grown in the open it frequently bears

seed when only twelve or thirteen years old, and when grown in a dense stand, if not too closely crowded by competitors, at from twenty to twenty-five years of age. Of course the younger trees do not bear a heavy crop at first, but it rapidly increases with age. The fruit is practically a scaly cone and the small seed is enclosed in a hard, woody receptacle in the base of the scale. The seeds ripen about the middle of autumn, varying according to latitude and locality, and the seed scales soon begin to drop off, and, as they have a sort of wing about 2 inches long and a little over one-quarter of an inch wide, they can be blown quite a distance by a moderate wind. As there is a gyrating motion given to the wing when it falls the seed may land several feet beyond the extreme ends of the branches, even

though there is no wind at the time. The seeds do not all fall at once, as do those of the pine, but some remain attached to the central cone for a more or less period of time, thus giving the changing winds an opportunity to scatter them in every direction. The central part of the cone does not drop off until the following spring, and even up to that time there may be some of the outer scales still attached.



STREET CAR CONSTRUCTION

Showing the ash or oak frame of an electric street car, and the point at which the frame is ready for the final process of manufacturing at the siding and inside paneling.



YELLOW POPLAR FOR STORE AND OFFICE FIXTURES

The wood is very satisfactory and much in demand for all backing and hidden work in the manufacture of store and office fixtures. This illustration shows a set of tier bins for use in a large grocery.

Unfortunately, but few of the seeds are fertile. No one of our useful timber trees has so low a percentage of fertility in its seed as the tulip tree. Old trees are said to give a higher percentage of fertile seeds than young ones, but even these cannot be counted on for a higher rate of fertility than 10 per cent at best. In fact, it is not safe to count on over 5 per cent producing a plant.

As must be seen, this lack of fertility in the seeds in a veritable "lion in the path" of both natural and artificial propagation. Nor is that the only difficulty that must be encountered and overcome. If the seeds, by any means, whether gathered and stored or left lying on the ground, shall become dry to any great extent, they will either fail to germinate or prolong that event for a year, but more frequently the former. If artificial propagation is undertaken the seeds should be gathered as soon as ripe and either planted in the seed-bed at once—which would be best—or stored in damp sand until spring, but not allowed to become mouldy. Placing them where they will freeze will be an advantage as tending to soften the hard shell enclosing the small seed. If a long, dry fall occurs and the seeds that fall on the ground become dry, little natural regeneration can result.

But this lack of fertility in the seeds, or their failing to germinate through becoming dry, is not the only trouble which will be encountered in artificial reproduction. While germination in the seed-bed may occur and the plants grow well under lath screens for the first year and reach a height of from 5 to 10 inches, the seedlings should no longer be allowed to stay there but be removed to the transplant bed or to the ground where they are to grow to maturity—far the best to the transplant bed, however, for there they will get their root development

greatly strengthened and will be better able to withstand the adverse conditions which they will encounter in the forest plantation—for at best there are but few fibrous roots and these are fleshy, soft, and easily broken. Transplanting directly from the seed-bed to the forest is seldom successful.

Although the seedlings may safely be removed to the transplant bed and there make a good growth, the liability of failure to live or thrive when removed to the place where they are to grow to maturity, is still another danger to be encountered. As has been indicated, the tree must be classed as emphatically light-demanding, but this strong demand for light does not appear to prevail for the first few years of its life, just how many is not known. Observation shows that if the seeds are sown and germinate among briars and low shrubs the plants will thrive and make great headway in overcoming their worthless companions, and almost invariably succeed; and it is among such surroundings that nearly all natural reproduction takes place, but if by any means the seeds are sown and germinate on bare, naked ground where the sun can pour down on them all day long, the young plants do not thrive as well, if they grow at all, as when growing in the shade which the low bushes and briars afford them. A case occurred under the writer's observation where an open field—on which grew only grass and a few insignificant weeds of little height—was bordered on one end and along its two sides by virgin forests that, at times, cast a shadow over a border of the field, varying from 50 to 100 feet in width. On this end there was planted a pot about 200 feet wide with 2-year-old seedling tulip trees. Substantially all grew as well as could be expected for the first year, but at the end of the fourth year from the time of getting them out, practically all were dead except



YELLOW POPLAR IN MANTEL MANUFACTURE

The ability of the wood to take and hold paint well makes it valuable for all white enamel work. These show part of the product of a mantel factory and are made of yellow poplar.

those enjoying the shade of the adjacent forest; but the condition of those in the partial shade varied in the ratio of their nearness to the forest, the plants in the rows next to the woods being far the best, but yet not as thrifty as some naturally planted close by, and about the same age, but among bushes and briars. Of course it is possible that the condition of the "forest floor" had something to do with the result.

It is an old adage that "one swallow does not bring summer," but we can pretty safely conclude that summer is not far off when a lone bird of that species arrives, and it is quite safe to assume that even this single lesson teaches that, however exacting for light the tree may be when past the age we may well call its infancy, it can have too much light and sunshine in its early life. Just how this is to be overcome when the plants are set out in the ground which is to become the forest is an unsolved problem. Such an extent of ground would be too great to attempt to shade with artificial screens. We must endeavor to get nature to do the work; but we cannot afford to grow weeds, briars and the like for that purpose, and, besides, these would serve for only a short time. They would not answer for "nurse trees." There must be a stand of tall, rapidly growing species to do that, for the tulip tree is a rapid grower. Planting a dense stand of that species would not accomplish the end sought, for there would be lacking the shade needed at first. Possibly if some fast-growing species, as European larch, or even red pine, were set out a few years before the tulip trees—at all events long enough before to give the needed shade, these to be planted in alternate rows, or, better, alternately in the rows, so as to shade the little

tulips at first and later on act as "nurse trees"—such a course might be successful. Of course the "nurse trees" would be the ones to be removed in thinning if a pure stand of tulips were desired; or, in case European larch should be planted for such a purpose, some of these could be retained, as European experience indicates that that tree does better in a mixed than in a pure stand, and we know that the tulip will endure others than its own kind for near neighbors. Such a course would, doubtless, secure a good stand of one or both species, and both are valuable.

To be sure, this scheme would be wholly experimental, as will any course, for few attempts have been made in this country to grow the tulip tree for economical purposes, and such as have been undertaken are not far enough along to fully determine what can or cannot be done, and European experience cannot help us much for it cannot be learned that much has been done there along that line. In case it should be ascertained that the trouble lies in a poor "forest floor" instead of lack of shade, it would seem that the plan suggested would still be in the line of practical treatment.

The lack of fertility in the seeds cannot be overcome, but the great abundance of them furnished by nature partially compensates for that, and it will be a strange



Photo by S. B. Ellis

TULIP OR YELLOW POPLAR FROM SEED

This tree is 16 years old. It was raised from seed and is now 9 inches in diameter, 2 feet above the ground. It bore fertile seeds when 13 years old. It is on the property of the author at Reynoldsville, Pa.

thing if modern ingenuity cannot greatly lessen if not entirely do away with the difficulty encountered in planting in the open which has been alluded to. Because the tree requires partial shade in early life there should be no hasty conclusion that it will grow at that period in a dense, tall thicket, or in the deep shade of a mature forest. If the seeds germinate there the little trees will certainly be suppressed, for they must have more light than such a situation affords. They must have a certain amount of

light in early life, but not too much, and in maturer days all the light they can get. There is a certain course laid out by nature for this species to travel in, and that course does not seem to be easily changed, and we must find that out and follow it to be successful. Nature does it and surely we can learn from her and gratify the peculiar propensities of this valuable tree in some way, and we can afford to expend some labor and money to find out what to do, because of the tree's great economic value.

Collecting Wood Specimens

THE United States National Museum at Washington has recently established a Section of Wood Technology. Under the direction of this section it is proposed to assemble a collection of native and foreign woods of commerce and to illustrate the manner in which they are utilized.

The wood collections are to consist of planks of approximately commercial size and of the best quality. Each wood will be given a natural finish and appropriately labeled and arranged so as to be of the greatest educational value. Specimens possessing rare or unusual qualities, exhibited by such woods as curly birch, bird's-eye maple, figured mahogany and others of beautiful color or otherwise attractive appearance are also to be secured. In addition, there will be a series of specimens illustrating the various styles and qualities of finishes given to different woods.

Supplementing the wood collections it is planned to illustrate their utilization by showing the products of various wood-using industries and also the progressive

steps involved in their manufacture from the raw material to the finished article. In this way will be shown, for example, the making of paper, from the bolt of spruce or other wood through each successive change in its form until paper of various kinds and grades is obtained; similarly the interesting story of veneer manufacture with its beautiful and useful products, the manufacture of excelsior, the making of matches and tooth-picks, the distillation of woods and a host of other wood products, the output of many different industries, will be explained by means of comprehensive and instructive exhibits.

Thus far in the work of assembling exhibition material lumber associations, lumbermen and the wood-using industries have shown a gratifying willingness to cooperate with and assist the Museum in developing exhibits of their products. It is hoped that this spirit will continue and sufficient interest will be aroused among them to assure creditable showings for all branches of the business of wood-production and utilization.

American Forestry Association Day

AMERICAN FORESTRY ASSOCIATION DAY at the Panama-Pacific Exposition, Wednesday, October 20, will see the largest combined gathering of foresters, conservationists, forest fire protectors, lumbermen and loggers that the Pacific Coast has ever had. Not only will there be present members of the American Forestry Association, but there will also be members of the Western Forestry and Conservation Association, Pacific Logging Congress, Society of American Foresters, California Forest Protective Association, Biltmore Forest School Alumni and a number of other organizations interested in the subjects to be discussed.

Dr. Henry S. Drinker, president of Lehigh University and president of the American Forestry Association, will preside on October 20 and will make an address on the forest relations between the East and the West. There

will be other addresses by members of the association on a proposed system of forest insurance, on the work of the association and the mission of its magazine, AMERICAN FORESTRY, and upon questions of forest fire protection and forest development.

Following the series of meetings there will be a visit to the redwood lumber camps near Eureka, Cal., where two days will be spent in witnessing the operation of cutting, logging and manufacturing the giant redwoods.

Members of the American Forestry Association from the East who anticipate attending may secure any information regarding routes, hotels, etc., from the secretary.

Headquarters for the association on October 18, 19, 20 and 21 will be at the Inside Inn, which is inside the exposition grounds and the meetings will be held at the Lumbermen's Building just across the way from the Inside Inn.

The Bird Department

BY ARTHUR A. ALLEN.

[Without birds to wage war upon insects, the insect hordes would increase so enormously that they would destroy all the vegetation in the world—and then what would become of the human race? This department will be devoted to public education on birds and each month will be given advice and instruction for their care and for encouraging bird life.—Editor's Note.]

BIRDS AND THE FORESTS

WHEN the world has once more regained its equilibrium and the great powers have again settled down to constructive policies, one of the questions that will be brought forward is that of international legislation for the protection of migratory birds. It will be a natural outgrowth of the struggle which the United States has witnessed during the past few years between the commercialist and the conservationist, a struggle that has resulted in national legislation giving our birds a more wide-spread encouragement and protection than has ever before been possible.

Had the battle in this country been waged along the lines of sentiment alone, with which these birds are so often and so rightly associated, our practical legislators could never have felt justified in enacting these far-reaching measures. Fortunately, the science of ornithology had already advanced to a stage where it could state definitely the important rôle played by the birds in protecting crops, orchards, and forests. The Biological Survey in Washington and economists in all parts of the country had been studying the food of birds for some thirty years, with the result that the issue was one of real economics rather than one of sentiment.

There are few people today that are uninformed as to the value of birds. The annual loss of over 700 millions of dollars to agriculture in this country due to the ravages of insects and the part taken by the birds in destroying these pests are familiar facts. The birds are nature's guards, appointed to keep the wonderfully prolific insects from overrunning the earth, and, when one stops to consider that a single pair of potato beetles, if uncontrolled, would at the end of a single season result in sixty million offspring; or that a single female plant louse could give rise in the twelve generations which occur each year to over ten sextillion young, one is forced to acknowledge the invaluable asset we have in the birds.

In the garden, however, and in the orchard, it is usually possible by artificial means to battle successfully with insects. Poisonous sprays and cleverly contrived traps with sufficient output of time, labor and expense, will, in most cases, keep the farm in profitable condition. But the whole world is not a garden. It is obviously impossible to exterminate all insects. Human ingenuity will never devise profitable means for spraying the forests or trapping the forest insects. Over 500 species of insects prey upon the oak trees alone and nearly 300 upon the conifers, any one of which, if left uncontrolled, would destroy the trees.

When experiments were being carried on in Massachusetts with the raising of the American silkworms (*Telega polyphemus*), the larvae of which feed upon a number of shade trees, a striking demonstration of the danger from these tree-inhabiting caterpillars was given, for it was discovered that each caterpillar required 120 oak leaves to reach maturity. If all the eggs laid by a single moth should all hatch and reach maturity, few oak trees would be large enough to support a single family. Fortunately, however, it was discovered, at the same time, that in a state of nature 95 per cent of the larvae are destroyed by birds.

Again, in Dakota, when the first attempts were made to grow trees upon the prairie lands, the experiments resulted nearly in failure because of the ravages of this silk worm and closely allied caterpillars, the reason for their destructive numbers being the absence of arboreal birds. This is a problem which always presents itself in the reclamation of waste lands by the planting of trees where tree-frequenting birds are not yet established. It is fortunate that many birds are quick to avail themselves of new territory and that a number of species have extended their ranges during recent years, following the reclamation of arid country.

But even where birds are established it happens occasionally that some insect plague escapes the control of its natural enemies and we have the great destruction wrought by the gipsy and brown-tail moths in Massachusetts, and the defoliation of the shade trees in many of our eastern cities by canker worms, tussock moths, elm-leaf beetles, and tent caterpillars. But during these devastations two facts have been repeatedly noticed. First, the outbreaks have always begun among the shade trees of our cities where birds are conspicuously scarce, and, second, spots to which birds have been attracted have suffered the least.

In this connection the experiments of Baron von Berlepsch on his estate in Germany, in attracting birds and maintaining a number far in excess of the surrounding country, have become almost classic. By putting up thousands of nesting boxes throughout the forest to replace the dead trees which are required by hole-nesting birds, by introducing food-bearing plants, shrubs and trees, by feeding the birds during winter and times of stress, and by destroying their natural enemies, he so increased their numbers that, when an insect plague spread over the country, his estate was the one green spot upon the entire landscape. Such a convincing

demonstration was it that the imperial government followed his example for the protection of the national forests.

But it is not from insects alone that our forest trees suffer. In some parts of the country rabbits and other small rodents have increased so alarmingly at times that during the winter months when other food was scarce they have done thousands of dollars damage by eating the bark and girdling the young trees. The field mouse (*Microtus pennsylvanicus*), which is perhaps the most destructive of the smaller rodents, has from six to eight young in a litter and from four to six litters a year. If left uncontrolled, the offspring of a single pair at the end of five years would number nearly a million individuals. Occasionally this does happen and we have the so-called "plagues of voles" or mice which overrun everything, and when they have consumed all the available food in one region they migrate to another. These plagues do not usually endure long, one of the chief reasons being that they are always followed by flights of owls or hawks which prey upon them.

It is true that one species of owl, the great-horned owl, and three species of hawks, the sharp-shinned, Cooper's and goshawk, do sometimes menace our feathered game and occasionally make a raid upon the poultry yard. These species have been passed upon as more harmful than beneficial, but all the rest of the hawks and owls which are shot indiscriminately are not only important but necessary aids to the forester, particularly where efforts are being made to reclaim waste lands.

We now have adequate laws for the protection of our insectivorous birds and those for the protection of rodent-eating birds are beginning to follow. Owing to these measures, our avian population in the course of time will show a large increase, but, in the meantime, bird lovers and those who have interests at stake either in gardens, shade trees or forests, will be willing to expend a little effort toward encouraging our birds toward immediate increase. Usually with but small effort the number of birds about one's grounds can be increased manyfold. In succeeding numbers of this magazine articles will appear showing what may be done during the different seasons of the year toward attracting, increasing and taming the wild birds about one's home,

one's garden or one's forest. The first of these on "Bird Fountains" appears in this number.

BIRD FOUNTAINS

NOTHING exerts a stronger attraction upon birds in hot weather than an abundant supply of fresh water. During the dry months of August and September the birds practically desert the dry uplands for the borders of streams or springs, where they can be sure of finding water for drinking and bathing. For this reason the home that has no natural pool or spring nearby must expect to have but few birds during this dry season unless some effort is made to supply the necessity.

Perhaps the most attractive bird pool, or fountain, is that constructed in the form of a rockery in the garden with ferns and wild flowers planted about it. The concrete basin can either be sunk in the ground or raised on a pedestal. If the former, one should make sure that there are no lurking places in the proximity where cats or other enemies can lie in wait to spring upon the birds while they are helpless with soaking feathers.

Other kinds of bird fountains are those made in the form of large pottery saucers raised above the reach of marauding cats, or a still simpler arrangement, which, although less attractive, serves the purpose just as well, is a shallow pan or tray sunk in the ground or placed in any convenient place frequented by the birds.

Whatever type of fountain is selected, a few points should be adhered to. The bottom and sides should be rough so that the birds will not slip upon entering the water, for if they slip once they will never return. Secondly, the water should not be more than a half-inch in depth where the birds are expected to enter. They will often wade in deeper, but the bottom should slope or flat stones should be so arranged that the birds can enter at this depth. And thirdly, the water should be refreshed as often as it evaporates or becomes stale. If feasible, the pool should be connected with the water supply or the drain from the ice-box, a labor-saving device which at the same time makes the pool more attractive to the birds.

These simple arrangements and sure protection from skulking enemies will serve to attract many birds about the garden where they will more than repay for the effort expended by the insects they will destroy, not to mention their cheery calls and interesting ways.





THE MATTERHORN

A view from the roadside, near Riffelalp, above Zermatt; altitude, 7,415 feet.

How Switzerland Cultivates Her Forests

By MARIE WIDMER

SWITZERLAND, in the year 100 A. D., is described as being covered with swamps and great impenetrable forests and the latter offered tremendous obstacles to colonization. The necessary land for pastures and agriculture had thus to be taken away from the forests and the history of the colonization is consequently closely connected with that of the forests.

Not much attention was paid to the cultivation or preservation of the forests in the early days, when the Alemanni, Burgundians and Franks swept through the land, but in the time of the latter, when Charlemagne was king, a general and remarkable improvement of conditions took place. History relates that Charlemagne's grandson presented in the year 853 the now famous Sihl Forest of Zürich to the Convent of Fraumünster

in that city, which indicates that the Sihl Forest is actually one of the oldest cultivated forests in Switzerland.

Gradually, as settlers began to scatter all over the country, their attention was drawn to the forestry problem and it is shown that in the thirteenth century there were already a number of villages which had prohibited the cutting down of certain forests, as the same provided protection against the ever-threatening peril from the avalanches. Thus, Göschen and Altdorf and Andermatt on the Gothard route, with their "Bannwald." For some time the great vaudoise forest of Risonx in the Joux Valley was also considered as a "protecting forest," as its presence could facilitate the defense of the frontier toward France in a case of emergency.



DAVOS, SWITZERLAND, IN SUMMER

Showing the type of municipal and cantonal forests, some of the former of which produce an annual net profit of as much as \$14 an acre, and some of the latter yield as high as \$8 an acre, which steady and ever-increasing revenue helps to reduce taxation in Switzerland to a minimum.

However, only in the eighteenth century was there voiced a general demand for better cultivation and preservation of the forests and in this respect the cantons of Zürich, Berne and Aargau were the leaders, with the others following after a short interval.

The latest statistics of forestation in Switzerland show that 22.7 per cent of the entire area of Switzerland is covered with forests; 52.1 per cent is devoted to agriculture and pastures and 25.2 per cent is non-productive soil (rivers, lakes, roads, railways, building sites, rocks, glaciers, etc.).

Of the productive soil in Switzerland, 30.1 per cent is thus devoted to forests and 69.6 to agricultural purposes. Statistics further show that about 67 per cent of these forests belong to individual villages or cities; 28.5 per cent are private property and 4.5 per cent only pertain to individual cantons. The ownership by canton, village or private persons shows a remarkable variation in the case of each canton and we thus find that the cantonal governments of Valais, Ticino, Grisons and Uri possess practically no forests. The biggest percentage of forests owned by villages—94.3 per cent—is however, found in the Valais, and the highest percentage of private-owned forests—78.8 per cent—is to be found in the canton of Lucerne.

The most extensive forest conservation is found in the Jura region of Switzerland, in the cantons of Schaffhausen, Aargau, Basel (Land), Soleure, Berne, Neuchâ

tel and Vaud, where as much as 60 per cent of the productive soil is devoted to forestation. While the high



VALAIS

This tree (Salix alba) is close to the shore of Switzerland, at an altitude of about 1,140 feet.



A GENERAL VIEW OF AROSA, IN THE GRISONS, SWITZERLAND, ALTITUDE, 6,043 FEET

This is one of the best of the "protecting forests" which are considered a necessary safeguard against natural forces such as avalanches, land slides and inundations, and as a consequence there are certain laws prohibiting their injudicious cutting. Of the entire area of forests in Switzerland, over three-fourths is classified as "protecting forests."

mountain regions appear thickly wooded at first, their production is poor.

Forests, as previously indicated are considered a safeguard against natural forces, such as avalanches, land slides and inundations, and as a consequence there are certain laws prohibiting their injudicious cutting down, and these laws apply to private-owned forests as well as to public-owned ones. All the forests in the canton of the Grisons, Appenzell, Ausser-Rhoden, Uri, Neuchâtel and Basle (City), are regarded as "protecting" forests, while in the cantons of Schwyz, Unterwalden, Glarus and Appenzell Inner Rhoden all public and a part of the private-owned forests are declared "protecting" forests. In the other cantons the public and private-owned forests are partly "protecting forests" and partly non-protecting. Of the entire Swiss forest area 75.2 per cent is considered "protecting forests" and 24.8 per cent non-protecting.

These laws safeguard the Swiss forests from untimely destruction and no matter how much building may be done in a district, the forests have to be duly respected.

The different parts of Switzerland, with their great variation of altitudes, are subject to widely different

climatic conditions and as a result we find a similar difference in the forest growth.

In the Jura, for instance, the beech plays a prominent rôle. It can really be considered the foundation of the Jura forest and, thanks to its thick foliage, it prevents the soil on the sunny slopes from drying up. The protecting presence of the beech enables other more exacting species of trees to grow in their turn, such as the ash, the maple, the fir, and the pitch. On all the slopes with a southern exposure the beech is intermingled with the red pine.

In the plains we find a good variety of the oak, elm, beech, ash, maple, linden, alder, willow, poplar, fir and red pine. Today the pitch tree also occupies an important place in these lower regions.

Approaching the Alps, the pitch tree and fir are more prominent and from 1,500 feet upward the former alone remains. In the central Alps the larch, the cembra pine and the so-called mountain pine are in particular evidence. In certain regions of the Bernese Oberland, in the canton of Unterwalden, around the Lake of Lucerne and in the Rhine Valley the beech is also well represented.



ARAUCARIA IMBRICALA

A famous specimen near Walzenhausen, canton of Appenzell. Altitude, 2,273 feet

Finally, in the southern part of the canton of Ticino, in Italian Switzerland, the chestnut grows in profusion.

While in early days the forester's principal task was to dispose of the timber, to be a fairly good shot and to keep general order on his domain, the public has, since the middle of the last century, begun to wake up and with the realization of the immense value of the forests came a general demand for a more thorough and scientific instruction of the foresters.

A forestry school exists in Switzerland since 1855, making part of the Federal Polytechnic at Zürich. From 1855-72 the duration of the course was two years, from 1872-82 it was two and one-half years, from 1882-1909

it was raised to three years, and since October, 1909, it has been prolonged to three and one-half years. This theoretical course has yet to be completed by an obligatory practical course of one and one-half years. The duration of the entire course in the science of forestry consequently amounts to five years.

The timber production of the Swiss forests has reached the comparatively high figure of 40,000,000 francs a year. The average annual export amounts to about 3,000,000 francs, but there is still an annual importation of wood for about 30,000,000 francs. This somewhat surprisingly high import is explained by a continually increased demand for wood by the paper industry, also by a much developed building activity.

The statistics available concerning the average increase of the Swiss forest cultivation do not yet suffice by far for an approximate valuation of the respective financial returns. However, in all those cases, where it has been possible to investigate the question, the proposition has proved itself a paying one.

Thus it is shown, for instance, that the municipal forests of Aargau produce an average gross profit of \$14 per acre, those of Zürich, Winterthur and Morat, \$12 per acre, and the most recent statistics in the case of Winterthur indicate a revenue of \$14.90 per acre. Admitting that these are somewhat exceptional instances, we nevertheless find that the general results of the cantonal forests of Aargau and Zürich reach a gross profit of \$8 per acre, while the richest state forests in Germany scarcely ever surpass a revenue of \$5.60 per acre. The returns in the Jura and the Alps, where the soil is naturally inferior, amount to \$3.25 to \$4.80 per acre.

This steady and ever-increasing revenue yielded by the forests helps to reduce taxation in Switzerland to a minimum.

The climatic and hygienic value of forests must also be taken into consideration. No place becomes oppressive from the summer's heat, or unpleasant through the winter's cold, if it is situated in a forest region. It is an established fact that all the renowned Swiss health resorts are in closest vicinity to woods and forests whose purifying presence and wholesome fragrance act like a tonic on the human system.

Reforestation and forest planting require much patience at first, as it takes so long for a crop to mature, but the results obtained in Switzerland will undoubtedly induce other countries in time to adopt a similar system, which makes the best possible use of land not suitable for agriculture and which at the same time has all the climatic and hygienic advantages pointed out above, not to mention the natural charm, the scenic value and the soothing effect of a stretch of dark-green, silent forest.



Mr. Charles Frederick Quincy

Director of the American Forestry Association and Chairman of the Executive Committee.

ORIGINALLY from Massachusetts, Mr. Quincy has for years had his business location in New York City, while maintaining a summer residence on Squam Lake, New Hampshire.

As a personal friend of ex-Governor Guild, deceased, he was invited by Governor Guild when the latter was president of the American Forestry Association, to become a member of the Board of Directors, with the particular desire on the part of President Guild that Mr. Quincy, with his large experience in finance, should look into the financial side of the Association, its affairs at that time being in a rather precarious condition.

Mainly under his leadership as chairman of the executive committee of the board, the Association has been lifted from an unsatisfactory financial position to its present basis of increasing prosperity. Our very successful bond plan for the development of our work and the bettering of our magazine was his idea.

Today we hold in securities twice the amount of our bonded indebtedness. The Association has attained a position of national recognition and its work in public service is recognized as great and increasing.

To Mr. Quincy—to his tact, his faithful devotion to his self-imposed duties in the Association, and to his experience and ability in financial management—the Association owes a great debt for services deeply appreciated and valued by his associates in the work.

HENRY STURGIS DRINKER.

Fire Fighting Exhibit at the Exposition

DON CARLOS ELLIS is in charge of the Forest Service exhibits at the Panama-Pacific Exposition which are attracting so much attention from the thousands of visitors, who are curious to learn what the Government is doing with the great forest areas under its control. The larger exhibit is at San Francisco and the feature about which most of the inquiries are made is the forest fire protection and fire fighting exhibit. This is complete in every detail.

In the center of the space is a large model, measuring 12 by 15 feet, showing a ranger district on a national forest. A lookout house and a lookout tower occupy the two highest peaks. These are connected by telephone with a ranger station, which in turn is connected with various users of the forest at a ranchhouse, a hotel, and a powerhouse. The model shows Government roads, trails and bridges, constructed primarily for the purpose of making every part of the forest accessible to fire fighters. Fire-fighting equipment boxes are placed at strategic points along trails and roads, and a fire line kept clear of inflammable material runs along one of the mountain ridges.

To one side of the large center model a full-size fire lookout house, fully equipped for discovering and locating forest fires, is built on an imitation of a great boulder on a mountain top. The house is painted white to serve as a conspicuous target for heliograph messages directed toward it by patrolmen. The building contains binoculars through which a distant forest fire is seen; a fire finder, by the aid of which the supervisor's office can be informed definitely of the location of a fire; and a special type of telephone in communication with the supervisor's office. There are also on display in this tower a portable telephone and a portable heliograph outfit for use by patrolmen. A pair of stereopticon machines are concealed within the imitation rock on which

the house rests and throw pictures and descriptions on screens built into the rock, which tell the entire story of the fire protection work.

On a redwood tree trunk in another part of the exhibit is displayed a weather-proof iron box telephone, such as is placed along patrol routes on the forests. This telephone is connected with the telephone in the lookout and with a supervisor's telephone at the desk of the demonstrator by slack lines attached to tree trunks on swinging insulators, just as the line is installed on a national forest. This manner of construction enables the line to stand the stress of the elements through the winter and prevents the wire being broken when a tree falls.

The latest type of fire-fighting toolbox, equipped with shovels, rakes, hoes, axes, canvas waterbags and buckets, canteens, lanterns for fighting fires at night, torches for setting back fires, nesting cooking utensils, and emergency rations, occupies a place near the lookout house.

Beside the desk of the demonstrator, who plays the part of the national forest supervisor, is hung a master fire map of the forest similar to the one in the lookout house. On this map is shown the location of every trail, bridge, road, telephone line, telephone station, ranger station, fire-fighting toolbox and lookout station. At the locations of the lookouts are protractions oriented to correspond with the protractors of

those stations. This map enables the supervisor to locate a fire directly from the reports of the lookouts without any mathematical calculations, and to place to the best possible advantage the force of men available.

Fire warning posters and rules concerning care with fire in the forests are posted upon tree trunks and in other conspicuous places through the exhibit as they are in the forests.



DON CARLOS ELLIS

In charge of the Forest Service Forestry Exhibits at the San Diego Exposition and at the Panama-Pacific Exposition, standing at the Entrance to the Building Containing the Exhibit at San Diego

California Tree Novelties

By E. A. STERLING

PART II

THE California redwoods and Sequoias have been described until they are familiar to every visitor. The Sequoias, in particular, are the mecca of many tourists and may be seen at their best on a trip to Yosemite by way of the Raymond and Wawona entrance. The other groups of Sequoias are not so frequently vis-

itimately, is within a few hours' ride of San Francisco, and should by all means be visited. It is reached from Santa Cruz by the Southern Pacific, and a day in the park will give some idea of the redwood forests in the lumber regions of Humboldt and Mendocino counties. These magnificent trees, however, are fully worth a trip



A GROUP OF SEQUOIAS

This is the largest cone-bearing evergreen tree in the world, and the oldest. Some reach a height of over 300 feet, but the average is about 270 feet. The trunks are from 17 to 24 feet in diameter at about 8 feet above the greatly swelled bases. This California big tree is in a region of about 50 square miles, within which there are twenty-six groves. One of the largest of these, called the Grant Forest, contains 3,000 trees. Some groves contain few, Deer Creek Grove having but thirty, and North Grove only six. The larger trees are between 4,000 and 5,000 years old.

ited, although thousands are attracted annually to the Mariposa grove and General Grant National Park. In the Yosemite Park, to which more and more tourists now go and which will be seen this year by more than ever before, there is a considerable variety of trees to be seen. Here the tourist, making his headquarters at one of such tent camps as shown in the accompanying photographs, may, in a few days, see all of the points of interest within the park.

The California redwood forests at their best are off the regular routes of travel. California Redwood Park, for-

up the Northwestern Pacific R. R., and over the new line from Willits to Eureka or by steamer to Fort Bragg or Eureka. Eureka will be visited by the members of the American Forestry Association after their meeting in San Francisco on October 20, in order to see the redwood forests and the lumber camps. Here the trees grow in solid forests of a density and splendor to which no description can do justice. By comparison, the best specimens of individual trees found on the slopes of Tamalpais in Marin County or in California Redwood Park are reproduced by thousands or millions, and by

their intimate association create a continuous forest in which the units or individual trees are almost lost sight of in the surpassing grandeur of the whole. It is a case of nature surpassing herself in the production of extremes in sizes, quality and quantity. The great colonnades of redwood trees have been likened to some wonderful cathedral, but, unlike any works of man, they extend over hundreds of square miles and produce a variety of conditions and vistas absolutely unattainable in the highest art of the architect.



WIND-BLOWN REDWOODS

This is in the Monterey National Forest in California. Here the winds from the ocean are so strong and persistent that they have the unusual effect upon the growth of the tree so vividly shown in the photograph.

The influence of environment is demonstrated by comparing the redwoods at the northern and southern limits of their range. While the character of the redwood forests changes materially on different sites in the several belts and groups from Humboldt County southward, a radical change is found on the seaward side of the Santa Lucia Mountains below Monterey. Here at its southern limit the redwood loses its dominant character, and in exposed situations becomes a gnarled, stunted and wind-flattened tree. In the protected canyons it grows to more nearly normal size, but decreases in height up the slopes until near the ridge summits it takes on the shape of a limber pine at timber line on some high mountain. The effect produced when viewed from a high point is peculiar, the canyon forests being practically flat to the

level of the protecting ridge with the trees in the center tall and straight, but decreasing in size up both slopes as if they all had been clipped off to one height like a hedge.

The famous old city of Monterey is the starting point for several trips which take in rare or unusual trees. One of these is to the stunted, wind-flattened redwoods just mentioned, which involves a trip by carriage or horseback to the settlements some distance down the coast. Such an excursion also shows much that is best in the way of sea-coast scenery. The shorter drives usually taken by the tourist from Monterey traverse the range of two trees which exist only on this particular part of the California coast. In fact, the main attraction of one of the drives, vying in interest with the old Missions, is the famous Monterey cypress. On the peninsula between Monterey Bay and Carmel Bay are the individual trees which have been so widely pictured and are so well known to tourists. They are picturesque specimens on



STUMP OF SEQUOIA

This stump is 20 feet in diameter. It was cut unusually high, not because it was convenient to do so but because the old fire scars made it worthless as lumber up to the point where the cutting was made. This stands in the Sequoia National Forest, Tulare County, Cal.

an exposed rocky sea cliff, where the artistic setting, wide, flat-topped crown, and grotesquely bent and gnarled trunk and branches, create an unusual spectacle. The natural belt of Monterey cypress is only a few hundred feet wide along the coast, with a few trees scattered inland on the ridge of the peninsula. Although extensively planted as wind breaks, there is no other natural group of these trees anywhere in existence.

Despite this fact there is a widespread belief that these trees are descendants of the famous "cedars of Lebanon," and despite the efforts to remove it the im-

pression still largely prevails in the public mind. Mr. H. A. Greene, president of the Monterey Tree Growing Club, has an interesting explanation of how the belief originated. Says he: "Some years ago, a man named Aleck Early was driving for the Hotel Del Monte and making himself remembered for his wit by people from all parts of the world. Many of his stories told to wondering tourists were prefaced by 'When me and Charley—' This was a reference to Charles Crocker, one of the 'Big Four' who developed the Pacific Railroad system. Aleck had been an old stage-driver and, for a time, was in the employ of Crocker and, having become too old to continue in such employment, he was sent to Hotel Del Monte by Crocker, who was the real sponsor for the famous hostelry, to be given a berth. As driver for the hotel's livery stable, Aleck spent his happiest days entertaining tourists with his wonderfully told tales, and he became so popular with visitors that often when people wired to reserve rooms they would also reserve the great story teller as their driver about the Monterey peninsula.

"Aleck Early's favorite story was evoked when his guests were driven into the weird presence of the ancient cypresses at Point Cypress on the world-famous Seventeen-Mile Drive. This was the tale of a highly civilized race of people who came to this vicinity thousands of years ago and builded a magnificent city with matchless temples of worship. Pointing to a large sand-dune he would explain that a partial exploration had revealed immense columns and capitals, strangely but beautifully carved, prostrate under the sands. This story, told in very ungrammatical sentences yet with originality of wording and a convincing manner, ended with a recital of the extinction of the colonists by hordes of cannibals. At its conclusion, Aleck would wave his whip toward the ancient cypress trees still growing in the vicinity of the 'buried city' and declare that they had been planted, about 6,000 years ago, from seed of the Cedar of Lebanon, brought across the sea from Syria.

"It was a ridiculous story, but the part about the trees

it seems impossible to destroy. Writers persist in referring to this wonderful grove of prehistoric trees—so much more wonderful than trees of history—as being of the same species as the sacred cedars. The Monterey



MARGIN OF REDWOOD FOREST

This is in Big Basin, Santa Cruz County, Cal. The tree behind the buggy is 7 feet in diameter and 260 feet in height.

cypress is no more a true cedar than it is an oak. It is probably the parent of all the cypresses and is extinct save on the extremities of Point Cypress and Point Lobos, near Monterey. The tree was discovered by La Perouse in 1786, but did not receive its name until 1846 when Hardweg rediscovered it and named it *Cupressus Macrocarpa*, meaning 'large fruited cypress.'"

Another tree confined to the immediate vicinity of Monterey is the Monterey pine, which is unique because of its isolated sea-coast habitude. Where growing in thick groups somewhat protected, it has tall, clean trunks, with an open, rather long and large branched crown. The older trees are flattened at the top, and where ex-



TYPE OF CANVAS BUNGALOW IN YOSEMITE VALLEY CAMP

Secretary of the Interior Lane's policy of opening our national parks as real playgrounds for the people strikes a new and popular note in these splendid camps, where the tourist with a medium-sized purse can get close to nature at a minimum expense. Seated in hammock is George Sterling, the California poet; standing is Lawrence Harris, whose poem on the San Francisco fire received world-wide comment, and on the chair, E. D. Coblentz, editor of the *San Francisco Call*.

posed to the salt winds, take on irregular shapes, resembling the Monterey cypress. It has, however, a considerably wider range, there being three groups along the coast and others on the Santa Rosa and Santa Cruz Islands.

Three other trees of limited range or rare occurrence deserve specific mention. One of these, the bristlecone fir, is found mainly in Monterey County, where it is irregularly grouped or scattered on the eastward slopes of the Santa Lucia Mountains. It is a little known tree because confined to a region which attracts few visitors. The only place it would be seen without a special trip is along the stage road near Pajarito Springs. It is the most unique of all the firs, and striking in character because of its dense Indian club-shaped crown, which often extends to the ground, and ends in a long, extremely narrow, sharp point. The foliage is of a lustrous green, so pronounced that the color becomes a distinguishing characteristic at some distance. A further remarkable feature is found in the cones, which have long needlelike points, which protrude from among the cone scales. While not deserving a special trip in order to see it, the bristlecone fir merits attention from anyone who is in the region where it grows.

The rarest and most restricted of all the California conifers is the Torrey, or Soledad pine of San Diego County. It is confined to a sea-coast range about 1 mile wide on both sides of the mouth of the Soledad River,

and to a limited area on Santa Rosa Island. Where exposed to the high winds, it is low, crooked and deformed, although in protected situations it may have a straight trunk 50 or 60 feet in height. A few of these trees can be seen from the Santa Fe train between Los Angeles and San Diego, the narrow strip along the coast starting about 3 miles north of Del Mar.

Another interesting evergreen of considerably wider range is the coulter or bigcone pine. The general distribution of this tree is the middle elevations on the coast and cross range mountains in Southern California. Although common throughout this range, it is nowhere abundant, and rarely forms pure forests. Its claim to particular notice is the enormous size of the cones, which are often 12 to 14 inches long, sharp spiked and armed, and extremely heavy. None of the other pine trees protects its seeds in such a strenuous way, and while the sugar pine cones are longer, the cone scales are thin, light and harmless by comparison. Visitors to any of the well-known mountain resorts or peaks in Southern California can hardly miss seeing some of these trees. The large cones and stiff foliage will distinguish the coulter from yellow pine, while the cone itself deserves close investigation and proves an interesting and lasting souvenir.

Of the California trees which are unique or different, the pines receive special attention. This is deserved because no less than seventeen distinct species grow in California and at least six are found in no other State,



MONTEREY CYPRESS ON THE SEA COAST

While these trees are true native sons of California, growing only around the Bay of Monterey, they have become generally known to the public as "cedars of Lebanon." In this article is explained the interesting origin of this misnomer. These old trees are the mecca for most sight-seers along the California coast.

although three of the six extend down into lower California. Their range is from the limber pine at timber line down to the pinon pine of the desert regions. In character of growth and appearance the range is as equally great. From the southern Sierras southward on arid slopes and mesas into northern Mexico is the dwarf single leaf or pinon pine. Of all the American species, no other pine has single leaves. The tree is further distinguished by the large size of the seeds which are known as pinon nuts, and have long been used by the Indians for food. The transcontinental traveler on the Santa Fe trains can buy these pine nuts from the Indians or at the stations, as peanuts are bought in the East. Another nut pine, which is less common, has four needles or leaves, which is also an unusual arrangement. The true white pines have five needles in a cluster and yellow pines two and three, so there are, out of the seventeen species, all arrangements of needles from one to five.

Another characteristic of the California pine is found in the various kinds of cones. They range in size from the enormous fruit of the coulter pine to the diminutive seed pod of the pinon or lodgepole, and from a smooth symmetrical shape and surface to a bristly, heavy cone which protects and hides its seeds until nature sees fit to open the scales. The bristlecone, lodgepole and knobcone pines, have very persistent cones, the latter often holding successive crops of cones indefinitely. They ad-

here to the trunk and branches and are often found imbedded in the wood, and rarely do the cones open until the tree is killed by fire or cut; yet some of the seeds remain fertile during all these years. The knobcone pine is the most conspicuous conifer on the intermediate slopes of the mountains back of Los Angeles, San Bernardino and Santa Barbara, and the persistent clusters of old cones can be readily seen.

Hardwood trees are not abundant on the Pacific coast. There are comparatively few broad-leaved trees of commercial value, and as a rule these are an inconspicuous feature of the landscape except along streams at the lower elevations. A sycamore very similar in appearance to the Eastern species is common along streams throughout the State, while in all of the foothills are a number of oaks, some of which retain their leaves the year round. These low-growing, round-topped oaks are an attractive feature along many roads and trails below the range of the conifers. For example the Ojai valley near Santa Barbara is made attractive by its oak trees, while along many streams, even back in the mountains, a fringe or belt of broad-leaved species breaks the monotony of the view. On the higher slopes and along the coast in the redwood country, tan bark oak is in many places quite abundant. Here are also found chinquapins which are similar to the Eastern chestnut, and under favorable conditions become large trees, although in the higher mountains forming low shrub. Maples, buckeye, ash and other



Photo by The Pillsbury Picture Co.

YOSEMITE FALLS CAMP, YOSEMITE VALLEY

From this tent city, for there are several hundred comfortable canvas bungalows back of the dining room and office buildings shown in the picture, the tourist visits any part of the beautiful park he desires and sees an interesting variety of tree life. The Yosemite Falls, seen apparently so close to the camp, leap 2,400 feet from crest to valley in three splendid cascades.

trees familiar in the East are found, although rarely of commercial size or in any considerable quantity. A peculiar tree in a class by itself is the rare California nutmeg, a member of the yew family. Found in central California, it forms dense thickets and associates with the hardwoods along streams. The name is derived from the resemblance of the fruit to the nutmeg of America.

Although not in the class of trees, the various shrubs which go to make up the chaparral of the slopes and foot hills deserve mention. In the mountains of Southern California over seventy distinct species constitute the almost impenetrable mass of shrub growth which covers many of the slopes. In the San Bernardino and San Jacinto Mountains, the chaparral area is 50 per cent, while in the San Gabriel Mountains it increases to 80 per cent. Small chance, therefore, that anyone will miss this feature. Chaparral also comes in after fire

and cutting in the northern mountain forests. Consideration of the different species is not of particular interest, and it is sufficient to know that several kinds of dwarfed oak are found in the chaparral growth. A group of low and slender trees or shrubs known as *Ceanothus* or myrtles grow in the low mountain canyons of Southern California and add an effective touch to the landscape by their fragrant blue flowers, which appear in long, wide bunches, from which the common name, lilac, is derived.

Two groups of small trees or shrubs attract immediate attention because of their red-brown trunks, red branches and shiny, evergreen foliage. One of these is the well-known *Manzanita*, which is an evergreen shrub widely distributed throughout the Pacific coast. It is found at the foot of cliffs, on the edge of the forests, and scattered throughout the chaparral from one end of the State to the other, usually in a variety of soils from sea level to several thousand feet elevation. Occasionally, under favorable conditions, it becomes treelike, and, wherever found, adds a touch of color to the landscape. The other red bark tree is the *Madrona*, which often reaches a height of 60 to 80 feet, about 2 or 3 feet in diameter, but can become low and shrubby more like the *Manzanitas*. It produces showy, large clusters of flowers resembling lilies-of-the-valley, and may be looked for along any of the established routes of travel.

To attempt a summary of the trees and shrubs to be seen from the trails and roads which the California Exposition visitor will traverse this summer, would be a hopeless task. The most that can be hoped for is to call attention to the unique and beautiful in the way of tree growth which may be seen if it is only looked for. It should not be enough for a party to go from Los Angeles to the top of Mt. Lowe or Mt. Wilson in the conventional way. To return without

realizing that they have passed through several distinct zones of tree growth, and have had an opportunity to see the effect of natural conditions, such as elevation, aspect, temperature and moisture on the distribution of the flora and also the effect which fire and other human agencies have had on the forest cover of the Southern California mountains, would be a distinct loss of an opportunity. Along the stream beds at the foot of the slopes will be seen sycamores, oaks and other hardwoods, followed by the chaparral of the arid foothills. Farther up in the moist canyons will be seen the bigcone spruce and perhaps other evergreens, and on the more exposed slopes the knobcone pine and perhaps the coulter pine with its big cones. The north and east slopes will be the most densely wooded, while on the hot, dry, south slopes, shrubs and trees with desert characteristics will prevail. Finally, on the summit of the main ridge and in the moist canyons of the main Sierra Madre, will be found the

yellow pines, firs, and cedars grouped according to their environment.

The same observations with the proper adjustment for locality and conditions may be made along any other

of view the Sequoias or redwoods and even Yosemite itself will not be the only things to register an impression, for if you can bring back with you visions and descriptions of trees and forests which the average visitor does not see, you will have something which will be an asset and treasure through the years.

John Muir, who knew every foot of it, eloquently described the chief forested region of California when he wrote:

"In the middle region of deep-cansons are the grandest forest trees, the Sequoia, king of conifers, the noble sugar and yellow pines, Douglas spruce, libocedrus, and the silver firs, each a giant of its kind, assembled together in one and the same forest, surpassing all other coniferous forests in the world, both in the number of its species and in the size and beauty of its trees. The winds flow in melody through their colossal spires, and they are vocal everywhere with the songs of birds and run-



DESOLATION VALLEY, PYRAMID PEAK IN THE DISTANCE

The two trees in the foreground are silver pine. The scene is in the El Dorado National Forest, Cal.

routes of travel. Before you go and after you get there read some of the best literature regarding the flora of California. John Muir, through his books, inspires you with a love and appreciation of the scenic wonders of his native State. Carry his "Mountains of California" with you and try to see them through his eyes. On many trips you will be within the National Forests and the officer of the Forest Service can broaden your view and direct your observations wherever you go.

The main thing is to know what you want to see and where to see it. Trees and forests are probably not the fundamental attractions you will see, but they should be the setting on many of your travels and supplement the other natural features for which you will make special trips. Distances are great compared with the East and stage and horseback trips are not always an unalloyed joy. The best way to forget the dust and heat and discomfort is to have something which will distract attention from the crowded stage and the blazing sun. This you will have in the constantly changing flora on most of the trips which are worth while. With the right point



LUMBERED SLOPE IN SAN BERNARDINO MOUNTAINS

Away in the distance, through the gap beyond the trees, the Mohave Desert may be seen. The trees that are visible are pine, fir and incense cedar.

ning water. Miles of fragrant ceanothus and manzanita bushes bloom beneath them, and lily gardens and meadows, and damp, ferny glens in endless variety of fragrance and color, compelling the admiration of every observer.

"Sweeping on over ridge and valley, these noble trees extend a continuous belt from end to end of the range, only slightly interrupted by sheer-walled canons at in-

tervals of about fifteen and twenty miles. Here the great burly brown bears delight to roam, harmonizing with the brown boles of the trees beneath which they feed.

"Deer, also, dwell here and find food and shelter in the ceanothus tangles, with a multitude of smaller people. Above this region of giants, the trees grow smaller until the utmost limit of the timber line is reached on the stormy mountain slopes at a height of from ten to twelve thousand feet above the sea, where the dwarf pine is so lowly and hard beset by storms and heavy snow, it is pressed into flat tangles, over the tops of which we may easily walk. Below the main forest belt the trees likewise diminish in size, frost and burning drouth repressing and blasting alike."

In no other State is there such a wealth of novelty in trees, in no other State such a variety, and in no other State trees which are so widely known and about which so much has been written as those of California. The tourist will find



A FOREST NORTHWEST OF PINCUSHION, SIERRA NATIONAL FOREST, CALIFORNIA

A dense Sierra forest at the higher elevations, where the trees of red fir and silver pine are practically all of the same age. Such forests are usually found at elevations of six to eight thousand feet and are of greater value in preserving moisture than for lumber purposes.

his trip to the State incomplete if he fails to pay them the attention they deserve.

Education in Wood Uses

WHAT is considered the most important movement ever undertaken by the lumbermen for the development and progress of their own industry is the organization, just perfected, of a department of trade extension. It will have a minimum fund of \$50,000 a year for operating expenses. While this is a comparatively small sum for the work involved it will doubtless be increased as the importance of the work is emphasized. The department is under the direction of an executive committee consisting of the following members of the National Lumber Manufacturers' Association: Edward Hines, W. A. Gilchrist, R. B. Goodman, E. B. Hagen, Wm. H. Sullivan and R. H. Downman.

Briefly stated the Department will undertake to promote the use of wood and to conduct an educational

propaganda which will at least maintain the present status of wood under the pressure of modern competition and selling methods. The field of activity concerns wood as such and does not duplicate nor conflict with the work of existing organizations. Education in the broadest sense is the keynote and every dollar used is an investment on behalf of the whole lumber industry. The initial lines of work will cover the following subjects: Building codes and shingle ordinances; engineering data for architects and engineers; fire protection; wood preservation; retail lumber sales extension; agricultural helps in lumber uses; cooperation with other organizations; publicity; and methods of promoting competitive materials.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association.

EDITED BY J. J. LEVISON, B. A., M. F.

Aboriculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School.

FALL PLANTING

NO MATTER whether we plant in the spring or in the fall, now is the time to commence the necessary preparations. This is the time to decide how many trees we need, of what species, where to place them and where to purchase them.

August or September is the best time to visit the nurseries for a personal selection of the plants required for both fall and spring planting. Even if the plants are to be used in the spring, one can have a wider choice of material if the selection is made at this period and selecting thus early will also prevent delay in delivery at the planting period, especially in the spring, when the pressure of time is very great.

Nursery-grown trees are preferable for planting to those grown in the forest. The nurseryman in training his trees aims to develop a compact fibrous root, a straight stem, a symmetrical crown and a well-defined leader. Trees grown in a neighboring nursery are better adapted to local soil and climatic conditions than those grown great distances away, and transporting them will entail less danger from injury in drying out of the roots and breaking of branches.

The quality of the trees with relation to local conditions is also important. It is important to consider such questions as to whether the plant requires a great deal of moisture or whether it will thrive in poor, sandy soil; whether it will tolerate considerable shade or whether it requires full light.

For lawn planting the low branching of the tree is a factor, while for street planting the branches should start at about 7 feet from the ground.

For street planting, it is also important that the stem should be perfectly straight and about two inches in diameter.



A HONEY LOCUST

A fine tree for an open lawn and for park purposes.

WHEN AND WHERE TO PLANT

Early spring, just before growth begins and after the frost is out of the ground, is the best time to plant most trees. From the latter part of March to the early part of May is generally the planting period in the Eastern States. Some consider the fall just as suitable a time to plant as the spring, and with some species and in some localities this is undoubtedly very true.

The location of the trees with relation to each other should be carefully considered. On the lawn they should be spread apart far enough for the full development of the crown. On streets trees should be planted 30 to 35 feet apart and in case of wide-spreading species like the elm, 40 to 50 feet is not too much.

HOW TO PLANT

An abundance of good soil (about 2 cubic yards) is essential with each tree where the specimen used is an inch or two in diameter. A rich mellow loam, such as one finds on the surface of a well-tilled farm, is the ideal soil. Protection of the roots from drying is the chief precaution to be observed during the planting process. Evergreens are more tender to exposure than

deciduous kinds and are consequently lifted from the nursery with a ball of soil around the roots. All bruised roots should be cut off and the crown of the tree of the deciduous varieties should be slightly trimmed back in order to equalize the loss of roots by a corresponding decrease in leaf surface.

The tree should be set into the tree hole at the same depth that it stood in the nursery. Its roots, except those with a ball of soil around them, should be carefully spread out and good soil worked in among them. Every fine rootlet is thus brought into close contact with the soil. The first few layers of soil should then be added firmly and the last layer allowed to remain loose in order that it may act as a mulch for the water, which is to be poured on freely immediately after the tree is planted.

WHAT TO PLANT

The choice of material will vary with the general region of the country and the local moisture, soil and atmospheric conditions, as well as with the particular aesthetic effect in the mind of the planter. No brief list of plants, given here, can, therefore, presume to be either complete or meet all the requirements of every reader. The only purpose a list like that can serve is by way of suggestion—to show, at least for the Eastern States, a few of the species that are generally considered worth planting

ORNAMENTAL TREES

1. American elm.
2. Pin oak.
3. European linden.
4. Red maple.
5. Copper beech.
6. Coffee tree.
7. European white birch.
8. Gingko.
9. Horsechestnut.
10. Sugar maple.
11. Soulange's magnolia.
12. Flowering dogwood.
13. Japanese cutleaf maple.
14. Oriental spruce.
15. Austrian pine.
16. Bhotan pine.
17. Japanese umbrella pine.

18. Obtuse leaf Japanese cypress.
19. Blue spruce.
20. White pine.

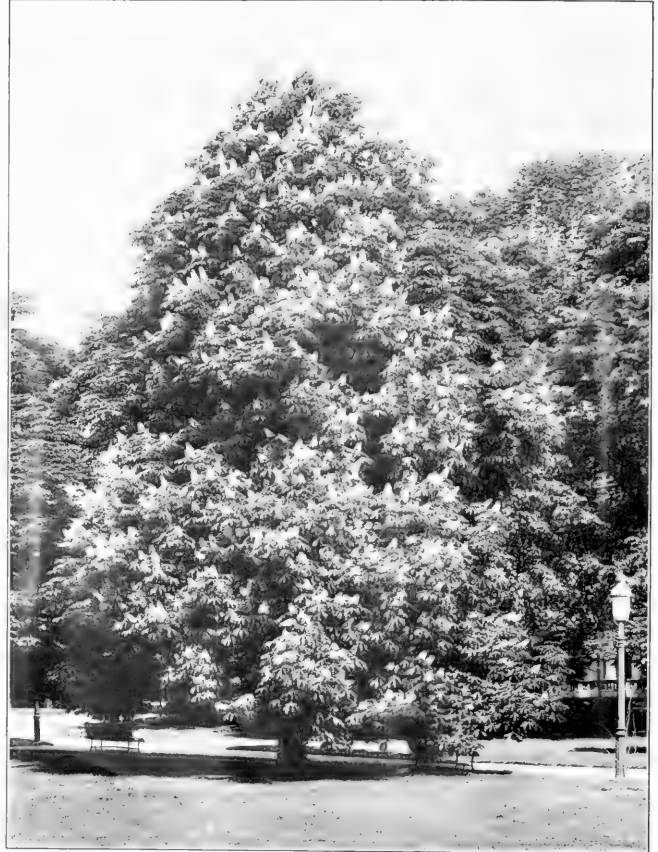
STREET TREES

1. Oriental sycamore.
2. Norway maple.
3. Red oak.
4. Gingko.
5. European linden.
6. American elm.
7. Pin oak.
8. Red maple.

QUESTIONS AND ANSWERS

AMERICAN FORESTRY invites its readers to send any questions they desire to this department and they will be answered without delay.

Discussion of the following questions is requested by the readers of AMERICAN FORESTRY, and expressions of opinion, addressed to the Editor of this Department, will be appreciated.



HORSE CHESTNUT TREE

This is a great favorite for garden and street tree planting, its large leaves and great spread making it particularly desirable as a shade tree.

1. How shall we determine what sections of a city should be included in the "Treeless Zone?" To what extent should business houses and commercial traffic across footways influence this?

Q. What can be said for and against the following practically untried trees for street and highway purposes?

- (a) Kentucky coffee tree (*Glymnocladus dioicus*).
- (b) Willow oak (*Quercus phellos*).
- (c) Hackberry (*Celtis occidentalis*).
- (d) Yellow wood (*Cladrastus lutea*).
- (e) White ash (*Fraxinus Americana*). Considera-

tion of these species is invited, with special reference to use in latitudes between New York and Richmond.

In reply to above questions on street trees, this discussion is based on my experience in the care of trees in the city of Wilmington, Del.

1. I consider the determination of the limits of the "Treeless Zone" to be purely a local one. Decision in all cases can only be reached after a close study of the existing conditions. The narrow streets of this city greatly hasten the crowding out of trees in the business center and manufacturing sections, but we are retaining every tree which it is not absolutely necessary to sacrifice. Our treeless zone is comparatively small.

2a. We have, too, a Kentucky coffee tree which was planted over sixty years ago, now in a dying condition. This tree lived through grade changes, neglect and abuse, and stands in brick pavement. Size, 18-inch diameter, and about 80 feet high. I find the Kentucky coffee tree has a tendency to have weak crotches.

2b. Have some fine willow oaks along the park drives. They are about 20 years old and in good condition. Their straight, clean stems make them fine avenue trees.

2c. Our single specimen of hackberry as a street tree is fine. Size, about 12 inches, stem 30 feet high. This tree leads me to believe they would make a good street tree.

2d. We have some large yellow wood trees on the edge of lawns close to the street; they are in good condition. These specimens have divided heads and branch low, features not desirable in street trees. This would probably be corrected in young trees by proper pruning.

2e. White ash are scattered quite generally throughout the city, varying in size and age. All seem to make good trees, give us very little insect trouble. Some very old specimens do well by cutting back to renew the top.

M. S. BLOWER,

Y. M. C. A., Wilmington, Del.

In discussing the above questions I wish to make the following answers:

1. There is no reason why there should be a "treeless zone." The business streets in Washington, in Paris, London and Berlin all have trees. If properly chosen and trimmed, trees are no interference on a business street, but rather an aid to the shopper. In factory districts

where atmospheric conditions are unfavorable, we can resort to the poplar and ailanthus. The only streets where trees might be eliminated would be those where there are markets and warehouses, where trees would really interfere with the convenience of the public.

2a. *Kentucky Coffee*—a very hardy tree free from insects and disease. Should be tried for street planting. The fact that it sends out its leaves late in the spring is a point against it.



SPRAYING ON A LARGE BROOKLINE, MASS., ESTATE

This is the most powerful sprayer in the United States, so the owners claim, and it also has the largest tank capacity.

2b. The *willow oak* is similar to the pin oak in its habits and see no reason against its being tried out for street planting.

2c. *Hackberry* makes a good shade tree in the middle west. Not so desirable for the East.

2d. *Yellow wood* is not sufficiently hardy for a street tree and does not have the necessary form.

2e. *White ash* ought to make a good tree for highways. Can see many fine specimens along highways in Massachusetts. In the city it would be liable to attack by oyster shell scale, but that should not be a point against it.

J. J. L., *Brooklyn, N. Y.*

Q. The contention has often been made that locust trees have a beneficial effect upon crops growing near them or that crops grown on fields on which there was previously a stand of black locust thrived better than those on adjacent fields. Will you please advise me?

S. T. D., *Washington, D. C.*

A. Replying to your inquiry about the effect of locust trees in supplying nitrogen to crops grown amongst the trees or after them, I will say that I know of no definite investigations of this kind but I have seen many instances of marked effect of this kind. I remember the last time I was at Montgomery, Ala., I went out to visit a plantation. There was a row of locusts through a large field in which the cotton looked like it might produce a bale or more to the acre. This strip was about ten feet wide, shading off till at a distance of about 25 or 30 feet from the center of the row the effect was no longer visible. Outside of this strip the cotton would not produce more than a quarter of a bale to the acre. The appearance of the strip was so noticeable that I inquired as to the cause. The owner of the plantation said: "That is where I used to have a row of locust trees; they always do that." This is a typical instance of several similar ones I have seen.

I may add that Mr. O. F. Cook, of this Bureau, who has given a good deal of attention to tropical agriculture, has observed that in coffee plantations it is a common practice to allow certain leguminous trees to grow here and there. The planters formerly attributed the favorable effect of these trees to their shade, but they had noticed it was the shade of only particular kinds of trees that had the effect. It was observed that in every case the trees favored by the planter belonged to the leguminosae family.

These instances lead me to believe that locust trees do have an important effect in supplying nitrogen to nearby crops or to crops which follow.

W. J. SPILLMAN,

In Charge Office of Farm Management, Bureau of Plant Industry, Washington, D. C.

Q. We set out in Century, Fla., during the past eight years some sixty to seventy-five water oaks for shade trees and these trees have been doing nicely up to the last year or two, but we now find quite a few of them suffering from some kind of a Borer, some insect that works its way around under the bark, sometimes making a circular path 15 inches long, or even longer than this, then, at apparently about the beginning of spring, works its way into the very heart of the tree, thence up to the

heart for a few inches, thereby causing the trees to bleed or lose sap.

The insect in question makes a hole in the tree, as it bores into the heart, about one-half inch in diameter, and the path that it makes around under the bark before starting into the heart varies from 1 inch wide to as wide as a man's hand.

These trees are native of this country and the young trees were gathered from adjoining lands.

We will thank you for any information as to how to handle or control this pest and any suggestions you can make us will be gratefully received.

ALGER-SULLIVAN LUMBER COMPANY,

Century, Fla.

A. In reply it is quite necessary as a basis for giving you the desired information that we should have specimens of the borer or of the bark and wood showing the character of its work. The description indicates that two or more species of insects may be involved, one with the bark-boring habit, the other a bark and wood borer. Specimens of work should show injury to living tissue.

If you will supply the specimens we will take pleasure in giving you information about the insects and methods of combating them.

A. D. HOPKINS,

In Charge of Forest Insect Investigations, Washington, D. C.

ADVICE FOR THE MONTH OF
AUGUST

1. Continue cultivating and watering the newly planted trees and shrubs and those that are weak.

2. Spray for aphids. Beech, white pine, fruit trees and elms are at this time commonly attacked by various species of soft-bodied, sucking insects and the treatment in each case, this month, is about the same—spraying with whale oil soap, one pound to 5 gallons of water.

3. Destroy the pupae of the elm leaf beetle. The elm leaf beetle has the peculiar habit of descending from the branches to the base of the tree in grub form and there changing into pupa form. This happens during the first week in August and those who are acquainted with this remarkable feature of the life history of the beetle take advantage of the opportunity to collect or destroy the pupae when they lie in masses at the base of the tree.



Twigs, buds and base of leaves of hickory trees which have been injured by the Hickory Bark Beetle.

They can be destroyed on the ground by pouring hot water over them or by spraying them with a strong solution of kerosene emulsion. Banding elm trees, so commonly practiced, prevents the grubs from crawling down the trees and defeats the very purpose intended by the bands.

4. Remove the cocoons and egg masses of the Tussock moth and insects of similar habit. These can be scraped off with wire brushes or may be destroyed by an application of creosote on a sponge or rag. The former is preferable.

5. The locust miner is now feeding ravenously on black locust trees and in some cases even on oak, linden, and fruit trees. Spraying the leaves with arsenate of lead, 1 pound to 10 gallons of water will destroy the insects.

6. The white pine weevil may now be found in grub form boring in the shoots of white pine trees. The affected twigs turn yellow and are easily noticeable. Timely removal and destruction of infested branches is the remedy.

7. This is the time when borers may be seen burrowing in peach trees or in oaks, maples and other trees. For those borers that work in peach trees and other trees that exude a gummy substance when injured, employ the method of cutting out the grub with a knife. Any attempt to inject a liquid in the cavity will be hindered by the gummy exudation. For the maples, etc., where the orifice leading to the grub is clear and large, inject carbon bisulphide and clog the orifice with a bit of soap or putty immediately after the injection. The fumes generated by the liquid will enter every crevice of the burrow and destroy the insects within.

8. August is a good time to begin thinning out woodlands where young trees are crowding each other or where young trees of better form are to be encouraged by the removal of surrounding trees of inferior quality. This work can be best accomplished while the leaves are still on the trees.

9. The latter part of August is the period to begin pruning trees and cutting off all dead branches. The distinction between live and dead branches can be made more readily before the foliage drops. The results will be more certain and the work will be accomplished with greater ease and less skill than if it were done in winter.

NOTES

1. The sycamore blight (*gleosporium nervisequum*) has exacted a heavy toll this year, especially on the native species. Complaints have come in from Rome, N. Y., and from all over Long Island. Early spraying with Bordeaux mixture has controlled the blight in Prospect Park this year and four years ago.

2. The hickory bark borer is very noticeable this year as far west as Buffalo, as far north as the Katskills and east in Connecticut. Seven years ago it was serious only in the vicinity of Brooklyn.

3. The forest tent caterpillar has shown itself more numerous this year than ever before. Whole forests were devoured on many parts of Long Island and in Pennsylvania and New York States. The insect is now in its egg state.

4. The moisture conditions have made this season a favorable one for vegetation in the East.

5. Mr. R. Brook Maxwell, city forester of Baltimore, reports a heavy invasion of the army worm in Cecil County and recommends the following formulas for spraying against it:

The first is a preparation of 2 pounds of arsenate of lead in powdered form mixed with 50 gallons of water. This should be applied to the seat of the army worm's efforts. If the lead is used in paste form, 5 gallons of paste are required to 50 gallons of water.

Another preparation that has given excellent results is made from 10 pounds of ordinary bran, one-quarter pound of Paris green, or arsenate of lead and a pint of molasses or other sweet substance such as sugar. This should also be spread over the lawn or applied otherwise to the center of the worm's activities.

The Directors' Meeting

DIRECTORS of the American Forestry Association will hold their fall quarterly meeting at the Profile House, N. H., on September 1 and 2. This meeting will be preceded by a visit to Boston on August 31, where the Arnold Arboretum will be inspected and the party will be met by officers of the Massachusetts Forestry Association and by Boston members of the American Forestry Association.

The directors will breakfast at the Algonquin Club and will leave there for the Arboretum at 9.30. The party will leave Boston at 12.30, reaching the Profile House that evening.

The annual forestry conference in the White Mountains under the auspices of the Society for Protection of New Hampshire Forests and of the State Forestry

Commission, will start on the evening of September 1 at the Profile House and the American Forestry Association directors will attend this gathering and will extend an invitation for the appointment of delegates to be present at the conference with Secretary of Agriculture Houston at Washington, at 9 a. m. on September 22. This conference will be for the purpose of presenting to Secretary Houston arguments in favor of extending the Weeks Law appropriation for the purchase of Federal Forest Reserves in the White Mountains and Southern Appalachians.

It is hoped to have Congress provide an appropriation of \$10,000,000 for this purpose, to be used during the next five years.

Children's Department

Devoted to imparting information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.

By BRISTOW ADAMS

FORESTRY AND WHAT IT MEANS

FORESTRY is the science of making trees serve man's uses continuously. The Forester deals with the woods as mass and not as single trees. He looks on this mass of trees in a good deal the same way that a boy or girl looks at a piece of moss, not taking account of frond or stem, but viewing the growth as a whole.

Not only does the Forester think in large terms as to trees over a great area, but he uses the same large thoughts in respect to time. It is nothing to him to plant a forest growth a hundred years ahead of the time when it will be cut. While the farmer plans for a season and the orchardist for a decade, or a ten-year period, the Forester plans for a century or more.

Yet, in order to know how a large mass of trees must be handled for such a long period of time, the Forester has to know the behavior of individuals, because he, of all men, can least afford to make mistakes. He has to know how each tree grows, and how it will act in relation to other trees. He must know the best use to which each tree may be put, and also how and where it should grow to fit this use. He must know which trees will grow fastest and thus give him quick returns, and which, even though growing slowly, will produce valuable timber. Only through such knowledge can he tell whether it will be best to give his land up to slow-growing, high-priced trees, or to quick-growing ones which will not sell for quite so high a price but which will earlier be ripe for cutting.

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WITH the possible exception of iron, there is no manufactured material more useful to man than wood is; it is easily worked and enters into daily life in every conceivable form. We walk on wooden floors and sit in wooden chairs at wooden desks writing our thoughts with wood-encased pencils on paper made of ground wood; then there are wooden window frames out of which we look upon the growing trees that are cut for fuel to warm our houses and cook our food. It is right and proper, therefore, that trees should be cut down and made available for man's use, just as any other crop should be harvested when it is ripe.

Besides growing wood, the forests, as a whole, serve a number of other useful purposes, and have a special influence on water and on soil.

WHEN rain falls on the bare surface it runs off very rapidly. The result is a series of floods and high waters, with corresponding periods of drought and dried-up streams. This condition is not uncommon in many parts of China and in certain areas of our own country where the forests have been destroyed. Mr. Gifford Pinchot, the father of Federal Forestry in the United States, at one time illustrated this point before some doubters by pouring water from a tumbler on the slanting top of a polished table. As might be expected, the water immediately ran off onto the floor. Then, when the table was tilted at the same angle, he poured an equal amount of water on a large sheet of blotting paper placed on the table top. In this case the water was held in the blotter. In exactly the same way the spongy root masses under the trees, combined with the woody soil which has been made up by falling leaves and twigs, and decaying trunks and stumps, holds the rain which comes from the sky.

MOREOVER, even the most driving pelting rains drop gently onto this forest floor because they are caught first by the leaves and branches and instead of falling with the force of a mile-high drop they strike the ground from only a few feet up in the air. Furthermore, a great deal of the rain slips down the trunks of the trees and reaches the ground with scarcely any force at all, to be taken into this blotter-like mass and there held for a long time to be given out through ever-flowing springs.

When a heavy rain falls on a steep hillside and the water gathers force as it goes down, it gullies and washes out the soil, taking away the finer and more fertile particles and carrying them down into the beds of the streams. The finest particles are carried farthest, and in many cases are borne away out to sea, where they form shoals at the entrances of harbors. Thus, this best soil is not only lost to the farmers, but is a serious bar to the passage of vessels, and a source of great expense, because it has to be dredged out of the channels in order that commerce may be carried on.

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THIS soil-washing, or erosion, is particularly harmful in the southeastern part of the United States, where the fine soils melt away almost like sugar. One writer on forestry has compared this action

of the water to that of a terrible dragon with steel claws, tearing away at the hillsides and destroying the prosperity of the country. The remedy for this condition—the way to fight this modern dragon—is to plant trees on the hillsides, or to keep enough trees there, if they are already growing, to protect the soil.

It can thus be seen that forests serve two principal purposes: First, as sources of lumber; and, second, as protectors of soils and streams.

IN FUTURE articles something will be told about the way trees grow and about their community life in the forest; how they struggle against one another and how they help one another. After that there will be talks on how to know the common trees.

Perhaps some readers of this department wish now to ask some questions about trees. These questions will be gladly answered. Address them to AMERICAN FORESTRY, Washington, D. C., and the answer will be sent at once.

A Pennsylvania Meeting

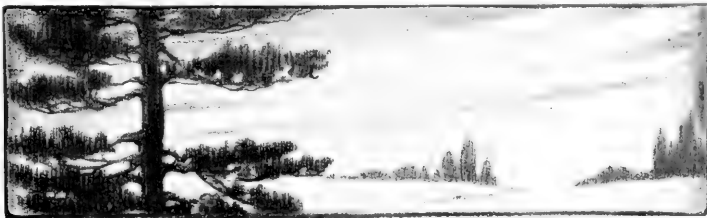
A MOST interesting and successful meeting was that of the Pennsylvania Forestry Association at Foxburg, Pa., on June 23, 24 and 25, where for three days a number of the members and guests inspected forest holdings and heard a series of instructive addresses. Foxburg is on the Allegheny River, 86 miles north of Pittsburgh and is famous as an oil-producing center, perhaps the most noteworthy in the State in the early days of the oil fields' development. Not the least interesting feature of the foresters' trips in the surrounding country was an inspection of oil wells and pumping stations on the Fox Estate and explanations regarding the present phases of the industry and reminiscences of its early days by F. L. Harvey, of Foxburg, and others.

One day was spent in inspecting the primeval forests owned by Mr. A. W. Cooke, of Cooksburg, who has an estate of 7,219 acres some 40 miles from Foxburg, on which there are many magnificent pine and hemlock trees. Here the members of the party tramped for some hours through the woods, finding much to examine and study. Afterward the foresters were entertained delightfully at Mr. Cooke's summer home.

The following day was spent in an automobile trip through the estate of Mr. J. M. Fox, a few miles from Foxburg. Here a well-established planting of some 100,000 young trees was examined with interest and then followed trips to stands of primeval oak, maple, chestnut and ash, ending with a visit to Mr. Fox's residence, where luncheon was served.

During the stay in Foxburg there was a series of meetings, at which the papers and discussions on forestry conditions were of unusual value. These included the following: "Blazed Trails in the Domain of Forestry," by Hon. S. B. Elliott, of the State Forestry Reservation Commission; "A Demonstration Tree Planting at Lehigh University," by Nat. M. Emery, vice-president of Lehigh University, read by Dr. Henry S. Drinker, president of Lehigh University and president of the American Forestry Association; "A Deciduous Forest, an Ecologic and Geographic Study," by Dr. John W. Harslberger, professor of botany at the University of Pennsylvania; "The Transformation of the Actual Forest Into the Normal Forest," by Prof. Joseph S. Illick, State Forest Academy; "Some Criticisms of Pennsylvania's Forest Policy Answered," by Walter D. Ludwig, Forester; "The Immediate Need of Extending State Forests in Pennsylvania," Prof. E. A. Ziegler, director State Forest Academy; "Aims of Central Pennsylvania Fire Protective Association," J. Linn Harris, State Forestry Reservation Commission; "The Relations Existing Between Forestry and Game Interests," Dr. Joseph Kalbfus, secretary Pennsylvania Game Commission.

There were also other addresses by Hon. Robert S. Conklin, chief of the Pennsylvania State Forestry Department; Dr. J. T. Rothrock, formerly a member of the State Forestry Commission; F. L. Harvey, of Foxburg; Hon. John Reed, of Foxburg; Robert H. Wilson, of Foxburg, and others.



Coal Company Practices Forestry

By A. C. NEUMILLER, Forester

THE Lehigh Coal & Navigation Co. and the Panther Valley Water Co., one of its subsidiaries, own large areas of forest land in Carbon and Schuylkill Counties, Pennsylvania, approximating 2 miles in width and sixteen miles in length.

For a number of years timber was taken from these lands and used for mining purposes, leaving the forests in an extremely bad condition. No attempt was made to confine forest fires with the result that today, there is a vast area of waste land, covered with sprout growth of

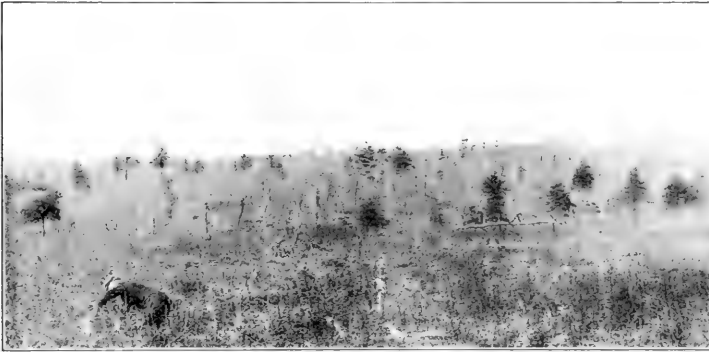
is destroyed by forest fires. An investigation showed that over 60 per cent of the fires were caused by sparks from locomotives; 125 of these locomotives operating daily over heavy grades in and around the company's land, so that it became a matter of extreme importance for the department to establish a system of forest fire protection without delay.

The first step taken in this direction was the installation of proper spark arresters on all locomotives owned by the company and one of its subsidiaries, the Lehigh & New England Railroad Co., operating in this section.

It was also noted that forest fires were caused by hunters, berry pickers and other people, who frequent the woods for pleasure, through their carelessness with matches, etc.

To establish adequate fire protection and to bring about the prompt extinguishing of forest fires, fire rangers were employed and instructed in the most approved methods in preventing and putting out fires.

At this time, there are eight fire rangers, each assigned to a district, where there are natural look-out points and telephones.



CHARACTER OF LAND ON WHICH PLANTING WAS DONE

This land was originally covered with forest, but this was cleared off years ago and the timber used in early mining operations. Since then it has been swept by fire so much of the land in the Pennsylvania anthracite region has. These fires are followed by a scrubby growth of chestnut, oak and pitch pine.

oak, maple, chestnut and pitch pine, interspersed with good stands of timber, which nature saw fit to preserve.

This condition is not only true of the coal fields in Carbon and Schuylkill Counties, but it is practically true of all the coal fields in Pennsylvania. Realizing the necessity for conserving the timber still growing and reforesting the waste land, the Lehigh Coal & Navigation Co., several years ago, employed a forester to organize a department, whose sole duty it is to prevent a further waste of these resources and to reforest the waste land.

In Carbon and Schuylkill Counties, as well as in other sections, most of the young timber



RANGERS AND LABORERS PLANTING

of this year planted by A. C. Neumiller during the spring of this year planted 100,000 young trees. The planting included 300,000 Norway spruce, 300,000 pitch pine, three thousand Norway spruce, and two thousand pitch pine and the work cost approximately \$10,000.



REMOVING TURF AND DIGGING HOLE

This is the first operation in the planting of the waste lands of the Lehigh Coal and Navigation Co. The planting crew follows with the seedlings and the operation is quickly completed.

The duties of the rangers are similar to those of the State Forestry Department. During the forest fire season, they continually patrol the property, when not fighting fires. In other seasons of the year they assist in cutting and cleaning fire barriers, building trails, cutting timber, etc. During the spring and fall fire seasons, the force of rangers is increased two and three fold.

The rangers are equipped with fire extinguishers, holding 2½ gallons of chemical mixture. Connected with the extinguisher is a water-proof bag, holding 8 gallons of water, from which the extinguisher can be recharged. We have found this device of great value, particularly in burning fire lines and back fires.

The power transmission lines radiating from the Lehigh Navigation Electric Company's new power plant at Hauto to the coal and cement regions, are kept clear, and thus serve as fire barriers to a good advantage.

On the Broad Mountain barriers 30 to 40 feet wide have been cut through the largest isolated tract to aid in the rapid transportation of labor to fires. Some of these barriers have been plowed, and in time will be developed into roads, which can be used for transporting timber.

There are spots along these barriers where the mountain is so rough as to prevent plowing; at such places two 8-foot parallel strips are cut, leaving 20 feet of uncut brush between the two strips. It is then an easy matter to burn the 20 foot strips each year. This method eliminates the cost of cutting and plowing.

In many instances the fires cannot be extinguished by the ranges, and in such cases the Department procures laborers from the different operations of the company, or when the fire is located at too great a distance from the operations, they procure the service of persons living nearest to the scene of the fire.

The Boy Scouts of America of this section recently organized, the Lehigh Coal & Navigation Co., lending its moral support, take considerable interest in the prevention and extinguishing of forest fires. It has been found that half a dozen enthusiastic Boy Scouts from fourteen to eighteen years of age, can get to a forest fire and put it out before other ordinary labor arrives.

Farmers and adjoining land owners cooperate with the Lehigh Coal & Navigation Co. in the work toward the prevention of unnecessary losses due to fires.

The following table, showing a comparison of fires during 1914, the first year of the department's work, with that of the year preceding it, shows a marked improvement in the losses, notwithstanding the fact that the dry weather conditions during the forest fire seasons in the year 1914 increased the number of fires 50 per cent.

| | 1914 | 1913 | Change |
|-----------------------|----------|-----------|------------|
| Number of fires..... | 102 | 68 | +34 |
| Area burned, acres... | 1420 | 15000 | -13580 |
| Cost of extinguishing | \$882.71 | \$1912.70 | -\$1029.99 |

Attention is called to the fact that while the number of



PLANTING THE WHITE PINE

Most satisfactory results were obtained from this planting. Here the planter is banking up the earth around a four-year old transplant which is so hardy and strong that only a small percentage fail to grow.

fires in 1914 increased 50 per cent the acreage burned was less than one tenth of the 1913 figures.

As previously referred to, there are a number of stands of good timber scattered through the Company's land, consisting mostly of mixed hardwoods, a large percent-

age of which are mature, over-mature and defective. The clearing of the stands of matured timber naturally develops the other standing timber.

The expenses of the Forestry Department are derived from the sale of over-mature and mature timber to the mining operations of the coal company. Revenue is also derived from the sale of timber from mine crop falls and from timber cleared from sites used for dumping refuse or for dumping of clay at the stripping operations.

It is the duty of the department to see that no useful timber is wasted. Timber cut from the company's land can be delivered to the mining operations at about one-half the cost of timber purchased in the open market; notwithstanding the fact that some of this timber has to be transported from the mountain sides, a considerable distance from the colliery operations. The freight haul on mine timber, purchased in the South, where most of the company's supply is obtained, is about one-half the total cost of the timber.

The lands of the Panther Valley Water Co. were acquired principally for their sources of water, necessary in the operation of the mining plants, as well as for domestic use. Due to the remoteness of this land from towns it has been neglected from a timber standpoint.

Recently an 80,000,000 gallon reservoir, domestic supply, was completed by the water company on one of its water sheds, and it has been decided to have this land reforested.

The location is in the Broad Mountain, a plateau ranging from 900 to 1,800 feet above sea level; the soil is light, deep and sandy, with a porous sub-soil varying to moist clay flats, which are not continuously wet.

The present sprout growth of chestnut, oak and pitch pine have been ravished from time to time by fire. With proper protection, this growth can be developed into good mine timber.



THE FINAL OPERATION IN PLANTING

After the earth is carefully tramped down the seedling is left to take care of itself and then it will not be many years before it is growing at a rate of 10 to 15 inches yearly.

A survey of the territory shows many small patches called "holes" occurring all over the water shed. These holes vary in number from 200 to 600 per acre and are lacking of any growth, except sweet fern and moss.

These holes are being planted with nursery stock of evergreens, and the sprout growth of hardwoods are being developed. To determine the best species, a trial tract of transplants was planted with the following results:

Per Cent Success

| | |
|---------------------|--------|
| White Ash | 95 1/2 |
| White Pine | 87 2/3 |
| Norway Spruce | 82 |
| Pitch Pine | 76 1/3 |
| Scotch Pine | 66 1/2 |
| Red Pine | 51 3/5 |



WHITE PINE AND WHITE ASH HEELED IN

Greater success followed the planting of these two species than any other and most of the replanting on this land in the future will be done with them. Over 90 per cent of the white ash and over 87 per cent of the white pine planted proved successful.

In all cases except white ash the transplants were in mixture.

Due to the high percentage of success with white pine, Norway spruce and white ash, it has been decided that future planting will be confined to these three species, the Norway spruce and white pine in mixture.

During the spring of 1915, 9,000 trees, consisting of 4,000 white pine four-year transplants, 3,000 Norway spruce three-year transplants and 2,000 white ash one-year seedlings, were planted.

The white ash is planted in the creek bottom lands, while the evergreens are confined to the sloping lands above.

The planting of the 9,000 trees referred to cover approximately twenty acres and the work was done

chiefly with ordinary labor and fire rangers. The total cost of the trees and planting was less than \$200, or approximately \$10 per acre.

A forestry department, such as outlined above, can be maintained from revenue derived from the sale of timber previously wasted, and the incalculable benefit from systematic reforestation and the conservation of growing timber is not only of great importance to the water shed, but will yield a handsome source of revenue in the future, and at the same time will slowly change the present mountain sides, almost barren of tree growth, to a thriving forest.

North Carolina's Action

MEMBERS of the North Carolina Forestry Association, at their meeting at Montreat, N. C., in July, passed resolutions earnestly advocating the continued purchases of forest reserves in the White Mountains and Southern Appalachians and the appropriation by Congress of \$2,000,000 a year for this purpose during the next five years.

These resolutions stated that as the purchase of mountain lands in the East, under the Weeks Law, is of national benefit in securing a perpetual growth of forest on the watersheds of navigable streams, thereby preserving water-powers and navigation on these streams as well as a continuance of a timber growth for industrial purposes, and, as under recent legislation these lands are open to the public for camping and residence purposes, thus affording facilities of great value for pleasure, health and recreation, that Senators and Representatives in Congress be urged to give their support to the recommendation of the National Forest Reservation Commission for a further appropriation for this purposes.

The North Carolina association also commended the action of the American Forestry Association in calling a meeting at Washington, D. C., on September 22 to present to Secretary of Agriculture Houston arguments in favor of Congress making an appropriation for the purpose of Eastern forest reserves. Delegates will be appointed to attend this meeting.

It was also decided to urge additional Congressional appropriations for assisting the States in forest fire protective work and to urge a law giving the Federal Government authority to establish game preserves on Federal Forest Reserves in North Carolina.

The program of address covered practically every phase of forest conservation and was most interesting and the attendance was large.

As a result of the conference on forest fire protection it is expected to have several cooperative areas started in the western part of the State during the coming fall.

Danger Season in the West

FEATURES of forest protection in the Pacific Northwest this year are an appeal to the public for assistance in preventing the smoke nuisance which will otherwise prejudice the stream of visitors going to and from the San Francisco Exposition and a perfected system of dry wind forecasts by the U. S. Weather Bureau which will be used by all protective agencies. State officials and chambers of commerce are sending out thousands of letters emphasizing the importance of reducing the smoke evil.

Reports for June received by the Western Forestry & Conservation Association, the clearing house for all private and official patrol systems from Montana to California, record practically no losses by forest fires up to date, but no cessation of preparation for the danger

months of July and August. Most of the patrol force is already on and within a few days over 2,000 will be on duty in the four Northwestern States. Favorable weather in June has been used in pushing the building of trails and telephone lines.

July hazard that had to be guarded against, other than from the usual carelessness with matches, cigarettes and campfires, was chiefly in slash burning to clear land and rights of way and in leaving fires thus started to smolder in logs and stumps to break out later in hot windy weather. Forest officers announce that State laws prohibiting burning without permit and precaution will be enforced rigidly and also warn summer camping parties to be extremely careful with campfires.

Yale Forestry Class in the Woods

By JAMES L. GOODWIN

ONE morning early in March, thirty of us, enthusiastic Yale Forest School seniors, awoke to gaze from the windows of our special sleeper at the little mill town of Clarks in northern Louisiana, upon which the sun was shining with a warmth and brilliance which we had not felt for many weeks. This town and its surrounding woods was to be our home for three months, and here, according to the annual custom of the Forest School, we were to be put into practice the principles of forestry acquired in the lecture room and learn from the actual operations in the woods and the mill how the tall pine trees of the forest are converted into lumber for our towns and cities.

We were not long in starting on a tour of investigation of our new surroundings. The first point of interest that attracted our attention was the general supply store, over whose wide doorway was written in big letters, "The Louisiana Central Lumber Co., and in and out of which sauntered in leisurely southern fashion long, lanky lumbermen and negroes, while a group of farmers whose horses were hitched to various trees and posts in the vicinity stood on the front steps and discussed the crop and timber output and vigorously chewed tobacco. Next to the store stood the hotel, a large white building, with vine-covered verandas reaching to the roof and a small green lawn in front, surrounded by a picket fence, and in which a row of rose bushes was already beginning to show signs of life. In front of the hotel ran a broad, dusty roadway which, before it ended in the pine woods a half mile beyond, was lined on each side by small, one-storied houses where the mill employes lived. A library building, a less pretentious church and a two-storied wooden house that was used as a dispensary and infirmary completed the list of buildings on Clark's main street. Adjoining on the left and covering as much space as the town, stood the sawmill, its long alleyways piled high with various sizes and grades of yellow pine lumber, its tall chimneys and refuse burner emitting black smoke, and the ever-busy saws on its mill floor and in its planing shed sending out to the warm air a continuous buzz and hum.

After hastily swallowing a scanty breakfast at the hotel, we embarked on the special train, consisting of a caboose and engine, which the company had provided, and were taken 8 miles over the logging railroad to the site which had been selected for our camp.

A half hour's run brought us to our destination and



CAMP OF THE YALE FOREST STUDENTS

Here in the depths of the lonely Louisiana pine woods, the boys made their camp of fifteen canvas houses, including a cook shanty and bunkhouse, each tent being fitted with a wooden floor and made thoroughly comfortable.

we landed bag and baggage. Here ground had been cleared and a cook shanty and bunkhouse built, and at once we set to work laying floors with lumber that had been provided by the company, and raising tents, so that by nightfall this lonely spot in the depths of the pine woods was suddenly transformed into a settlement of fifteen canvas houses.

Next day work began. It was divided into two parts: the forestry work and surveying, and a study and written report on the lumbering operations in the woods, and on the work in the mill at Clarks.

For the first six weeks surveying with transit and level was carried on over the neighboring roads within a radius of 12 miles, while in the woods land lines were run by crews of six with a chain and surveyor's compass to re-establish old section and township lines and corners. Later a timber estimate was made by sections of an area of approximately 50 square miles, and a map



VIRGIN LONG-LEAF PINE

was drawn showing the forest types, roads, fields, streams, houses and contours.

"While you are walking through the woods," said the professor in charge, "learn to distinguish between the three species of pine growing here." The long-leaf pine, with its long, thick needles growing in plume-like bunches, bark in long, thin plates and enormous cones which lay scattered on the ground at its base, was not hard to pick out, but the loblolly and short-leaf pines, which grew in greater abundance and possessed smaller needles and cones, could only be distinguished from one another by the difference in size of their bark scales.

In the swamps and along the bayous grew many different species of southern hardwoods: Spanish, Black Jack, white and Texas oaks, black and red gum, the winged elm, with its curious cork-ridged branches, and growing out of the bayous; the south-

ern bald cypress, surrounded by the root-like growths protruding from the water, known as "knees."

Under these tall trees grew a dense and tangled underbrush of shrubs, bushes and vines, often covered with sharp thorns and spines that made traveling through these woods frequently of the greatest discomfort and inconvenience, and destructive to both clothing and temper.

At first the nights were cold and the days hot. The thermometer at noon frequently rose to 85° in the shade, while at night it fell to 40° and below. During these nights four or five blankets and a sweater were none too warm, and at 6.30 in the morning it was a shivery crowd of foresters that peered from the flaps of their tents, and, after a hasty toilet, ran down to the cook house for breakfast.

Every other Saturday was a holiday and when these long-looked-for days arrived, those of us who had grown tired of camp life and wished to get a glimpse of civilization would shave and change our old flannel shirts, khaki trousers and high boots for a collar and necktie and presentable clothes, and ride into Clarks on the log train.

Sunday was spent either in Clarks, where we would sometimes go to hear the old Baptist minister exhort his congregation in eloquent, and often violent language, or out at camp, where we could take long walks or go fishing in the bayou.

The study of the lumbering operations going on all around us occupied two weeks. An inspection and detailed study was made into the methods, equipment and cost of logging from the felling of trees in the woods to their transportation to the mill at Clarks. This included the building, equipment and maintenance of the logging railroad. Later, in



HAULING LOGS WITH A MULE TEAM

Part of the course of instruction in the Yale Forestry students in summer camp consists of inspection and detailed study of the methods, equipment and cost of logging from the felling of the trees in the woods to their transportation to the mill

addition, another two weeks' investigation was made in Clarks of the methods of mill stocking, the arrangement and equipment of the manufacturing plant, the manufacture of rough and finished lumber and the system of grading lumber.

Our camp was situated within half a mile of where lumbering was being carried on. A walk through the pine woods led to a railroad spur, where the freshly cut stumps, covered with yellow, sticky resin, the piles of huge pine logs and the disorder of tops and branches lying in all directions indicated that only a short time had elapsed since the lumbermen had been busy in this district with their saws and axes. Nor had they proceeded in their work to any great distance. From out of the woods where the tall, rough barked pines still remained standing, came the ringing blows of axes and the sound of cross-cut saws. Occasionally an old veteran would begin to tremble, then slowly lean to one side and, falling faster and faster, strike the ground with a crash that shook the ground in the vicinity and could be heard for several miles around. The fallen tree would then be sawed by the sawyers into 16- to 20-foot logs, which were subsequently loaded onto eight-wheeled wagons and slowly hauled by mules or oxen to the side of the track, where they were piled on a skidway, ready to be hoisted to the log cars by the log loader and carried off to the mill.

The lumber camp was another object for investigation. This little settlement bore the name of Oakland and consisted of thirty or forty wooden portable houses, a store for supplies and stables for the mules and oxen, and was situated on the main logging railroad. Each house consisted of one story and two small rooms about 12 by 12 feet, and housed the lumbermen and, in many cases, their wives and children. They were owned by the lumber company and were rented out to the men at



TO CLARKS, I.A., ON THE LOGGING TRAIN

Clarks is in northern Louisiana and it was near the little village that the Yale Forestry students spent a busy summer doing practical work in the woods.

a monthly rate of from \$2 to \$3. At the little store and postoffice, also of the portable variety, such a miscellaneous supply of goods were to be had as hats, shoes, canned vegetables, fruit, candy and tobacco.

As one examined the men who lived and worked there, he could not but realize what a thin, unhealthy-looking lot they were, often very tall, but slim and narrow-chested and with constitutions undermined with malaria or subject to attacks of pneumonia, which frequently proved fatal.

In our own camp we led a regular and, until the arrival of the extreme heat in May, healthy life. Breakfast was at 7 and at 8 everyone was supposed to be dressed for the woods, and equipped with lunch, water canteen and whatever instruments that were necessary for his especially assigned work for the day. Surveying and traverse work required transit, level and traverse board and was conducted on the roads. Timber estimating, on the other hand, required calipers and



GETTING LOGS ON THE CARS WITH A LOG LOADER

The work of the Yale Forestry students in the woods included the building, equipment and maintenance of the logging railroad, an entirely practical experience.

height measurers, and was conducted in the woods. Most of the latter work was carried on several miles from camp. The road to one of the heavily timbered regions led for 2 miles through pine woods downward to the valley of the Castor Bayou. No good roads association had yet been organized in this part of Louisiana, and the highway along which we walked was dignified by the name of road. It was a rough and rugged enough trail on which to travel by foot, but when one risked his peace of mind in a wagon on this thoroughfare, as most of the farmers had long ago accustomed themselves to do, he was indeed brave. Sometimes the wheel track on one side would be 2 or 3 feet higher than the other, sometimes a tree would fall across and bar the way, and after a heavy rain storm it was no uncommon occurrence for the swollen streams to cover the roads to a depth of 2 or 4 feet, so that the wayfarer who drove or rode on horse or mule would be compelled to swim his beast across.

Before reaching the Castor Bayou, we passed two or three small farms. These stood in clearings and were surrounded by ploughed fields in which the stumps and dead trunks of girdled pine trees still remained, the owner not having sufficient energy to cut them down. Fat razor-back hogs snuffed and grunted around the front door or lay sunning themselves in the dust of the road, and sometimes a disagreeable bloodhound ran barking to the gate. The houses were small, wooden shacks of two or three rooms, where the farmer and his family lived the year round. Extreme poverty and ignorance appeared to be universal in this region, and even the largest and most prosperous land owners lived amid conditions that would be tolerated nowhere else.

As we approached the river valley the pine trees became smaller and less numerous, and oaks and gum trees took their place. At this season the woods were white with the blossoms of the flowering dogwood, whose branches appeared in the rest of the foliage like small scattered clouds. The jasmine vine too covered bushes and shrubs with a mass of yellow blossoms which gave forth a sweet heavy perfume.

The Castor Bayou was a small stream which we crossed on a long iron bridge. Out of its brown, muddy waters grew tall, straight cypress trees surrounded by their rootlike knees which protruded above the surface; Spanish and white oaks, sweet and sour gum trees and winged elms grew on the banks, and under them the thick underbrush and the bushes, which later bore the little red "May haws" or "May apples," were beginning to turn green.

After leaving the bayou, our road led out through a flat open country, bordered on each side by wide fenced-in pasture lands, where horses and cows and hogs were

feeding. Frequently we found here rows of large, skinny necked turkey buzzards lining the top fence rails and silently watching for an unsuspecting chicken to make its appearance in the fields beyond or a fat young razor-back to wander from its mother's side.

We soon diverged from the road and after crossing a stream, several fences and some open fields, again entered the pine woods. We had not far to go before we found what we were looking for—a large fresh blaze cut in the bark of a young pine tree on which was written in black letters "1320." This marked the quarter section previously measured and blazed and marked the spot where that day we were to begin timber estimating. All morning long we walked back and forth in the quarter section in carefully sighted compass lines north and south, measuring the diameters and heights of the pine trees.

At noon we found a shady spot and stretched our weary limbs on the ground and ate lunch. It was then that the active ticks and jiggers began to discover us and it was much better at this time to discover a small round brown tick traveling up one's trousers than to have to pull the head out later which the tick, if possible, firmly burrowed into one's leg. Lizards and chameleons also disported themselves on shrubs and trees, rustling about among the dead leaves or darting down the trunk of a tree and running out on a log where in a warm bright spot they would sun themselves, turning from a dark brown to a vivid green and ever keeping on the alert to snap up a palatable looking fly.

After an hour's rest, we resumed work, keeping at it until 4 or 5 o'clock. The time for quitting work, however, was a variable one and as every one was supposed to be back in camp at five, it usually depended on the distance that intervened and whether one could walk at the rate of three to four miles an hour. If a heavy tropical thunder shower suddenly took a crew unawares, as was sometimes the case, a record time was made back to camp, but usually the warm weather did not admit of very fast traveling.

Occasionally the work was carried on in districts situated at such a considerable distance from camp that we were forced to beg a night's lodging at the nearest farm. On account of poor food and sleepless nights, due to unseen occupants of our beds that we usually encountered at these houses, we did not look forward with the keenest anticipation to these distant trips. But back at camp again, after a good supper, while some smoked and others played guitars or mandolins, with the whip-poor-wills and tree frogs joining in, we forgot we were way down in the forests of Louisiana; we forgot the heat and long dusty roads, and the life of the forester and all it stood for seemed worth while once more.

Editorial

THE ENLARGED MAGAZINE

WITH this issue the AMERICAN FORESTRY MAGAZINE makes a departure from the form it has had for the past twenty years—a change which it is hoped will greatly please the members of the association and render the magazine of still greater value to them in the future. Not only is the enlarged size more attractive in appearance and more convenient to handle and to read, but it permits larger and better illustrations, so desirable in presenting pictures which are of value in impressing upon the mind the essential points of the articles they illustrate.

Public education in forestry and in a knowledge of trees is so necessary to the success of the movement for forest conservation and for proper care of ornamental and shade trees that AMERICAN FORESTRY will present each month a series of instructive articles designed to further this necessary public knowledge of forests and trees. The cover of the magazine will have a picture in colors of the particular tree being described, so that identification of it may be readily made, and there will follow articles on its appearance, characteristics and its commercial uses, so that the readers may acquire a

personal knowledge of the best-known trees, a knowledge which will not only be desirable but beneficial to them. There will also be special departments on forestry for children, which will be interesting for adults as well; on birds, without which to wage war on insects there would be no trees or other vegetation; on wood preservation, which has such an important bearing on forest conservation, and on ornamental and shade trees, about which there is such a rapidly growing public desire for knowledge.

In addition to these features, there will be the usual timely and important articles upon various phases of forestry, articles which will keep the members informed of forest conditions not only in the United States and Canada but all over the world.

Appreciation of these improvements in the magazine is, of course, expected, but what is most desired is such substantial appreciation as an increase in membership in the association. This may best be secured by the present members telling their friends about the association, its work and its magazine, and nominating them for membership.

ONE-THIRD OF OUR LUMBER WASTED

ONE of the vital essentials in the conservation of the forests is the utilization of as much of the tree cut down as possible. The fact that, with lumber conditions as they are, 30 per cent, or almost one-third, of the timber cut is left in the woods to waste makes it apparent that a reform in the lumber industry is absolutely necessary to prevent a great natural resource being shamefully dissipated.

Reduced to figures, this waste means an annual loss of fifteen billion feet of timber, or practically one year's total consumption of timber every three years.

This fact was presented to members of the Federal Trade Commission in Chicago in July by President R. H. Downman, of the National Lumber Manufacturers' Association in describing the condition of the lumber industry. Mr. Downman and a number of other leading lumbermen were invited by the Commission to tell how severe the depression in the lumber industry is, what has caused it, and suggest measures for improvement.

Perhaps no business in the United States has suffered so greatly in the last several years as the lumber business and perhaps for none is the outlook for the future more cheerless. It is therefore of prime importance that some action be taken to revive it. The Federal Trade Commission has indicated its desire to aid in this

and the meeting was the first of a series at which the members of the Commission will hear facts concerning the industry and consider the remedies suggested. What may result from this is not yet apparent, but the opportunity to present their case has been given to the lumbermen and it is up to them to cooperate with each other in the endeavor to decide upon some legal, practical plan by which their business may be saved and by which it may be possible for this great industry to regain the place it formerly held.

What this industry means to the United States may be judged by Mr. Downman's statement that:

"We are here today representing an industry which has an investment of practically two and one-fourth billion dollars in the way of raw material and development—an industry which is the third largest in the point of employment of all industries in the United States, engaging 695,000 men, upon whom are dependent 3,475,000 people."

How the extreme depression of the lumber industry results in waste of the forest resources was described by Mr. Downman when he said:

"The condition of this business in the last eight years has been one of demoralization. Practically little or no profit has been made during that period. At the present time an actual loss in the business is

occurring, not only of profits, but an unavoidable, but nevertheless shameful, waste of forest resources. In some instances it will be demonstrated that the assets being converted into lumber are being sold on a basis which yields the owner nothing. This situation is due, more than any other thing, to over-production and uncontrolled competitive conditions.

"The price of lumber has gotten so low that a very large portion of the tree cannot be profitably manufactured. As a result of this condition 30 per cent of the cut is permitted to stay in the woods to waste. Based on the production in the United States for 1909, practically fifteen billion feet of timber is wasted annually, which in a period of a trifle over three years, is one year's total consumption of lumber."

The public has a very definite interest in the situation, an interest which deserves most serious attention, an interest appreciated by the lumbermen, and the guarding of which is one of the prime objects of the American Forestry Association. Of this interest, President Downman said to the commission:

"It is not alone our own business interests that are being sacrificed on the altar of unlimited and uncontrolled production of timber products, but, indeed, the broader interest of the public itself is involved. The wicked and needless waste of a prime, natural necessity would be impossible in any other civilized country in the world. With us waste results from fear of law; in Europe waste is made impossible by law.

"The suggestions to be made to this honorable body by these business men will in no way encroach on the anti-trust laws of our nation. It is not our purpose to urge a course of action that runs counter to the fine spirit of justice that illuminates the interpretation by our courts of these laws. The *Rule of Reason* is the very essence of the thought we seek to present. At the base of all laws is to be found the purpose of conserving public welfare. This is the ultimate view of our courts in analyzing the purpose of our anti-trust laws. We, as business men, although wishing to benefit our own interests, seek by the suggestions to be made to this commission to so order our affairs that self-interest will not obscure public welfare."

Of the causes that contributed largely to the depression in the lumber business, Mr. Downman said:

"The railroad industry, one of the largest consumers of lumber in the United States, has not been in the market normally since 1907, and we estimate that their consumption today does not exceed more than 50 per cent of normal consumption.

"The export business, which consumes 10 per cent of the production of lumber, has practically ceased on account of the war. In the summer of 1914 building operations stopped by reason of financial conditions.

"All of these causes, coupled with uncontrolled output, contribute to produce the demoralizing con-

ditions that have for a long period existed and still exist. Prices have gone to pieces, wage scales have been universally reduced, and bankruptcy has overtaken a large number of individuals engaged in the industry.

"To this statement there is appended a compilation of data taken from Dun and Bradstreet covering a period of five years. This data gives a vivid and tragic picture of the financial ruin that has overtaken a large number of the lumber manufacturing interests and the impending threat to all such interests."

The data referred to shows that in the last five years 2,253 lumber firms, the liabilities of which amounted to \$85,756,280, have become bankrupt.

In conclusion Mr. Downman made the following appeal, after which further evidence, in detail, was presented to the commission by other leading lumbermen:

"We earnestly urge the commission to make the fullest possible investigation of our trade conditions—and this for the reason that we feel that if this body becomes thoroughly conversant with the industrial and economic situation as today exists in the lumber manufacturing business, you will, not only permit some plan for relief, but of your own initiative, urge such a course."

It has been variously estimated that the timber supply of the United States, at the present rate of cutting and present extent of re-growth, will be exhausted in from fifty to a hundred or hundred and fifty years. With a knowledge of all that forested land means to the health, wealth and prosperity of a country, how vitally important it is to overcome a condition that permits 30 per cent of the timber cut to be wasted. How much it will mean to future generations if industrial and economic reforms which will prevent most of this waste are adopted. It is possible by wise regulation of output and proper adjustment of prices to provide for the utilization of much of the timber which is now wasted. Such utilization would add scores of years to the life of the forests.

Nor is this all that is necessary. The forests should be perpetuated. Their ultimate elimination in one hundred years or in one thousand years will lead to just such conditions as today exist in China, from whence, at this writing, news dispatches announce the loss of 150,000 lives on account of unprecedented floods. Had China's forests not been destroyed, such floods would not be possible. In a lesser degree, but at the same time strikingly impressive, is the report of flood losses in Ohio aggregating \$1,000,000. It is the loss of forest cover which in great measure results in flood conditions.

With all there is at stake both as it concerns business conditions and conservation of the forests, the decision of the Federal Trade Commission will be awaited with eagerness and anxiety.

Wood Preserving Department

The Modern Application of Wood Preserving Methods—Various Treatments and the Uses of Treated Woods

By E. A. STERLING

[In this department each month will be given the best information regarding all phases of wood treatment by preservatives and the uses and values of treated woods, this having become an essential feature of conservation. The Editor will welcome any inquiries.]

THE universal use of wood makes the modern practice of preserving it against decay of wide interest. The saving which is effected, and the extension of the use of wood because it can be made permanent, concerns the consumer, the lumber producer, and the wood preserving interests on common ground.

The decay of timber has been a problem since time immemorial, yet wood so far surpasses all other structural materials in workable qualities, availability, beauty and convenience that it has held its own through all the years. Under modern competition with other materials it still retains the leading place, and by proper preservative treatment as now developed the renewals necessitated by decay can be greatly reduced or eliminated. Permanence and improved service become a matter of knowledge. Information on the subject should be extended so that treatment can be applied where it is economical or otherwise advisable.

In this country the extensive commercial application of wood preserving methods is a twentieth century development. It is true that the first plants were built nearly forty years ago and crude treatment applied even earlier; yet only during the last fifteen years has there been rapid advancement. In Europe wood preservation has been an accepted practice for three-quarters of a century, with the recorded experimental use of many preservatives and processes extending back to 1657. Even in the dim ages of Egyptian supremacy, it is apparent that ways and means had been found for preserving animal and vegetable tissues indefinitely; while during the early Greek and Roman civilization oils were applied to preserve their statues and bridges.

The modern application of wood preservation depends on the economic advantages and on knowledge of the possibilities and methods. During the years of rapid industrial expansion and of cheap and abundant supplies of lumber it was cheaper to renew the wood which decayed than to incur the greater initial expense of making it permanent. These conditions no longer hold, hence the adoption of wood-preserving processes, first by railroads for crossties and bridge timbers; later for a great variety of construction timbers which are subject to decay. The next step is to the home builder and retail trade.

Despite the fact that several hundred different materials have been tried and advocated for preserving

wood, the cheapest and most effective in use today have been known and used for many years. These are coal tar creosote and zinc chloride, each having been brought to us from Europe. Strangely, both were invented or proposed in England in the same year—1838. New preservatives are continually being produced and promoted, and while some of them have merit, the two old standards remain supreme in point of consumption and general acceptance. The test of time is the essential proof of efficiency, and other preservatives may ultimately make good. To merely prevent or defer decay is not enough; the ideal preservative must be permanent, penetrate the wood readily, and not be too costly.

The nature of decay is understood by scientists, but is not of general knowledge by the public or even by everyone interested in the wood-preserving business. As applied to wood decay is caused by vegetable organisms known as fungi. These propagate by means of microscopic spores, which are equivalent to the seeds of plants. Being produced in enormous numbers and blown about by the wind, they are present everywhere. When they find lodgement on wood they develop a growth of microscopic threads which penetrate the tissues of the wood and cause disintegration. After a period of growth they produce fruiting organisms which constitute the common fungus growth seen on decayed wood.

In order to develop, the fungi must have moisture, favorable temperature, air supply, and food. The latter is furnished by the wood itself and the other factors are present in practically all outdoor conditions. Preservatives prevent the development of the organisms of decay through the double function of being antiseptic or toxic and killing or poisoning the spores, and by at least partial elimination of moisture. The antiseptic feature is probably the most important and while inert oils, which to an extent waterproof the wood, will prevent decay for a time, they are not certain or permanent in their action. Coal tar creosote is both antiseptic and moisture excluding to a marked degree. It also has the further advantage of permanence. Zinc chloride is effective mainly through its poisoning action to low forms of vegetable growth and from our present knowledge is of greatest efficiency in regions of low rainfall or in dry situations.

Preservatives are applied to wood in several different ways, the more common forms of treatment being pres-

sure, open tank and brush. They are efficient in the order named.

The pressure treatment in large closed cylinders gives thorough impregnation of the wood, which protects all portions and makes the preservative less liable to loss by evaporation in leeching.

The open tank treatment consists of immersing the timber in open tanks containing the preservatives, and by the application of alternate hot and cold baths. Penetration to a considerable depth is obtained.

The brush treatment is superficial, but liberal coatings of hot creosote or similar coal tar derivatives protect the wood from decay to an extent which fully justifies this form of treatment.

The cost is naturally determined by the amount of preservatives used, hence the pressure treatment is adopted for crossties and structural timbers, where permanence rather than initial cost is the determining factor. Choice between the open tank and the brush treatments may be determined on the same basis or by the availability of plants where the more thorough treatment can be given.

The application of preservative methods to industrial needs and the requirements of the home builder will be discussed in more detail in later issues. The railroads

have already demonstrated the economy of using treated crossties, bridge timbers and other structural material. In sea waters infested by the teredo, creosoted piling has prevented destruction of timber from marine borers. On the streets of our larger cities creosoted wood block has been found to be the most satisfactory pavement, and the same materials are now being used for factory floors. It is principally among the small consumers of lumber and on the farms that the advantages of treated material has not been realized.

Fence posts, floor beams, planking and many other kinds of timber used around every home could be profitably treated against decay. An educational campaign which is intended to extend widely the knowledge as to the possibilities and advantages of treated timber is under way.

Essential facts and items of interest will be stated on this page from month to month and at any time detailed information may be obtained upon request from the United States Department of Agriculture, the American Wood Preservers' Association, or the National Lumber Manufacturers' Association. Inquiries may be made direct to these organizations or through the editor of the AMERICAN FORESTRY MAGAZINE.

Forest Reserves Purchased

THE purchase by the Government of 97,888 acres of non-agricultural land in the White Mountains of New Hampshire and the Southern Appalachians has been approved by the National Forest Reservation Commission, bringing the total area so far approved for national forests in the East up to more than 1,275,000 acres. This latest acquisition will involve an expenditure of \$380,000, or about \$3.88 an acre.

The largest parcel is in the Boone purchase area in North Carolina, a block of 36,386 acres, which the owners have agreed to sell for \$1.90 per acre. The next largest is in New Hampshire, a group of tracts comprising 23,518 acres, one of which will close a gap between the tracts already acquired in that region, the price being \$7.21 per acre. The rest of the purchase is distributed as follows:

Nine thousand, seven hundred and twenty-three acres at \$4.96 per acre, in the Monongahela area, West Virginia.

Three thousand and sixty-two acres at \$3.16 per acre, in the Potomac area, Virginia and West Virginia.

Two hundred and sixty-four acres at \$3.50 per acre, in the Massanutten area, Virginia.

One hundred and ninety-eight acres at \$3.49 per acre in the Shenandoah area, Virginia and West Virginia.

Thirteen thousand, four hundred and twenty-three acres at \$2.77 per acre in the Natural Bridge area, Virginia.

Seven thousand, six hundred and ninety-four acres at \$2.89 per acre in the White Top area, Tennessee and Virginia.

Six hundred and twenty-six acres at \$5.55 per acre in the Savannah area, North Carolina.

One thousand, six hundred and fifty-one acres at \$7.28 per acre in the Nantahala area, North Carolina.

Three hundred and thirty acres at \$4.67 per acre in the Cherokee area, Tennessee, and

One thousand and sixteen acres at \$5.33 per acre in the Georgia area, Georgia.

The lands have been examined and appraised by the Forest Service and sales contracts will be concluded with the owners by the Secretary of Agriculture as soon as possible. They will then have to be surveyed and their titles approved by the Attorney General before their development can be commenced as national forests for the use of the public. Practically all of the land is mountainous, non-agricultural, and valuable only for forests. Much of it has been culled or cut-over, but several large tracts are comparatively heavily timbered.

About half a million dollars now remains available of the money which Congress appropriated for carrying out the Commission's plan to acquire ultimately about 5,600,000 acres for watershed protection, timber conservation, recreation, and the other uses made practicable by the establishment of national forests in the White Mountains and the Southern Appalachians.

Forest Notes

A New Course

The College of Forestry of the University of Washington, at Seattle, particularly calls attention to the opportunities for specialization in the business of lumbering, the courses of which are for the first time announced in the catalog this year. They include courses in commercial geography, money and banking, accounting, trade of the Pacific, principles of advertising, and other courses in business and commerce. With the addition of these courses, the School of Forestry is now offering opportunities to the students for specialization in practically every form of the lumber industry.

Forest Fire Warnings

With the opening of the season of fire danger on most of the national forests, the Forest Service is sending broadcast a warning that more than half of the forest fires in the United States are due to carelessness or other preventable causes, starting from campers, railroad locomotives, brush burning, incendiaries, and sawmills.

This statement is based on an analysis of statistics compiled from the forest fire records of the last season, when more than 7,000 fires were reported on national forests alone and approximately 10,000 on State and private holdings in the eighteen States which received Federal cooperation in fire protection under the Weeks law, namely, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Maryland, West Virginia, Kentucky, Michigan, Wisconsin, Minnesota, South Dakota, Montana, Idaho, Washington and Oregon.

Forest fires destroy millions of dollars' worth of timber and other property every year, and in some years cause considerable loss of life. It has been estimated from the best information obtainable that forest fires last year burned over an area of approximately 6,000,000 acres, with a total loss of at least \$9,500,000.

Autos in the Yellowstone

Secretary Lane has just received an encouraging report from his assistant, Mr. Stephen T. Mather, in charge of national parks, relative to the opening of Yellowstone Park to automobiles on August 1. Mr. Mather states that everyone concerned is now enthusiastic about the change in the regulations under which automobiles will be allowed to enter the park and that Colonel Brett, the superintendent, has worked out a schedule under which it is expected the automobile traffic will not endanger visitors to the park. The Sec-

retary feels that in authorizing the entrance of automobiles to this park a step has been taken in the right direction and that a greatly increased number of people will be enabled to visit the park without increased danger in travel. Mr. Mather's report also states that travel in the park is breaking all records, the total visitors for the month of June being 7,500, and that during the period from June 15 to July 8 about 12,500 people visited the park, and that on July 8 there were 4,000 visitors there.

Summer Camp for Forestry

The forestry summer camp of the University of Maine opened at Camp Lunka soo on August 4. This two weeks' course was started in the summer of 1913 in response to a demand for a popular, short, introductory course in forestry. The staff of instructors at the University of Maine are in charge of the work, but it is not a part of the regular four years' professional course in forestry given at the university.

No tuition is charged, but living expenses while in camp are divided pro rata between those in attendance, thus making the expense very light. Tents, blankets and cooking equipment are all provided at the camp. The work consists in lectures, general discussions of forestry problems, and practical field work, the latter occupying fully two-thirds of the time.

In the Adirondacks

One of the best sites in the Adirondacks has been obtained for the 1915 camp of the State College of Forestry at Syracuse through the generosity of George H. Thatcher, of New York. During August the time will be devoted to lectures and demonstrations by graduate foresters, botanists, zoologists and more particularly to field trips which will enable the campers to come in close contact with the forest and its wild life.

Standardizing California Walnuts

Announcement is made by the California Walnut Growers' Association that a by-products plant will be opened in Los Angeles shortly to work all inferior nuts into by-products. This will raise the standard and consequently increase the demand for California walnuts all over the country by keeping from the market the culls, cracked and otherwise inferior walnuts.

Several hundred tons of walnuts will probably be cracked up each season and the association intends to make standard

grades, putting the goods up in the most approved way, believing that it will thus develop a fine business on walnut halves and pieces shelled. The association also intends to introduce this year 25- and 50-cent consumer packages of shelled walnuts.

A million or more cartons, containing 1 and 2 pounds of walnuts in the shell, are also to be put out this season. All cartons will have a diamond-shaped gelatin opening, so the consumer can see the contents.

Re-enters Forest Service

On the recommendation of the Secretary of Agriculture and with the concurrence of the Civil Service Commission, the President has authorized the reinstatement of Edward E. Carter in the Forest Service as forest inspector at \$2,800 a year "without regard to the year limit of the reinstatement rule."

Mr. Carter entered the Forest Service in March, 1905, as a field assistant at \$1,000, and resigned in September, 1910, after having been promoted to the grade of assistant forester at \$2,500.

Philippine Concessions

The Bureau of Insular Affairs of the War Department is in receipt of a cablegram from Manila advising that the Bureau of Forestry of the Philippine Islands has extended until noon, October 1, 1915, the time at which it will open bids for a forest concession covering the area known as the Tayabas-Camarines tract.

The Bureau of Forestry also proposes to grant a concession covering the Tamlang tract on the Caramoan Peninsula in the Camarines, and announces that upon the receipt of the first satisfactory application the concession will be advertised and bids invited.

The Bureau of Insular Affairs is prepared to furnish information regarding these forest tracts.

Book Reviews

CAMP CRAFT, by Warren H. Miller, \$1.50. Charles Scribner's Sons, New York City.

This is a thoroughly well illustrated book of 282 pages by the versatile editor of *Field and Stream*, whose contributions to AMERICAN FORESTRY are so well known by our readers. Mr. Miller is so well versed in all the knowledge of camping and camp comforts that what he says may be adopted as authoritative. The book contains whatever information may be needed by the lover of the woods, the hunter, the fisher or anyone who anticipates and enjoys life in the open. Besides what information

of camp life may be sought will also be found many suggestions which will add materially to comfort and convenience in the camp.

Chinese Wood-Oil Tree

The adaptability of the Chinese wood-oil tree for cultivation in northern Florida seems to have been proved by recent experiments. A tree at Tallahassee, Fla., bore 2 bushels of the fruit last season. In addition to being an economically important tree, it is a decidedly ornamental one. It bears clusters of white flowers with reddish-yellow centers, and in full bloom resembles a catalpa.

The United States imports annually about 5,000,000 gallons of Chinese wood oil, valued at \$2,000,000. As the demands of the American varnish trade are steadily increasing, this affords a very large domestic market for this prospective new Florida industry.

Fire Protection

The Vermont Timberland Association, the object of which is the protection of Vermont forests from fire, was organized early in July. The principal offices are to be in Bloomfield, Vt. The association will endeavor to enlist the aid of the United States and the State government in the work and will encourage enactment of laws which provide for adequate fire protection.

Any firm, person or corporation interested in the management of timberlands within the State shall be eligible to membership. A board of directors, consisting of five members, will have control and cooperate with the State Forester as far as possible.

The articles are signed by officials of lumber concerns which have large interests in the State: W. R. Brown, of Berlin, N. H., of the Berlin Mills Co.; E. E. Amey, of Portland, Me.; Dalton Power Co., of Fitzdale, Vt.; Connecticut Valley Lumber Co.; Howard G. Philbrook, of Boston, Mass.; A. N. Blandin, Mountain Mills. N. H., president of the East Haven Timber Co.

Forest Land Uses

The scheme of relieving unemployment in Massachusetts by providing a special fund to be spent under the direction of the State Forester has proved to be a complete success, according to the report of Forester Frank Rane, filed with the Governor.

With the \$99,547.55 provided by the Legislature and gifts of \$12,076.87, the State Forester was able to provide work for thousands and at the same time complete a large amount of useful labor on the woodlands and roadsides of the State. The total expenditures from the fund amounted to \$109,623.20 and, counting

gifts still to come, there will be still available \$1,838.37 to complete work partly done.

City's Timber Tract

Having a thirty-day option on the tract of land comprising 5,500 acres belonging to the Bee Tree Lumber Co. and known as the Bee Tree watershed tract, the members of the Board of City Commissioners of Asheville, N. C., have notified the owners of the property that it will be purchased by the municipality in compliance with the terms of the option. The sum of \$30,000 will be paid for the land and it will become the property of the city before the eighth of October.

The land contains a valuable stand of timber and this will be preserved, the property being bought with a view to increasing the present watershed holdings of Asheville.

Wood Waste Exchange

Since the inauguration of its Wood Waste Exchange, on April 15 last, the Forest Service has been requested to list 147 mills and factories as having waste material for sale, while during the same time seventy-six other wood-using concerns have asked to be listed as desiring to purchase waste of a wide range of species in specified dimensions or as mill or factory run. The latter have been included in the list of "Opportunities to Sell Waste," which is sent monthly to concerns which have waste material for sale. This list is growing steadily, but the Forest Service is anxious to accelerate its rate of growth inasmuch as it comprises only about half as many buyers as there are sellers listed under "Opportunities to Buy Waste."

Off for Alaska

Chief Forester Henry S. Graves, accompanied by E. A. Sherman, an Associate Forester, left in the middle of July for Alaska, where they will inspect the national forests there with a view to classification. There are about 78,000,000,000 feet of timber on the national forests there of which 70,000,000,000 is on the Tongass. The woods is mostly spruce and western hemlock.

Private Reforesting

The first private reforesting project in West Virginia will be undertaken by State Tax Commissioner Fred O. Blue on a 400-acre tract of personal property in Barbour County, according to an announcement made by Frank Glenn, of Parsons, W. Va., chief deputy in the State Forestry Service. The land is to be reset in chestnut, poplar, locust and black walnut. Mr. Blue will be given assistance in the undertaking by the United States Forest Service.



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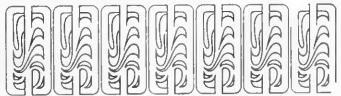
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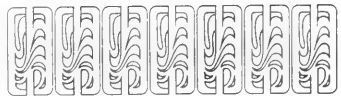



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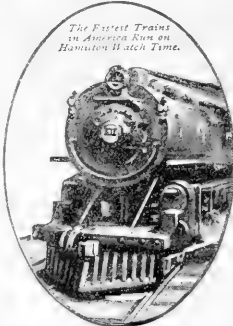
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oratory. Mr. Thomas Adams, of the State tax commission, was toastmaster.

Foresters Meet

Pennsylvania State Foresters met at Galeton, Potter County, Pa., on August 10, 11 and 12 for their fourth annual summer convention and during that time the annual meeting of the Pennsylvania State Forest Academy Alumni Association was held, with W. Gard. Conklin, of Harrisburg, presiding. The foresters visited Asaph on the Stone State Forest, and Crossfork on the Ole Bull Forest.

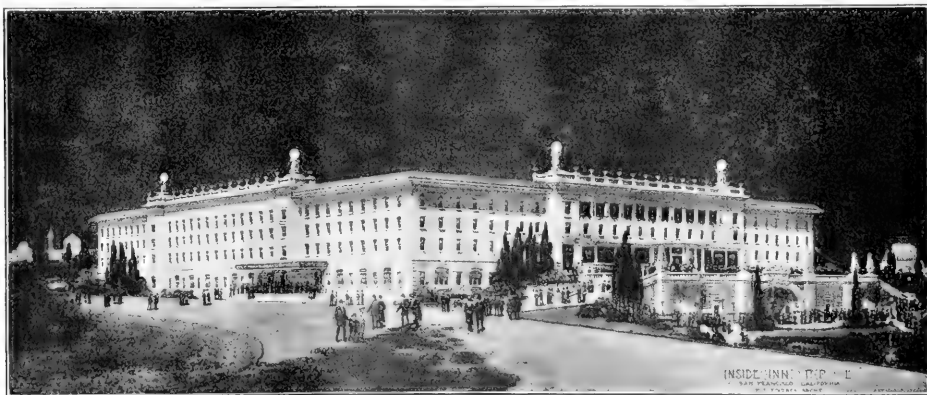
At Asaph was seen the State forest tree nursery, where nearly 2,000,000 seedlings are produced annually, and a number of interesting and instructive plantations, among which is an experimental plantation made in conjunction with the Du Pont Powder Co. to determine effects of subsoil dynamiting to stimulate tree growth. Of no less interest were object lessons learned from plantations damaged by ice, floods, landslides, and fires; also plantations made from "culls" and seedlings which are usually discarded, showing good establishment and growth. The best white ash plantation on State Forests was seen.

At Crossfork were plantations of white pine, bull pine, silver pine, red pine, Scotch pine, Norway spruce, Douglas fir, red oak, and European larch. The operation of a

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Dinner for State Forester

A dinner was given for State Forester Griffith at Madison, Wis., on July 16, in appreciation of his service in the cause of forestry in Wisconsin. About twenty

of Mr. Griffith's friends were present, representing a variety of interests. Informal talks were given by President Van Hise and Dean Birge of the University of Wisconsin, ex-Senator Hatten, and Howard F. Weiss, director of the forest products lab-

State Forest telephone system was studied there. Crossfork is an abandoned lumber town and once was almost as thriving as Galeton. The comparison and contrast between the two is a matter of historical and economic interest.

Canadian Department

ELLWOOD WILSON

Mr. Robson Black, the new secretary of the Canadian Forestry Association, has started out to put a lot of life into that organization and we wish to compliment him on the work already done and to wish him good luck with his endeavors. The first number of the Canadian *Forestry Journal* is a great improvement and should be a great help in increasing the membership. It is newsy and interesting and the articles are timely and readable. In the matter of publicity in the press, Mr. Black has also done good work and his idea of sending copies of the papers in which articles about the work of the Association appear to the directors is a most excellent one. A very good article from his own pen in the issue of the *Monetary Times*, of Toronto on "Ontario's Forests and Water Powers" is very interesting and should do a good deal to awaken public interest in this most important subject. The interest taken by the government of Ontario in hydro-electric development has been great and has shown courage and foresight on the part of the officials responsible for it and they will no doubt soon realize that without forests their water powers will be deteriorated and will do something to wake up and put life into the moribund forest policy of Ontario. When the importance of the subject is considered, the present system is little short of criminal.

The Dominion Forests Products Laboratory of McGill University is about to undertake a study of the mechanical properties of Jack Pine. This tree is very abundant throughout Ontario and Quebec and as it is the most rapid in growth of any of the trees native to these provinces, we need all possible information about it. It would seem that it would be a most profitable tree to grow for railway ties, mine props, and fence posts, especially if it could be satisfactorily treated with some preservative. Trees ten years old show a growth of 9 to 11 feet in height with a diameter of 2½ inches on the stump.

The Minister of Land and Forests, the Hon. Jules Allard, has taken up the question of taxation of lands used for reforestation and will probably bring forward a bill at the next session of the Legislature to regulate this matter, which naturally is of great importance.

The Laurentide Co., Ltd., of Grand Mere, Que., has entered into an agreement with the Parish of St. Jacques de Piles, which provides that the parish will not raise the taxes on lands used on which trees are planted for a period of twenty-five years at the end of which time the

agreement can be renewed. This shows a most progressive spirit on the part of the parish and the company will continue its plantations in this district until all available land is planted. This spring about one and one-half miles of road were built in this parish by the company which it is hoped will serve as models to the farmers and encourage them to improve their roads. Fire lines have also been cut around the plantations and along the roads.

The fire situation in the Province of Quebec has been much improved this year and the number of fires this season will probably be the lowest ever recorded. So far there have been practically no fires set by railroads, and the settlers fires have also been below the average. The greatest improvement has been in the reduction of fires set by river drivers, a special ranger having been placed with each drive crew. In the territory patrolled by the St. Maurice Forest Protective Association only one fire set by drivers has been reported. It is a curious commentary on the state of mind of employees of companies that they should not be willing to do all in their power to safeguard the property of their employers, but such is the case. In this Association it has been extremely difficult to get the full cooperation of the Woods Departments of the various companies who are members of the Association. They think the forests should be protected, but when it comes to taking a drive crew to fight a fire, or to forbidding the drivers to smoke in a dry time, or to discharging a man who is careless about setting a fire, it is extremely difficult to get them to do anything. However, this state of affairs is passing and it is to be hoped that a spirit of full cooperation will soon take the place of such a petty state of mind. Two very important things still block the wheels of progress. The more important of the two is the interference of politics which is shown in two ways. First and least important is the pressure occasionally brought to bear by politicians to have good men of an opposite party removed from their positions as rangers and men of the same party substituted. Fortunately there has been very little of this. The greatest difficulty is the way in which the law is enforced by the judges before whom offenders against the fire laws are tried. The law provides a fine of fifty dollars or three months' in prison for infractions of these, but the judges either dismiss the actions or give such light fines that no good whatever is done. Often members of Parliament interfere on behalf of their constituents and by using their influence obtain light fines. In either case the ef-

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fect is the same, the law is made the laughing stock and fires go on just the same. Of course the education of public opinion will in time remedy this, but it is a pity that those who are charged with the execution of the laws should have so little regard for their oaths and for the good of the country.

The next most important thing which is necessary for fire protection is the better disposal of lumbering slash. Once a fire gets into a cut-over country it is almost impossible to stop it, but if the debris from lumbering were removed there would practically never be serious forest fires in this section. If a general law were passed making it compulsory on all woods operators to burn their debris at the time of logging, little extra expense would be involved, and since every operator would have to use the same measures there would be discrimination and the cost would all fall on the consumer. That such disposal is entirely practical and not at all prohibitory in cost is shown by the experience of Mr. Gutches in Saskatchewan and Forester Cox in Minnesota.

The worst fire in the territory of the St. Maurice Forest Protective Association was on the Croche River on the limits of The Belgo-Canadian Pulp and Paper Co., The Brown Corporation and Mr. J. H. Dansereau. This fire was probably caused by some dam keepers or fox hunters throwing away burning matches used to light their pipes and burnt over about 30 square miles. The section where this fire started had been partly lumbered and the fire gained such headway in the old cuttings that it was impossible to check it and by the time it reached the virgin timber it had gained such headway that nothing but rain could check it.

In Ontario there is no restriction on brush burning or land clearing by fire, so that the settlers are much more of a menace than in Quebec and the same problem of proper and impartial enforcement of the fire laws are necessary.

The tenders are all in for the million and a half dollar storage dam to be built by the Quebec Government on the St. Maurice River, at the rapid La Loutre. This dam is of the first importance to one of the most important industrial sections of the province and by stabilizing the water conditions will be of great benefit.

Dr. B. E. Fernow, dean of the Faculty of Forestry of the University of Toronto, is just starting a trip through the west.

Prof. W. N. Millar, of the University of Toronto, is in Calgary.

Mr. Clyde Leavitt, Forester to the Dominion Railway Commission and presi-

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dent of the Canadian Society of Forest Engineers, will visit Grand' Mere shortly to confer with the secretary of the society on its future activities.

The automobile purchased by the St. Maurice Forest Protective Association for one of its rangers has proved a great success.

British Columbia Notes

The Hon. W. R. Ross has received information from the Agent General for British Columbia to the effect that the cargo of 160,000 creosoted Douglas fir ties shipped to India to the order of the Bengal & Northwestern Ry. last fall per the steamship "Queen Helena" have arrived, and have given full satisfaction.

Advices reaching the Minister of Lands concerning the fire situation throughout the province are for the present satisfactory, although the immediate prospects unless rain falls, are rather ominous in certain sections.

During the early part of July rain fell in the Hazelton, Nelson, Cranbrook, Vernon and Kamloops Districts, as well as in the eastern section of the Fort George Division, followed, however, by clear, warm weather, with resulting increase in the fire hazard. In the Tete Jaune District, conditions are reported as being reasonably safe, in view of the hot, dry, windy weather.

The prevailing heat, accompanied by a clear atmosphere and wind, with resultant drying out of vegetation, has been responsible for several fires in the coast districts, outbreaks being reported at North Vancouver, Langley, Delta, Cheakamus, Half Moon Bay, Texada Island, Toba Inlet, Thurlow Island, Green Point Rapids, and Loughboro Inlet, the area burned over being approximately 1,000 acres, principally slashings, and the damage to merchantable timber fortunately small.

Four fires, all under control, have occurred in the island district, two of which were at Parksville, and a third at Courtenay.

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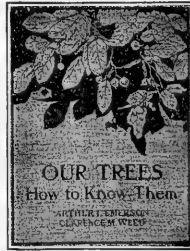
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MONTHLY LIST FOR JULY, 1915

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TENDERS will be received by the undersigned up to and including Wednesday, the fifteenth day of September 1915, for the right to cut pulpwood on a certain area situated north of the Transcontinental Railway, west of Lac Seul and south of English River in the District of Kenora.

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Minister of Lands, Forests and Mines.

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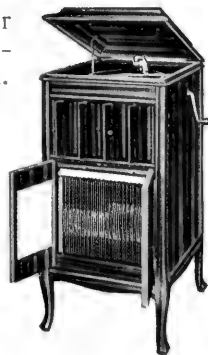


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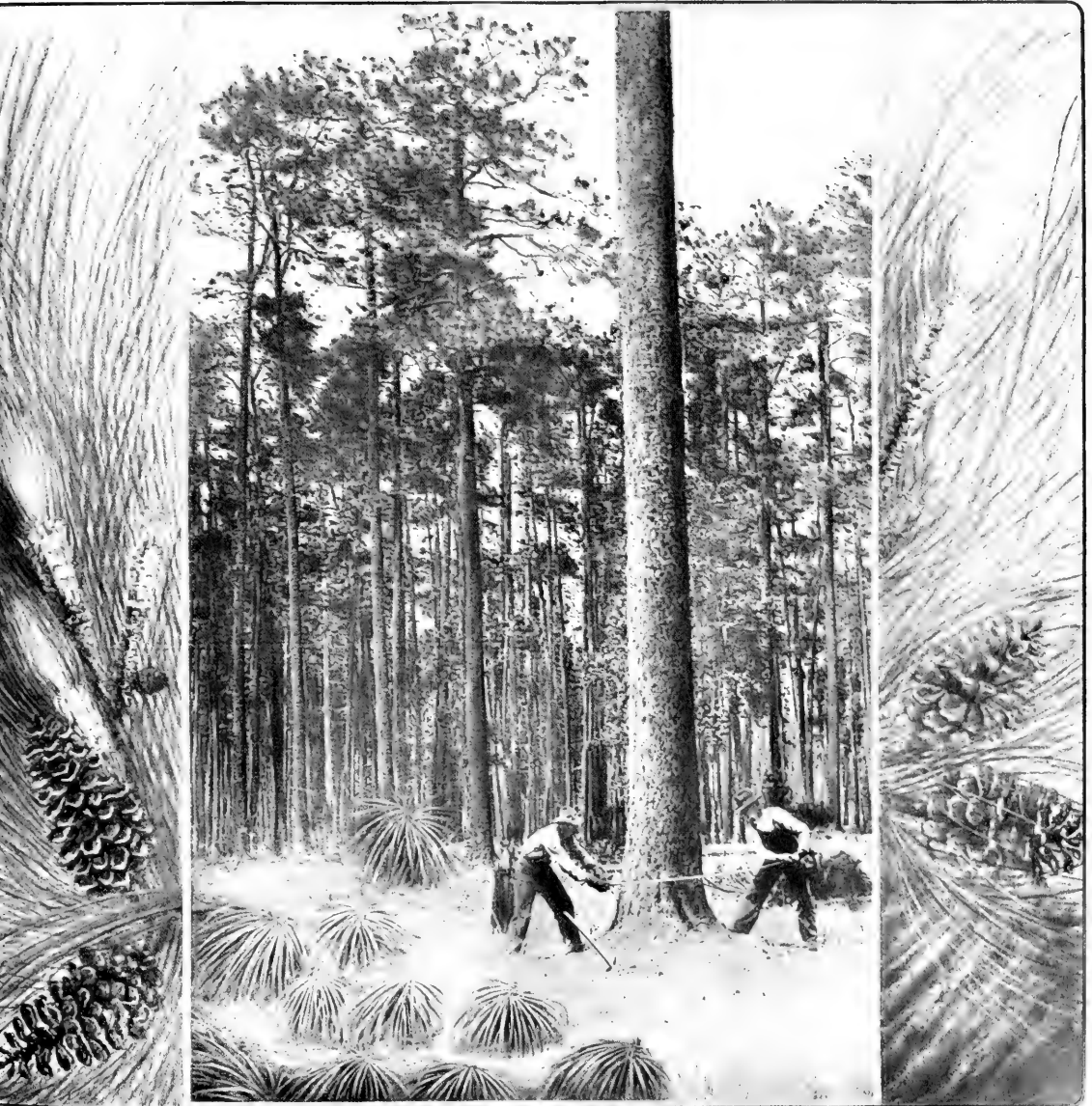
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American Forestry

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SEPTEMBER, 1915

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THE LONG LEAF PINE

The American Forestry Association

Washington, D. C.

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IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

Federal Administration and Management of national forests; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners; non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

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The Magazine of the American Forestry Association

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THE DAY OF NO TIMBER

Is farther away now than the ultra-conservationists ten years ago said it was when they spread an alarm of exhausted supply.

THE theory of exhaustion has been dismissed. Wood is still abundant. It is still and always will be the warm, friendly material that makes four walls a cosy cottage or a magnificent mansion. Our regard for it is inherent. Our children will continue to use it because its adaptability, beauty of finish and sound absorbing qualities give it a home-making charm that no other material possesses.

AND the uses of wood are multiplying phenomenally. We are just now coming to know its real values and save them. Practical by-product utilities that represent more than 60 per cent of the usable value of trees are now known, in addition to lumber which utilizes only one-third. Others will be found. With added use there is added worth.

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The Longleaf Pine

Identification and Characteristics

THE longleaf pine is one of the two most valuable timber pines in the eastern United States. The other is the white pine. The longleaf is found from the foothills of the Appalachian Mountains to the Coast from southeastern Virginia to central Florida, and thence westward in the Gulf States to eastern Texas. In this region it grows in a belt about 125 miles wide.

It has many names, fully twenty-eight, and chief among them are yellow pine and Georgia pine, but it is best and most generally known as Longleaf Pine.

It is a tall tree, reaching a height of one hundred to two hundred and twenty feet, and a diameter of two to three feet. Trees of this size have reached their full growth and are one hundred and seventy-five or more years old.

The stem of the longleaf pine is straight. It tapers but slightly. It is free from limbs for more than one-half way to its top. When it has reached its full growth it throws out large limbs, branched and crooked. These have dense tufts of long, dark green leaves at the ends.

The leaves are from nine to fifteen inches

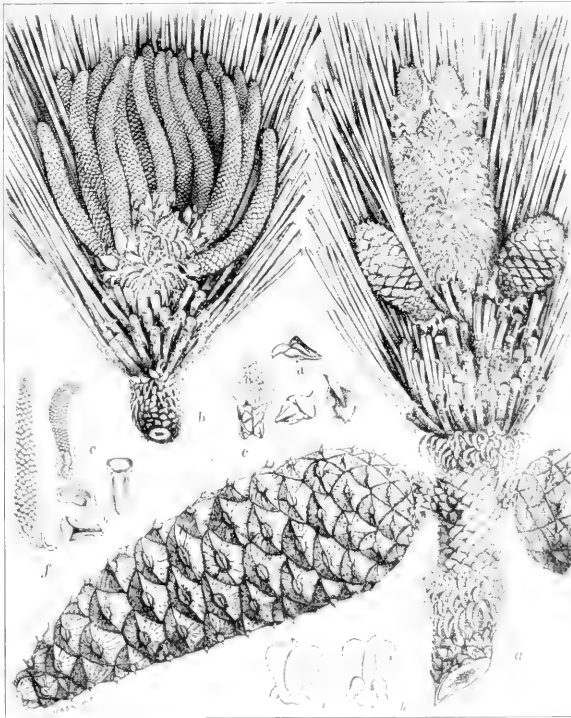
long. They grow in clusters of three and are enclosed at their base in a long sheath. They are so flexible that they hang down from the limbs gracefully and plumelike. The leaves are shed by the tree at the end of the second year.

Natives of the "pine barrens" where this tree grows sometimes weave the leaves into coarse fabrics for mats.

The cones appear on the tree when it is twenty or twenty-five years old. They are from six to nine inches long, slightly curved. They have thick, blunt scales with a sharp point or beak at the end. The seeds ripen in late summer but the cones open only in dry weather. If the weather is unfavorable they may not open until the middle of autumn.

The seeds when they fall on favorable ground frequently sprout before winter sets in. The seeds are devoured by squirrels and other seed-eating animals which like them very much.

The young trees grow slowly. They seldom are over seven inches high when seven years old, and being small and not strong are easily destroyed by forest fires or by cattle or other animals. Or, if the grass and weeds about them are high and strong the young longleaf pine trees



LONGLEAF PINE (*PINUS PALUSTRIS*) MALE AND FEMALE FLOWERS

- A. Branch with mature cones and female flowers at top, just below which are young cones of one or two seasons' growth.
- B. Cluster of male or pollen-bearing flowers.
- C. Detached female flower.
- D. Detached young seed-bearing cone scales.
- E-F. Detached male flowers.
- G. Detached pollen sacks (anthers).
- H-I. Detached very young female flowers showing two ovules at the base which later develop into seeds.

LONG
NEW
MOUNTAIN
HARVE



BARK OF LONGLEAF PINE

The bark is thin and orange-brown, separating on the surface into large papery scales which lie flat against the trunk.

have a hard and often unsuccessful struggle to live.

While it may be only seven inches high at seven years of age, its tap root may be all of seven feet long, and when the tree is full grown this tap root is often sixteen

feet long. After reaching seven years of age, the tree grows rapidly until it is sixty or seventy years old, when the growth becomes slow again.

The bark of the tree is thin and orange brown, separating on the surface into large, papery scales which lie flat against the trunk.

The wood is heavy, exceedingly hard and strong. It is usually fine-grained and durable, orange color, sometimes of a very deep shade. It is largely used for building, both framing, flooring and interior finishing; also bridging, railway ties, fencing; and for masts and spars. Although it makes a hot fire, it burns

slowly and warehouses and storage houses built of it are said to be of slow burning construction. It is rich in resinous materials and thousands of acres of trees are tapped annually for the "gum" (oleo-resin) from which resin and turpentine are derived. The older methods of obtaining the "gum" resulted in killing a great many of the trees in a very few years; recent improved modern methods are not so harmful. The wood, however, is not injured by this tapping.

Unless protection against fire and means of reproduction are looked to, it is expected that there will be practically no longleaf pine trees left in a few years. They are being cut for lumber in large quantities every year, and without protection they are likely gradually to become extinct.

Commercial Range

| | |
|------------|-----------------|
| Alabama, | Mississippi, |
| Florida, | North Carolina, |
| Georgia, | South Carolina, |
| Louisiana, | Texas. |

Commercial Uses of Longleaf Pine

By P. L. BUTTRICK

WHAT the white pine has been to the Northern States, the longleaf pine has been, and still is, to the Southern. If the great white pine forests of northern New England, New York, Pennsylvania, and the Lake States have vastly affected the lives of the people, not only within their borders, but in the nation as a whole, and have left it the poorer for their passing, the vast pineries of the South Atlantic and Gulf States have had no less an effect, and their passing is no less to be regretted.

It is said that England won the title "Mistress of the Seas" with ships whose masts were of New England pine. These same ships tarred their rigging and calked their seams with tar and pitch derived from the longleaf pine of the South, for this tree was justly noted as a producer of naval stores before its

wood was much used as lumber. Later the famous frigates of the American Navy which so boldly disputed England's title, were in part built of longleaf timbers. About all the original wood which remains today in the famous old frigate Constitution is its figurehead, which is of longleaf pine.

Although the longleaf is the pine tree par excellence of the South, there are other valuable pines in that section, and they are sometimes confused with it, chiefly because of the similarity of some of their common names, for all are called "Southern Pine" and all are called "Yellow Pine," but the trees are themselves quite distinct.

Besides the longleaf pine, the other common southern pines are: the shortleaf pine, the loblolly pine, and the Cuban pine.

The shortleaf is a tree of higher altitudes than the others, and

Properties of Longleaf Pine

| | |
|----------------------------------|-------------------------------|
| Heavy, hard, very strong, tough; | Color, light brown or red; |
| Grain fine, even, straight; | Thin sapwood light yellow; |
| Compact; | Durable in contact with soil; |
| Annual rings narrow; | Height, 55 to 100 feet; |
| Proportion of heart wood large; | Diameter, 1½ to 3 feet. |
| Very resinous; | |



Courtesy Manual Arts Press.

MAP SHOWING COMMERCIAL RANGE OF LONGLEAF PINE

is not generally common in the longleaf territory. Its wood is highly valuable, but not so strong or resinous as the longleaf, yet sometimes the two woods so closely resemble each other that they cannot be distinguished even by an expert, so that they are sometimes marketed together. Loblolly is more important as a second growth tree than in the original forest and seldom occurs pure over large areas of virgin forest. Its wood is coarse grained, and weak as compared with the others. Most of the loblolly comes from the South Atlantic States, North Carolina being the leading producer. It is generally marketed as North Carolina Pine. The Cuban pine is, as its name indicates, a straggler from the West Indies. It occurs only along a narrow strip near the coast from South Carolina to Louisiana. Its lumber is valuable and more or less resembles longleaf, and is marketed along with it.

The longleaf itself occurs from the neighborhood of Norfolk, Virginia, south along the coastal plain, seldom more than 200 miles from the coast to Cape Canaveral and Tampa, and west along the Gulf Coast to Trinity River in eastern Texas.

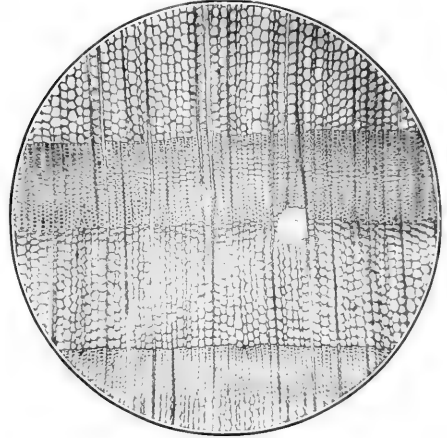
NEEDLES 9 TO 15 INCHES IN LENGTH

Although the wood of longleaf may be at times difficult to distinguish from that of some of the other southern pines, the tree itself is absolutely characteristic, and once seen is always known. There are other pines with long leaves or needles, but this tree is the longleaf pine, and its needles are from 9 to 15 inches in length. The tree itself is tall and dignified in appearance. At maturity the crown is wide-spreading and flat-topped, and does not descend very far

down the trunk. It is composed of a few large irregular branches. While it lacks the symmetry of the white pine crown, it is by no means scraggly or fantastic. There is nothing "Japanesy" about the longleaf.

The tree attains large size, but it cannot rival white pine or hemlock, the two largest conifers of the Eastern states, in this respect. Trees 36 inches in diameter breast high and 120 feet tall are exceptional. A tree in Marion County, Mississippi, is 43 inches in diameter, but like most trees of the largest diameter is not of great height, probably not more than 80 feet.

Longleaf suffers from a super-abundance of common names. No less than twenty-seven are listed. Most of



Courtesy Manual Arts Press.

MAGNIFIED CROSS-SECTION OF LONGLEAF PINE

This shows alternating bands of porous spring wood and dense summer wood, and spring and summer wood band together making one annual ring. Note resin duct near center of the cut.

them are trade names, composed of various combinations of the words longleaf, or leaved, longstraw, yellow, hard, pitch, southern and the names of various states where the tree grows. The original trade name was North Carolina pine, which later became Georgia pine. In the export trade the wood is generally called pitch pine. Today it seems that the name of longleaf is being more used than

ever before, and this is as it should be, for such an important and characteristic tree is entitled to a distinctive name. The technical name, *Pinus palustris* is unfortunate. *Palustris* is derived from the Latin *palus*, or *paluster*, which means swamp. Longleaf never grows in a swamp.

Various Names

- | | |
|-----------------------|----------------------------|
| Longleaf pine, | Heart pine, |
| Southern pine, | Pitch pine, |
| Yellow pine, | Longleaf pitch pine, |
| Turpentine pine, | Long straw pine, |
| Rosemary pine, | North Carolina pitch pine, |
| Brown pine, | Georgia yellow pine, |
| Hard pine, | Georgia heart pine, |
| Georgia pine, | Florida yellow pine, |
| Fat pine, | Florida pine, |
| Southern yellow pine, | Florida longleaf pine, |
| Southern hard pine, | Texas yellow pine, |
| Southern heart pine, | Texas longleaf pine, |
| Southern pitch pine, | |

IN A SOUTHERN PINE FOREST

There is a wide belt stretching from northern North Carolina along the coast to eastern Texas where the low-lying sandy soil is poor and sterile. It is a recently up-raised sea bottom. Shallow streams wander through it edged by swampy bottoms. The upland is a flat or occasionally slightly rolling plain. At the coming of the white man, this great plain was covered with a pure and almost unbroken longleaf forest. A few scrubby oaks grew scattered here and there through it, and now and then a pine of other species, but that was all.

These hot, sterile, tree-covered flats were avoided by settlers of all but the poorest sort, and soon became known as the "pine barrens," whither fled the runaway negro slave and the renegade white, to eke out such existence as they might, and to take refuge in the swamps if pursued too closely. Yet these barrens are not without attractiveness. They are a distinct novelty, even to the tree-accustomed eye of the seasoned forester from other sections. Their flatness, openness and general lack of underbrush allow one to see long distances through the trees. Vistas of a mile or more straight through the timber are not impossible. Originally, it is said, there was some undergrowth beneath these forests, but today, after repeated fires, they are generally carpeted only with thin grass and a few pine needles. One can travel through them with as much ease as over a prairie.

It is delightful to ride horseback through them, or, if one wishes, in a buggy, for it is possible to drive almost anywhere. And then there is the sunlight. One begins to understand the meaning of that phrase, "the Sunny South," after a brilliant day spent in the company of the virgin longleaf forest. The misty shadowless light of early morning is followed by the brilliant morning and noonday sun, which comes straight down through the tree tops, casting light and fleeting shadows. Then comes the golden light and the long flat shadows of late afternoon—the evening of the South. They show the great pines with their regular brown trunks in all possible combinations of light and shade. Nor must we forget the fra-

grance—that rich piney smell, so much richer than from other pine forests.

HEALTH AMONG THE PINES

Despite their intense summer heat, if one will but observe a few rules of sanitation required by the proximity of the tropics, the pine barrens are a health resort. Witness the fame of Southern Pines, North Carolina; Sumter, South Carolina, and many places in the interior of Florida, to say nothing of the "Ozone Belt" in Louisiana and Mississippi. After an experience in the sunlit barrens, one can cheerfully drink the old toast to the oldest of the longleaf pine states:

"Here's to the land of the longleaf pine

The summer land, where the sun doth shine

Where the weak grow strong and the strong grow great.

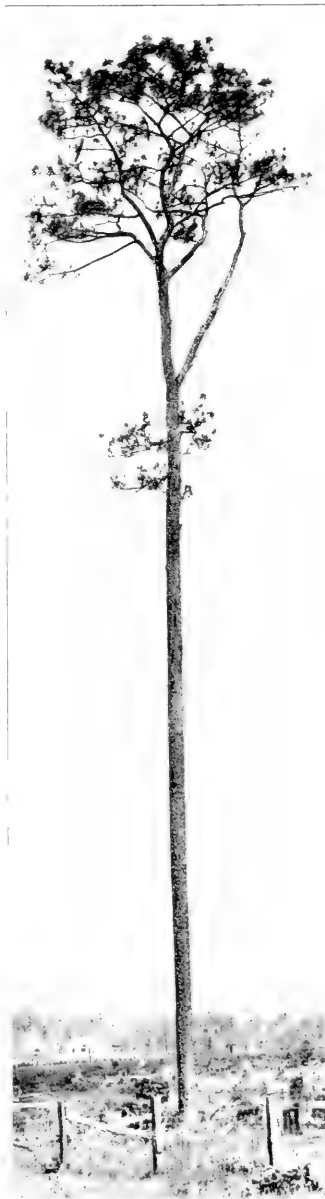
Here's to the Old North State!"

The English speaking settlers came into contact with longleaf at the settlement of Jamestown, and as early as 1610 tar, pitch and turpentine, the triumvirate of products of the pine tree which are known as naval stores, are mentioned as possible products of the new Colony, although no shipments seem to have been made at that time.

EARLY SHIPMENTS TO ENGLAND

It was not until about 1660, when the first settlers pushed south from Virginia and settled along the north shore of Albemarle Sound in what is now North Carolina, that the colonists came in contact with the vast forests of the pine barrens. Their first exploitation took place shortly afterwards, and by 1704 shipments of pine tar from the Carolinas to England amounted to over 400 barrels per annum. Shortly after that the exhaustion of the supply of naval stores obtained from the pitch pine forests in New England gave the industry an added impetus.

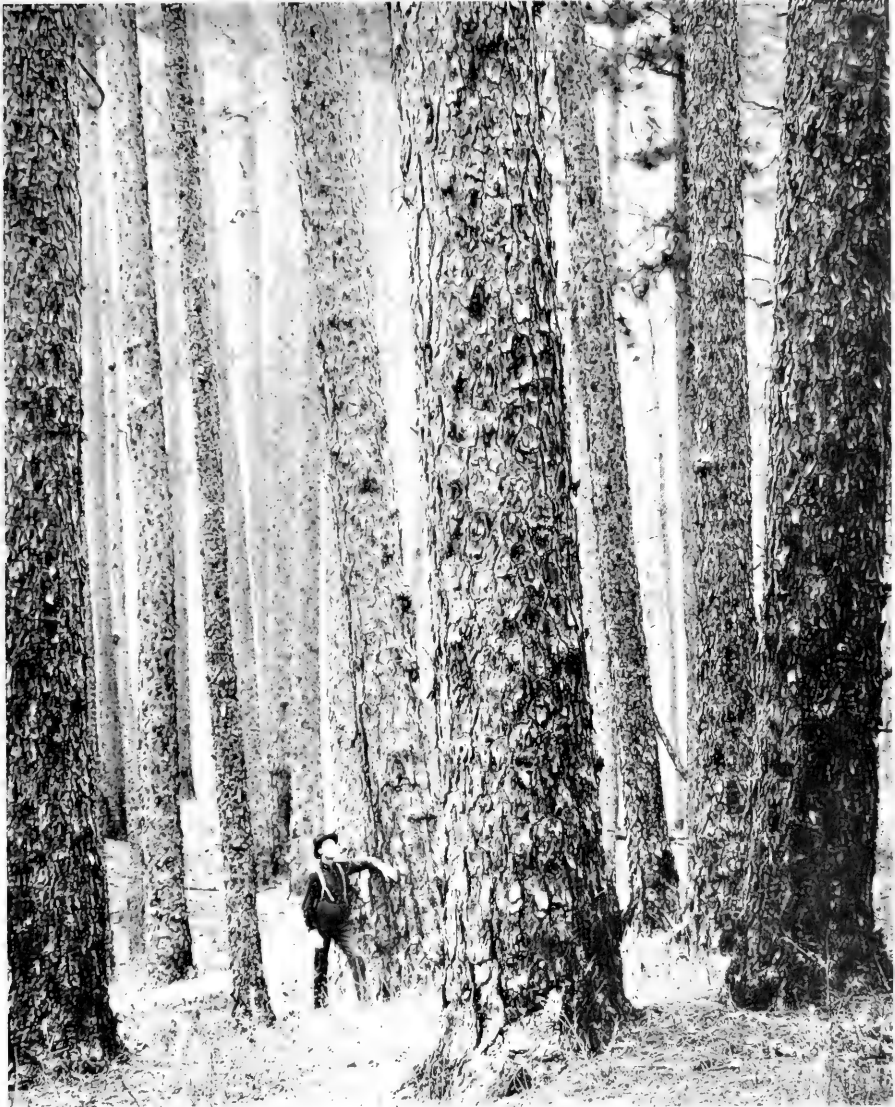
It seems to have been about 1750 that the production of turpentine and resin as well as tar and pitch was undertaken. From the middle of the eighteenth century till the early part of the last quarter of the nineteenth,



Courtesy of Southern Pine Association.

THE SENTINEL

A long tall longleaf pine left by the owners of the land to reseed the cut-over area surrounding it.



Courtesy The American Lumberman

TYPICAL LONGLEAF PINE STAND

The trees reach a height of one hundred to one hundred and twenty feet and a diameter of from two to three feet. The larger ones in this picture have reached their full growth and are doubtless one hundred and seventy-five years or more old. The stem of the longleaf is straight and free from branches for more than half way to the top.

North Carolina led the world as a producer of naval stores. The close connection between the North Carolinians and this industry was the probable cause of their receiving the well-known appellation of "Tarheels." Up to 1820 most of the turpentine and resin was used in this country—only tar and pitch being extensively exported. But a few years later the increased use of turpentine as an illuminant and in the arts caused a greater demand. Soon the North Carolina forests could no longer supply

the demand, and other virgin pineries were sought. In 1850 the industry entered Georgia which in 1880 became the leading state in production, and in a few years later Savannah became the leading naval stores center of the world, which position it still holds. Between 1900 and 1910, Georgia lost first place to Florida. Alabama, Mississippi and Louisiana are now important producers, but the virgin pineries of western Louisiana and eastern Texas have not yet been extensively invaded. Bruns



Courtesy The Southern Pine Association

LONGLEAF PINE BOARDS

Immense quantities of Longleaf pine are made into flooring, and manufacturers of window and door frames and of sash and doors draw supplies of raw material liberally from this source. It finds place as finish for kitchens, halls, libraries and sleeping apartments and is made into stairs, railing, molding, spindles, balusters and newel posts and also for the manufacture of furniture, cabinets and wardrobes.

wick, Jacksonville, Pensacola, Mobile, Gulfport and New Orleans, all figure as trade and export centers.

According to the 12th and 13th Censuses, the value of the naval stores produced in the different States in round numbers was as follows:

| | 1910 | 1900 |
|----------------------|--------------|-------------|
| Florida | \$12,000,000 | \$6,500,000 |
| Georgia | 8,000,000 | 8,000,000 |
| Alabama | 2,500,000 | 2,000,000 |
| Mississippi | 1,500,000 | 1,500,000 |
| Louisiana | 1,250,000 | 1,000,000 |
| North Carolina | 750,000 | 1,000,000 |
| South Carolina | 250,000 | 750,000 |
| Texas | 200,000 | |

The value of the naval stores production for a series of years as taken from the Census reports is as follows:

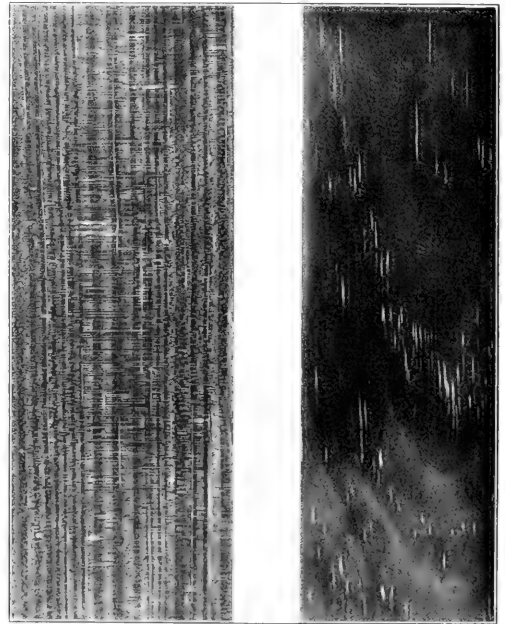
| | |
|------------|--------------|
| 1849 | \$ 2,855,657 |
| 1859 | 6,468,369 |
| 1869 | 3,585,369 |
| 1879 | 5,585,369 |
| 1889 | 8,077,379 |
| 1899 | 20,314,888 |
| 1909 | 25,295,017 |

In 1909 the total production was 289,888,954 gallons of turpentine, valued at \$12,654,288, and 3,263,857 barrels

of resin valued at \$12,576,721. About 50 per cent of the crop was exported. The amount of naval stores produced from other American trees is insignificant.

WOOD TAR AS A BY-PRODUCT

Wood tar is produced from pine wood. The original process was very primitive. Dry wood, often roots, stumps and logging waste was piled in a pit which had an underground opening. The pile was covered and fired in the same manner as a charcoal pit, and as combustion proceeded the tar flowed into the underground opening and was collected in barrels. Pitch is obtained by boiling down or burning wood tar. With the passing of wooden ships and sailing vessels, the demand for tar



Courtesy of the Manual Arts Press

LONGLEAF PINE BOARDS

Board on left is quarter sawed, sawing having been done at right angles to the annual rings. Board on right is bastard or tangential cut, sawing having been done parallel with or tangential to annual rings.

and pitch has fallen off. Today most of the pine tar is used by destructive distillation in iron kilns.

The collection of the crude resin, which is the raw product from which resin and turpentine are made, was originally carried on by digging holes in the ground at the base of the trees and then gashing the trunks so that the resin would flow from the wound into the hole. This crude and wasteful method gave way to the system known as "boxing," in which a hollow or "box" is cut in the tree at its base and into which the resin flows from the cut face above. This system, too, is wasteful, both



Courtesy of the Southern Pine Association.

LONGLEAF PINE TREES TAPPED FOR THEIR "GUM"

Thousands of acres of these trees are tapped in this manner each year for their "gum," (Oleo-resin) from which resin and turpentine are derived. The old methods of tapping resulted in killing a great many trees in a few years but the modern and improved methods are not so harmful. Formerly the "gum" was collected in holes or boxes out of the base of the trees. Now cup systems are used, the one invented by Prof. Herty a few years ago being considered among the best. Turpentine stills are scattered all over the yellow pine belt. The "gum" gathered from the trees is placed in these stills and heated. The lighter portion comes to the top and passes off as vapor, which when condensed becomes the turpentine of commerce. The heavier portion is drawn off from the bottom. It becomes resin.

of resin and timber, and many cup devices were tried, so as to do away with the box, but it was until about fifteen years ago that Professor Charles Herty perfected the cup and gutter system which bears his name. Other cup systems have come in since, and today the old wasteful "boxing" system is rapidly being abandoned.

Crude resin is collected in barrels, hauled to the turpentine stills and distilled. The turpentine being the lighter product comes off first and is collected in barrels. The heavier resin remains in the still and is drawn off at its base. In the early days turpentine was the most valuable product, but now resin is more in demand.

Today the title of "naval stores" is rather a misnomer, since their use is now so largely in the arts and industries rather than in shipping. Turpentine and resin enter into the manufacture of paints, varnishes, papers, soap, lubricants, rubber goods and in the pharmaceutical industries. Turpentine sells for about 42½ cents per gallon wholesale, while resin of the best grade is worth about \$7.50 per barrel, and pine tar \$1½ cents per gallon.

THE TURPENTINER AND HIS METHODS

The turpentine is almost a nomad. It takes only five years to exhaust an "orchard," which means that he must move almost that often. So he moves his still, his house, his store and all his other possessions and starts anew. He generally has his own crew of negroes who follow him from place to place, and depend upon him for employment, supplies, counsel and protection. Some of the turpentine men have in their employ negroes whose fathers and grandfathers were the slaves of their fathers and grandfathers. Without the negro, it would be difficult to carry on the naval stores industry. Life in the turpentine camps is often even rougher and more primitive than in the old time logging camp, yet some of the turpentine operators carry on their establishment in the spirit of the Old South.

LONGLEAF PINE LUMBERING

Longleaf lumber was first used locally in the region of its occurrence. In the sections of the South where



Courtesy Southern Pine Association.

BOX SHOOKS MADE FROM THE TRIMMINGS OF LONGLEAF PINE

it occurs, it was long almost the only building material. Its long clear trunks, straight grained and easily split, rendered it a favorite with the man who hewed out timber and "boards" with a broad ax. As a fence wood, it rivaled the popularity of chestnut in other sections. Rails and posts made from it were not only easily split, but were very lasting. For posts, the "fat" pine was used. The butts of fire scarred or turpentine trees accumulate an excess of resin which renders them very durable. Such pieces are called fat, and are sought after for positions in contact with the soil. These fat pieces are also known as lightwood, and will burn at the touch of a match. They are collected and sold as kindling material in Southern cities.

Even before the Revolution longleaf was exported. The first shipments were made to Cuba, the West Indies, Mexico and Central America, where it outlasted the native timbers. It early figured as a shipbuilding timber, and exports for this purpose were made to England in pre-Revolutionary days. Because of its weight, it could not compete with white pine in supplying the largest sized masts, but masts for smaller vessels, as well as yard arms, booms and bowsprits for larger ones were made from it.

Writing in 1810, Michaux says that longleaf from North Carolina and Georgia commanded 25 to 30 per cent higher prices in England than any other pine from the United States. After the Revolution exports continued to increase, and by the outbreak of the Civil War, it had secured such a firm foothold for general construction

purposes in the English market as to drive out the pine imported from Scandinavia and northern Russia. The early exports for lumber were mostly in the form of "squares" rough hewn by hand, and hauled long distances by ox teams or floated down the streams to the seaports.

A WOOD IN DEMAND THE WORLD OVER

Today there is hardly a country in the world to which longleaf pine does not go. It is estimated that a billion and a half feet of southern pine is exported annually and that longleaf comprises the bulk of this enormous amount. This places it as the leading export wood of America. Its nearest competitor is Douglas fir. Most of the longleaf is shipped from the ports along the south Atlantic and Gulf Coasts. Europe and South America take the bulk of the supply. It is estimated that 8 per cent of the total cut of the Southern pines is exported. At the outbreak of

the European War, the yellow pine lumber trade was paralyzed to a greater extent than that of any other wood.



LONGLEAF FOR VATS, TANKS AND SILOS

This wood is second on the list of woods used for these articles, the staves being generally made from the heartwood of the tree.



Photo by P. L. Buttrick.

A TIMBER PRESERVING PLANT IN LOUISIANA

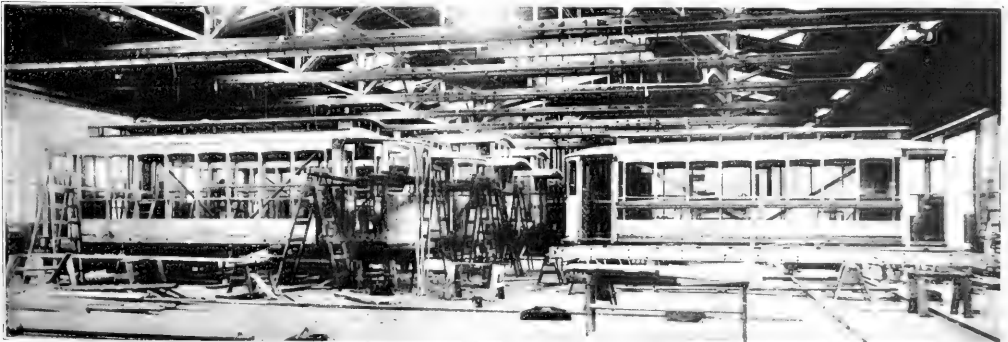
Although the heartwood of longleaf pine, if free from timber-destroying fungi, is very durable, yet more and more of it is being treated with preservatives to increase its durability. This plant treats railroad ties, paving blocks, structural timbers and other products.

No very great improvement is looked for till the close of the hostilities, when it is not too much to expect that billions of feet of longleaf will be used to repair the ravages of war in the various war zones.

Longleaf was favorably known in Europe and the West Indies before it secured much of a foothold in the northern market of our own country. The white pine regions of Pennsylvania and Michigan were much nearer, and the people were more accustomed to that wood than to its southern competitor, so that, although it was introduced into the northern markets in the seventies, it was not looked upon with favor. In 1892, when the cut of white pine was over 9,000,000,000 feet, that of longleaf was estimated as 7,000,000,000 feet. Its use did not be-

come general till the supply of white pine waned, but today it has come to its own, and it is shipped by water and rail clear north into Canada and is used amid the stumps of the old pineries of Michigan and Wisconsin. It travels west to the foot of the Rocky Mountains, and disputes the markets there successfully with its western competitors. The annual cut is estimated at 12,500,000,000 feet, its nearest rival is Douglas fir, which is estimated at 5,200,000,000 feet. Its old rival, white pine, has fallen off to about 2,500,000,000 feet. So far as statistics go, 1907 seems to have been the banner year, when a cut of 13,215,185,000 feet was reported.

Like the white pine industry, the longleaf industry has moved ever onward, seeking new and virgin supplies



LONGLEAF PINE FOR CAR CONSTRUCTION

This wood is extensively used for both passenger and freight cars, being especially desirable for frame work, sills, siding and flooring.

Starting originally in North Carolina, it has moved south along the Atlantic to Florida and then west along the Gulf to Louisiana and Texas. This movement was at first slow, and North Carolina retained for many years its leadership, which then passed to Georgia (it was as Georgia pine it captured the markets of the North), and from there to Alabama and finally to Louisiana and Mississippi. Texas is the last frontier of the longleaf, and may have its turn at leadership before the tale is told.

TURPENTINERS WASTED VALUABLE TIMBER

At first the turpentiners led the van, searching out virgin timber, "boxing" it and leaving it to fire and wind-fall when it would yield no more resin. The lumberman harvested such trees from these depleted orchards as he could use, but many of them were destroyed before they were needed for lumber. With the greatly increased demand for lumber, the lumberman pushed ahead, and now has passed the turpentine and is working largely in unbled timber.

The early mills were small water power affairs, located close to the timber. But the Census of 1820 mentioned a steam sawmill in Brunswick County, North Carolina, operated by a 20 horse power engine, and using 24 saws. Its crew was given as 16 men, and its cut as 400,000 superficial feet per annum. Later larger mills were

located at the towns on the larger rivers and timber was rafted down to them from the pineries far up stream. At first ox teams were used to haul the logs to the rivers, but as it became necessary to go further back from the river banks, and operations assumed a larger and larger scale, tram roads were built into the timber, and logs were hauled on them to the rivers. Now, however, nearly all logs are railroaded directly to the mills, which are generally located on trunk line railroads. The mills too have increased greatly in size, and the longleaf region boasts some of the largest and most completely equipped sawmills in the world. These great mills run day and night, year in and year out. The smoke from their stacks covers the landscape and at night the glow from their refuse burners lights up the sky like miniature volcanoes. The roar of these great mills as they turn out hundreds of thousands of feet of lumber a day, destined for all the world, can be heard for miles. These gigantic operations take a strong hold on the imagination, and one takes off his hat to the genius of the American lumbermen who have created them. Perhaps when these great mills are dead, and the armies which operate them are scattered to the ends of the earth, the pineries will have become a new forest or a prosperous farm land. One wonders.

It is interesting to glance for a moment at the men who have brought these changes about. The original develop-



Courtesy The Southern Pine Association.

LONGLEAF PINE "EDGINGS" USED FOR THE MANUFACTURE OF KRAFT PAPER

The making of paper pulp from Longleaf pine is an industry which is just beginning to grow up in the South. Mill waste is chiefly used for this purpose. In the interests of conservation this industry should be increased. The Forest Service tests prove that the quality of "Kraft" papers manufactured from longleaf pine surpassed in strength and toughness any other produced in this country or abroad.



LONGLEAF PINE USED LARGELY FOR WOOD BLOCK PAVEMENT

While several coniferous woods are used for wood block pavements, fully eighty-five per cent of the total amount of raw material used for this purpose is yellow pine, principally longleaf. More and more cities are adopting wood block pavement or extending that already in use and it is expected the consumption of longleaf pine for this purpose will steadily increase.

ment of the naval stores industry was undertaken by the settlers of North Carolina, and the descendants of the original Tarheel turpentine men are found in every turpentine-producing state. The lumberman, on the other hand, particularly along the Gulf, are often Northern men. Many of them are from the white pine regions of the Lake States. The longer visioned of the white pine men, foreseeing the exhaustion of that wood, cast about for other timber supplies. Some went west; others located in the Southern pine region. Many of the latter bought up Government land in Louisiana and Mississippi at \$1.25 per acre, the timber on which is by now worth from \$2.00 to \$1.00 per thousand feet.

To enumerate all the uses to which longleaf can be put is almost to catalog the uses of wood itself. Heavy construction, shipbuilding, housebuilding, interior finish, machinery, railroad ties, freight cars, paving blocks, box boards, shingles, wood pulp; and we have named but a partial list.

WEIGHT FOR WEIGHT STRONGER THAN
STEEL.

Longleaf may not be the strongest of woods, but it is one of the strongest

which can be obtained in large dimensions and amounts, for the strength of wood is roughly proportional to its dry weight and longleaf is almost as heavy as oak, being the heaviest of the important conifers. Weight for weight, it is stronger than steel. Individual pieces of longleaf, as of any wood, vary in weight, hence in strength. The weight is roughly proportional to the density, which



FRUIT AND VEGETABLE PACKAGES

These are made of one-eighth inch rotary cut of longleaf pine veneer, the longleaf being an important wood in this industry and grouped with the other southern yellow pine stand-third in the list of woods used for this purpose.

is determined by the size of the annual rings and the proportion of dense or "summer" wood which they contain. Lumbermen and timber engineers are discussing the adoption of revised grading rules which shall take these facts into account and will result in furnishing to consumers longleaf timbers of a uniform strength as well as freedom from defects. Longleaf pine is also one of the most durable of important structural woods, both in air and in contact with water or in the soil. It is possible to obtain clear sticks in dimensions up to 14×14 inches by 70 feet, and there are records of some even larger. Derrick booms, masts, flag poles, trestle beams, and timbers for buildings of the slowburning or "mill frame" construction type demand these timbers. A rather unexpected use came to the attention of the writer recently when he saw an order for longleaf timbers to build the framework for targets for big gun practice in the Navy.

We are hearing a great deal these days about the danger of using wood for construction purposes, since forsooth it will burn. The fact has been advertised as if it were a recent discovery, at the same time those most interested in circulating this interesting bit of information have failed to inform us that steel will melt and cement will crumble. If a longleaf timber and a steel beam constructed to support the same load are placed side by side and subjected to a fire of the same intensity the steel beam will become red hot and bend under its load before the longleaf beam will have burned through

and broken. A fire hot enough entirely to consume longleaf timbers of any size will reduce an unprotected steel beam to a mass of twisted iron. Indeed it is very difficult to burn a longleaf timber entirely away, and it will scarcely consume itself without added fuel. For this reason, engineers and architects still specify longleaf timbers for certain kinds of construction, and are more concerned in securing longleaf which meets their specifications, and is free from dry rot, than in securing a non-organic substitute. Where both are supplied with automatic sprinklers, buildings of the "slow-burning" or "millframe" construction type are insured at the same rate as semi-fireproof buildings of steel construction. Most millframe construction is built of longleaf timbers. Wooden rafters for gymnasiums, halls, churches and other public buildings, where the overhead construction is in view from the interior are much more attractive to the eye than steel beams. Longleaf is well adapted to such uses, because of its strength, attractive appearance, cheapness and the ease with which it can be obtained in suitable dimensions.

Longleaf is used for house building in enormous quantities. It is particularly suitable where the same boards appear on both inside and outside of the structure, the reason being that it is strong and durable, holds paint well and at the same time is attractive in the natural wood, for its slow growth and large proportion of dense summer wood give it a pleasing yellow and brown banded appearance. Shortleaf Southern yellow pine is perhaps



LONGLEAF PINE USED FOR PILING

Longleaf is extensively used for this purpose because it is particularly desirable for any heavy timber work, and because of its durability. Weight for weight it is stronger than steel. It is also in demand for derrick booms, masts, flag-poles, trestle beams and timbers for buildings of the slow burning or "mill frame" construction type. Its most recent new use is for the framework of targets for big gun practice in the

more perfectly suited to fine interior finish. As it ages, the color of the wood changes from a light yellow and brown to a rich golden brown which takes a fine polish and becomes extraordinarily beautiful.

IN A CHURCH OF REVOLUTIONARY DAYS

There is an old Episcopal church at Raleigh, North Carolina, built in Revolutionary times. It is of stone. Its rafters, pews, and other furnishings are of prime longleaf, finished in the natural wood, now darkened and

chiefly longleaf, than of any other wood. Although we have no statistics at hand to prove it, it is almost safe to assert that more freight cars are built of it than of all other American woods combined.

In the last few years the popularity of wood paving blocks in our cities has increased. They are soundless, sanitary and very durable if treated with preservatives and made of the right kind of wood. They are also easy both on the feet of horses and the tires of motor vehicles. Yellow pine, because of its hardness and density, meets



LONGLEAF PINE TIMBERS

The most important of the yellow pine group for heavy structural and bridge timbers is the longleaf. Owing to its strength and last properties it was long considered supreme among American woods as a structural timber and only with the exploitation of the forests of the Pacific Coast in the last decade has it had to share this place with Douglas fir.

deepened in color by age. One has a new conception of the value of this wood for decorative purposes after a visit to this cathedral-like building. It is a pity that more manufacturers do not specialize in the curly grained pine which has as pleasing grain and color as curly maple, and could be sold much cheaper.

As a general flooring wood, longleaf has no superior, whether it be thick planking for mills and factories, where strength and durability are the consideration, or in the home of the average citizen, where it combines inexpensiveness with beauty and utility. The so-called edge-grain, quartersawn, or rift flooring is the most durable, and takes the best polish.

We can pause to discuss only lightly a few of the other uses, one of the most important being car stock. More American railroad cars are built of yellow pine,

these requirements, and it is far and away the leading wood for this purpose.

In 1907 the railroads of the country purchased 34,215,000 yellow pine ties. The life of an untreated long leaf tie averages between 5 and 7 years, which compares favorably with that obtained from white oak or locust and other hardwoods. Many of these ties are hewn. Dead trees are often preferred, only the seasoned and durable heartwood being used. Many are treated with chemical preservatives.

An industry is beginning to grow up in the South in the manufacture of paper pulp from longleaf, chiefly from sawmill waste. It is in the interests of conservation that this industry be increased, since the waste from the manufacture of Southern pines is far in excess of what it should be. Tests by the Government Forest

Service proved that the quality of "Kraft" papers made from longleaf pine surpassed in strength and toughness any others produced in this country or abroad.

GRADES AND PRICES

We have no way of knowing the price of longleaf in the early days, but it must have been very low. Even now it is low compared with some other woods of anything like its high quality. The average selling prices at a large mill in Louisiana for the year 1913 are as follows:

| | |
|------------------------------|--------------------|
| Timbers above 4" sq. | \$21.12 per M feet |
| Timbers 2½ to 4" sq. | 17.99 per M feet |
| "A" Edge grain flooring | 36.36 per M feet |
| "B" Edge grain flooring | 36.29 per M feet |
| "C" Edge grain flooring | 25.70 per M feet |
| "A" Grade boards | 30.08 per M feet |
| "B" Grade boards | 24.04 per M feet |
| "C" Grade boards | 23.43 per M feet |
| No. 1 Common | 11.83 per M feet |
| No. 2 Common | 12.98 per M feet |
| No. 3 Common | 10.75 per M feet |
| Box Shooks | 15.08 per M feet |
| Moulding | 24.54 per M feet |
| Lath No. 1 | 1.78 per M |
| Lath No. 2 | 1.15 per M |
| Shingles | 2.41 per M |

The mill run at the time was about \$16.50 per M as compared with \$19.00 for white pine.

FUTURE OF THE LONGLEAF

The original area of the longleaf range was slightly in excess of 100,000 square miles, over most of which the tree grew in pure stands. Assuming an average stand of 5,000 feet to the acre, the original stand would have been 320,000,000,000 feet. The original stand of white pine is estimated to have been 450,000,000,000 feet. The longleaf estimate certainly seems conservative, since the annual cut for the last ten years has been in excess of 10,000,000,000 feet per annum and in 1913 the remaining stand was estimated at 232,300,000,000 feet, or about one-twelfth of all the standing timber in the United States. The estimated stands of western yellow pine and Douglas fir alone exceed that of longleaf. The longleaf pine stand by States is as follows:

| | |
|----------------------|-----------------|
| North Carolina | 2,900,000,000 |
| South Carolina | 4,600,000,000* |
| Georgia | 18,500,000,000* |
| Florida | 58,200,000,000* |
| Alabama | 25,600,000,000 |
| Mississippi | 17,600,000,000 |
| Louisiana | 32,500,000,000 |
| Texas | 22,400,000,000 |

*Includes some Cuban pine.

That seems a huge supply, but experience has proven that no wood is inexhaustible, even though the supply may last longer than is at first predicted. The average rate of cut for the past few years has been about 12,000,000,000 feet per annum, and it is thought to have reached its maximum. At this rate the supply of virgin

longleaf will be gone in 20 years. It will probably last slightly longer, since the maximum cut cannot be maintained clear to the point of exhaustion. Companies exhaust their holdings and are unable to secure more stumpage; with the restrictions of output comes an advance in price, resulting in a substitution of other woods, and a lessened demand, more conservative cutting and milling methods are introduced; all of which help to stretch out the supply. It is therefore safe to assume that virgin longleaf will last at least 25 years, but will be gone in 35.

LITTLE HOPE FOR SECOND GROWTH

But what of the second growth; has the longleaf, like the white pine, a future as a second growth tree? The answer, unfortunately, seems to be "No." Technically it is possible to reproduce longleaf, and if the pine barrens could be constituted a forest reserve, and handled simply from the viewpoint of forest management, the tree might be perpetuated commercially, but as it stands this seems scarcely possible. For longleaf does not "come back" after lumbering. It seeds very infrequently and grows slowly. Young growth scarcely ever comes in under the shade of the older trees, and in the openings it is kept out by fires. When the area has been logged, the burning of the slash, which invariably follows, kills all the smaller trees which have been left, and the annual grass fires, together with the absence of seed trees keep more from coming in. So longleaf has become commercially, almost botanically, extinct over whole sections and they are now barrens indeed. North Carolina, formerly the pine tree state of the South, hardly knows it now as a commercial tree. There are no counterparts to the second growth stands of white pine which occur in portions of New England, in the longleaf range. Nor does the species lend itself to artificial reforestation. It sends down into the soil a strong, deeply penetrating tap root, almost before it has developed any top at all, which prevents its satisfactory cultivation in the nursery.

An article on shortleaf pine will follow this shortly. Commercially the longleaf and shortleaf are both known and sold as yellow pine, but there is such a difference in their characteristics that separate articles describing them are warranted.—Editor.

AN IMPORTANT CONFERENCE

ON SEPTEMBER 22 at 9 in the morning, Secretary of Agriculture Houston will meet representatives of the American Forestry Association, of several State forestry associations and of Chambers of Commerce from the larger cities on the Atlantic Coast to discuss the proposal to ask Congress to make an appropriation of \$10,000,000 to continue the purchase of Federal forest reserves in the White Mountains and Southern Appalachians. There is hope that such an appropriation may be provided, in which event it will be possible to continue such purchases as have already been so wisely made.

Forests in the War Zone

DISPATCHES and special reports from various points in Europe differ as to the damage done to forests within the war zone and to the effect which the cutting, destruction by artillery fire, forest fires, and by the logging and marketing of timber from the forests in enemy's territory which has been captured, will have on forest conditions in the future.

Some of these reports are here given for what they are worth and because they are interesting.

A special newspaper dispatch from Bar-le-Duc, France, says: "The splendid forests of the Argonne, as well as those of the Alsatian slope of the Vosges Mountains and of the Woevre, are being gradually razed by shell and shrapnel fire. Of the majestic pines that covered these heights there remain only hacked and blackened stumps and a wild tangle of fallen trunks.

"Germans and French have cooperated in this devastation, but the greater destruction is credited to the intense, concentrated fire of the 3-inchers and 6-inchers that alone could dislodge underground German fortresses. There is said to be abundant evidence that all the ground had been carefully plotted and the ranges taken by the Germans before the battles. On many occasions French detachments following obscure paths unknown to any but the woodmen of the region, fell a prey to the fire of German gunners, for whom there seemed to be no secrets in the thickets of the Argonne. Against the advantages of preparation, the French had but one resource—a complete upheaval of the entire ground by concentrated artillery fire. If the French succeed in driving the Germans finally into the open, the priceless forests of the entire region of the Argonne from Bar-le-Duc north will exist no more."

Another dispatch, this time from Paris, quotes a well-known Frenchman as saying that forest preservation is necessary to maintain population. It says:

"Paul Descombes, discussing the progressive depopulation of France, gives some statistics to show that the thinning of the woods and forests is largely responsible. There are thirty-one French departments that are more or less mountainous. These now have 8,094,940



Photo by Underwood & Underwood, New York.

FRENCH FOREST DESTROYED BY GERMAN SHELLS

This forest land in the northwestern part of France sheltered several British regiments until the Germans discovered them, and, concentrating a terrific artillery fire on the woods, drove the British out and destroyed the trees, as the photograph so well illustrates.

inhabitants. If the old rate of increase had been maintained, their population now would be 11,896,366. Monsieur Descombes points out that the mountainous regions of Switzerland, which should not be any less favorable to repopulation than the mountainous regions of France, show an increase of more than 50 per cent in population during the last sixty years, and he attributes it to the fact that forest protection in Switzerland is far more rigorous than in France."

A cablegram from Amsterdam says: "Tremendous forest and moor fires are raging in various parts of



Photo by International News Service.

A FRENCH OBSERVATION POST

Here the trunks and branches of trees in one of the French forests have been cleverly used in an effort to shield and to hide an advanced post.

Silesia, according to the Berlin Tageblatt. Around the district of Wittchenau some villages have been evacuated, and war prisoners are engaged in throwing up trenches to assist the fire brigades in fighting the fires."

A newspaper article widely printed in the United States says: "It is reported that the French and German Governments are utilizing war prisoners for reforestation work. It is said that vast forests have been entirely destroyed by the fighting. The ground in many places is absolutely sterile, the announcement says, because of fumes and gases from bombs and explosives of various kinds. It is understood that the French Government is paying fifty cents per day to the German prisoners for the work. The regular foresters are all at the front."

A correspondent of the *New Orleans Lumber Trade Journal*, who is a petty officer in the German Army commanded by Von Hindenburg, contends that the forest destruction in the war zone is not so great as some reports indicate. He says:

"Lately I have often had the opportunity to visit the battlefields of the glorious victories of Marshal Hindenburg near Tannenber and round the Masurian seas. It was evident that the effect of the war in general on

the forests was not so great by far as some forest experts feared. Naturally in those parts of forests in which fights have taken place, and that were for a longer time covered with showers of cannon balls, a great number of trees have been broken and much more have been wounded. Even the mills in later time will have some trouble in cutting this wood, as every now and then rifle balls and pieces of iron from exploding shells have penetrated into the wood. But compared with the whole of the East Prussian forests, the direct losses of trees are small. A very interesting feature in those parts that were occupied by the Russians during the last winter are the numerous subterranean rooms, that in one place alone, as I calculate, may have given shelter for more than 10,000 men. For miles long the soil of the forest is holed in this way. All rooms have been covered by wooden props and earth. Many thousand cubic feet of wood from smaller trees are used for that. At other places,

as, for instance, the wonderful street along a small channel, the old oak, willow and elm trees have been cut by the Russians to get free shooting. But on the whole these devastations of wood offend more the feeling and the love of nature than that they are important in the sense of forest economy.

"By far more important are the devastations of edifices. It is highly interesting to see that these devastations stop immediately at the old Russian frontier. If the Russians say that the destructions are caused only by some undisciplined people, such as Cossacks and Tscherkessians, this fact proves the contrary, for an undisciplined troop makes no difference between its own and foreign country. The destructions are caused by the direct order of Russian army commanders who have ordered the destruction of all public and private property of the country. One may calculate that in this way more than 20,000 houses have been burnt at places where never a gun has been fired nor a fight has taken place. From 10 to 20 million cubic feet of timber, mostly of German pine, will be wanted for the reconstruction of these houses.

"In the timber market, so far as foreign timber is concerned, the situation is practically unaltered since my last report. Ash is wanted at all times, but the price is falling a bit."

The Bird Department

By A. A. ALLEN, PH.D.

Assistant Professor of Ornithology, Cornell University.

OUR VANISHING SHORE BIRDS

WHEN our forefathers first turned their attention to the hunting of birds either for food or sport, it is recorded that they found the woods from Maine to Florida teeming with wild turkeys; the air filled with clouds of wild pigeons, the lakes and marshes covered with waterfowl, and the shores animated with countless thousands of snipe and plover.

Today the turkey, in its wild state, is unknown except in a few remote and inaccessible places; the last passenger pigeon died a year ago in the Cincinnati zoo; the geese and the ducks are so reduced in numbers that one species, the Labrador duck, has not been seen in forty-five years, and another, the wood duck, has been practically exterminated over a large part of its range. The same is true of the shore birds. The Eskimo curlew is almost extinct; the long-billed and Hudsonian curlews, the avocet, the stilt, and the godwits are found only in small numbers, and even amongst the smaller species single birds now grace the shores where once great flocks assembled.

The cause is not difficult to discover. The cutting of the forests and the increase in the numbers of hunters were sufficient to destroy the turkey; the gregarious habit of the passenger pigeon, making possible the slaughter of countless thousands on the breeding grounds, annihilated this species; the automatic gun, the market hunter, the greed of the sportsmen, and the shooting of mated birds in the spring of the year wiped out the waterfowl. At this point the vast army of gunners, having no other game to hunt, equipped with automobiles so that no place is inaccessible, turned loose on the shorebirds, and little wonder is it that the snipe and plover decreased and are now rapidly disappearing. First the larger species gave way before the onslaught and now the smaller, until even the little "sand peeps" that trot along the beaches and chase the receding waves are not safe from destruction. The small boy with his newly acquired rifle, and the amateur with his shotgun pick them off as they stand in a row asleep on

the sandpit. The professional hunter fires into their densely massed ranks as they swing by to see how many he can kill at a single shot.

This flocking habit has helped the near extinction of other species as well, although the true sportsman, however great the temptation may be, never takes advantage of it. But the number of true sportsmen is relatively small, and the number of hunters who realize that to kill



"SAND PEEPS" IN FLIGHT

These birds, the least and semi-palmated sand pipers fly in such flocks as shown in the photograph. This flocking habit has caused the near extinction of many species. Frequently a large number of a flock are killed at a single shot by an unscrupulous gunner.

a dozen birds at a shot provides insufficient sport for the great reduction in the supply of game is still smaller. With these birds the sport of hunting is reduced to a minimum, the lust of killing raised to a maximum, and economy ranks lower than did forest conservation with the early settlers. Far better that the temptation of shooting into these flocks be removed from the unscrupulous and that these birds be protected for all time.

Among the "shore birds," however, there are two species, the Wilson's snipe and the woodcock, which do not have this flocking habit and which, except for their small size, fulfill all the requirements of first-class game birds. They lie close and unseen by the hunter until, with a startling call or whir of the wings, they bolt into the air on an erratic course which requires all the hunter's skill to intercept. Even when traveling in scattered flocks, they get up singly so that only one bird can be killed at a shot, thereby yielding the greatest amount of

sport for the number killed. It would seem, therefore, that these birds ought to be able to hold their own but, unfortunately for their preservation, they do not fly far when frightened, thus allowing the hunter several trials if he is not successful the first time. Furthermore, when they have finally reached their winter home in southern United States, they seldom leave the thicket or wet



A LESSER YELLOW LEGS

Single birds now grace the shores where once great flocks assembled.

meadow which they have selected until it is time to return once more to the north. Here, therefore, the gunner is able, by hunting over the ground day after day, unless the number killed is limited by law, to annihilate all the birds wintering in the vicinity. In fact, there is a case on record of a hunter in Louisiana who boasts of having killed 69,087 snipe in 20 years, an average of 3,500 each season, as many as 366 having been killed in a single day. The State game laws are further to blame because they have permitted the shooting to continue far into the spring, after many of the birds are mated and ready to leave for the breeding grounds. With such laws and such slaughter it is little wonder that the numbers of snipe and woodcock have rapidly decreased.

It is true that these birds are preeminent as game, serving man perhaps better in this capacity than in any other, and furnishing the largest return of legitimate sport for the smallest loss of game life, but limits must be fixed by law to govern the greed of what have been aptly called "game hogs," so that the number killed each year shall be distributed among the largest possible number of sportsmen; and the open season must be so adjusted that there will be no further decrease in their numbers.

It is fortunate that the United States Government realized in time that some action had to be taken, and now if public sentiment is sufficiently aroused, it will still be

possible to preserve the remnant of these charming and valuable creatures and even to restock the depleted covers. The passage of the Weeks-McLean bill for the protection of migratory game and insectivorous birds puts the jurisdiction over these birds with the National Government and the regulations drawn up by our far-seeing United States Department of Agriculture now have the force of law. This Federal law removes all the smaller shore birds from the game list; likewise the fast-disappearing curlews, avocets, stilts, godwits, killdeer and upland plovers; it prohibits all spring and night shooting and equalizes the open seasons in all parts of the country. The law will be difficult to enforce. Already it has met the determined and organized resistance of market hunters, game dealers, hotelkeepers, and anti-conservationists generally. If it is to be effective in preserving for this and future generations one of the most delightful assets of our shores and marshes, it must have the recognition and active support of all true conservationists.

BIRD LIFE IN SEPTEMBER

SEPTEMBER marks the beginning of well-defined migration among birds. Shore birds of which we have been writing, the long-distance travelers, during this month arrive in greatest numbers, and it is now that the hunting season opens in most of the northern States. It is true that as early as July a few birds begin their southward journey and during August there is a general uneasiness felt among many species. But it is not until September that the general exodus begins. Most species migrate by night so that we do not see them passing, but if one goes out under the heavens almost any cloudy evening this month, he is sure to hear them calling to one another as they fly over. Cloudy nights are more satisfactory because when the sky is clear the birds fly higher, often several thousand feet above the ground and far out of hearing distance.

In addition to the shore birds there will be many other insect-eating species like the warblers, vireos and flycatchers, migrating, but few will be recognizable for their nocturnal calls are usually quite different from those we have come to know during the day.

During September one may look for many species that have not been about all summer, birds returning from farther north to their winter quarters. The first birds to leave in the fall are those that have farthest to go and most of these September migrants winter outside of the United States, either in Central or South America and some of the shore birds are not content until they have reached Patagonia.

One who has learned the birds only in their spring attire will be greatly disappointed with himself when he follows, for the first time, the flocks of fall migrants,

for few of the plumages will be the same. The once brightly colored warblers and tanagers have now completed their molts, changing every feather, and the males now resemble the obscurely colored females. There are more birds in the fields and along the borders of woodlands than there were during the spring when every tree seemed to burst with color and song, for the young almost outnumber the adults. But they are quiet now, only a few species are singing, and in their dull garb they pass unnoticed.

Another feature of bird life that is observable in September is the gathering of many species about fruit-bearing plants, bushes, vines and trees. One can observe which of the native shrubs are most attractive and therefore most desirable to plant about one's grounds. We will consider this phase of bird life in a later issue, but now is the time to observe. The drinking fountain and bathing pool mentioned in the last issue of this magazine will continue to be a popular resort for the birds throughout September.

At the Panama-Pacific Exposition

AMERICAN FORESTRY ASSOCIATION DAY at the Panama-Pacific Exposition at San Francisco—Wednesday, October 20—will find gathered for the meeting in the Lumbermen's Building on the Exposition grounds not only members of the American Forestry Association, but members also of the Western Forestry and Conservation Association, the Pacific Logging Congress, the Society of American Foresters, the Society of Canadian Foresters, the Biltmore Forest School Alumni, and a number of forestry and conservation organizations from California and adjoining States.

A general invitation to all who are interested in the work of the American Forestry Association to attend the meeting is extended by the Board of Directors.

The president, Dr. Henry S. Drinker, will preside and will speak upon the present forestry situation in the United States, and a member of the Western Forestry and Conservation Association will talk about the forestry conditions on the Pacific Coast.

A paper prepared by W. R. Brown, of Berlin, N. H., on the organizations of timberland owners in the East and in Canada for forest fire protection will be read by E. A. Sterling. Chief Forester Henry S. Graves will make an address on what the Government has found out about the lumber industry as a result of the recent inquiries relative to lumber costs and the domestic and foreign lumber markets. Executive Secretary P. S. Kisdale will speak on the development of the Association's magazine, *AMERICAN FORESTRY*.

During the meetings of October 19, 20 and 21, in which the American Forestry Association participates with the Pacific Logging Congress and the Western Forestry and Conservation Association, there will be, among others, addresses on such important topics as: The year's lessons in private, State and Federal forest fire protection

work; fire weather forecasts by the weather bureau and their use; forest fires caused by railroads, an actual record and what it proves; modern inventions adaptable to forest fire protection; the psychology of making public sentiment in favor of forestry; the business end of co-operative forest fire work; compulsory forest protection laws; can manufacturers, timber owners and forest fire protective agencies unite to advantage? Does the lumber industry need radical reorganization to protect producer and consumer? Is timber a speculation, a crop, or the necessary storage of raw material? The architect's responsibility for closer utilization of forest products; taxation and forestry: are we talking theory and neglecting facts?

One of the features which those who attend these meetings will particularly wish to see are the several forestry and lumbering exhibits, chief of which is the United States Forest Service exhibit. This alone is worth several hours' examination. There are also exhibits from the Philippines and several foreign countries, while many of the commercial woods have special exhibits. In addition to seeing these, many who attend the meetings will spend October 22 and 23 in the redwood logging camps at Eureka, California.

WISCONSIN'S NEW COMMISSION

PROF. FRANK B. MOODY of the Cornell Forest School and formerly assistant State forester of Wisconsin has accepted the appointment as a member of the State Conservation Commission of Wisconsin. This commission is the consolidation of the State Board of Forestry, State Park Commission, State Fishery Commission and Game Warden's Department. The other members of the Commission are James Nevin, who has been fish commissioner for thirty years, and W. E. Barber, a business man.

Aviator to Detect Forest Fires

QUITE the latest development in the protection of the forests from fires is the appointment of an aviator to detect any forest fires near Big Trout Lake in Wisconsin. He is L. A. Vilas, a relative of the late United States Senator William F. Vilas, of Wisconsin. Using his hydroaeroplane and arising from Big Trout Lake, Mr. Vilas in a few minutes can reach an altitude of 1,000 feet and from that height can survey some 200,000 acres of forested land. If he detects smoke indicating a fire in the forest he can report in a few minutes more to the State Forestry headquarters for the district and in a very short space of time state forest rangers can be placed along the line of the fire.

The use of a flying machine is particularly valuable for this kind of work where the country is flat or where there are no high elevations upon which lookout stations may be placed. In flat or rolling lands lookout towers enable the observer to guard a territory of rather small area, whereas Aviator Vilas at the height of 1,000 feet can detect a fire thirty or forty miles away from the lake.

While appointed by the State Forester, Mr. Vilas accepts no remuneration, volunteering his services. In writing to AMERICAN FORESTRY about the work, Mr. Vilas says:

"I greatly appreciate the interest you show in the part the flying boat is taking in detecting forest fires. The

machine I am using is a standard Curtis four-passenger flying boat with a Curtis eight-cylinder V type 100 horsepower motor. This machine has an average speed of about sixty-two miles an hour in the air and forty miles an hour in the water, with a climbing capacity of 1,000 feet in three minutes. At an altitude of 1,000 feet a fire thirty or forty miles away is distinctly visible.

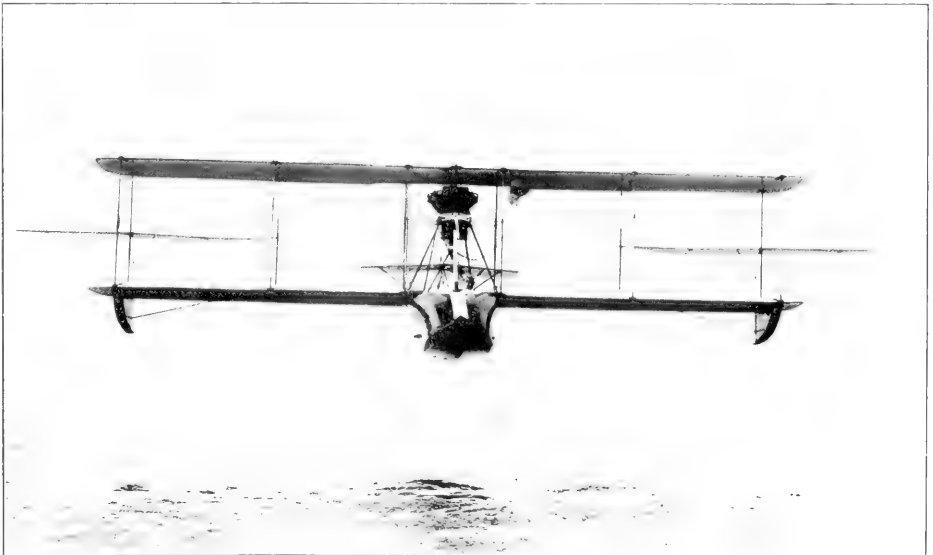
"I usually am flying every evening around six o'clock and I always reach an altitude which enables me to see about forty miles in every direction and if I do see indications of fire I can report to the Forestry headquarters at Trout Lake within three minutes."

E. M. Griffith, who has recently resigned as State Forester of Wisconsin, said:

"It is generous of Mr. Vilas to offer these services to the state without charge. The other day I made an ascent with him and we detected a fire. By communicating with the rangers when we came down, we found that it was a settler doing some clearing. The hydroaeroplane will reach the place of a fire in only a few minutes, where otherwise hours would be consumed."

Mr. Vilas recently discovered a fire thirty miles off and on investigation it was found that he had made an accurate estimate of the distance.

Mr. Griffith said that at an altitude of about 1,000 feet it is possible to clearly view all of the state forest



HYDROAEROPLANE, USED FOR FOREST FIRE PROTECTION WORK

This machine which has an average speed of 62 miles an hour in the air and 40 miles in the water, with a climbing capacity of 1,000 feet in three minutes is used by L. A. Vilas who has volunteered his service to protect the forests near Trout Lake, Wisconsin, from fire. At a height of 1,000 feet he can survey 200,000 acres of forested land and in a few minutes can report any indication of a forest fire to the State Forestry Department headquarters for the district.



AVIATOR L. A. VILAS

With his hydroplane Mr. Vilas is aiding in protecting the forests near Trout Lake, Wisconsin, from fire. His work in behalf of the State Forestry Department being the first time that a flying machine has been used for forest fire protection.

reserve lands in Vilas county. He declares that the ascent which he made with Mr. Vilas was 1,600 feet and the 1,200 lakes in the county at that high altitude was one of the finest panoramic views that he has ever seen. The hydroaeroplane is known as "L. A. V., II." This is the second machine that Mr. Vilas has owned. Mr. Vilas is familiarly known in aviation circles as "Jack" Vilas, and about a year ago came into prominence by reason of his flight in a machine across Lake Michigan.

TEXAS STATE FORESTER

TEXAS, which recently passed a State forestry law, has selected J. H. Foster, professor of forestry in the New Hampshire State College and forester of the State's Agricultural Experiment Station, as State forester.

Mr. Foster is a native of Massachusetts, and is thirty five years old. He was graduated from Norwich University in 1903 and from the Yale Forest School in 1907. After leaving Yale he entered the United States Forest

Service as a forest assistant, and in 1910 was promoted to assistant chief of State cooperation. His principal assignments were studies of forest conditions in Alabama, Mississippi, and Louisiana, the examination of forest conditions on the watersheds of the Allegheny and Monongahela Rivers, and the taxation of forest lands in New Hampshire. Mr. Foster left the service September 1, 1911, to become professor of forestry in the New Hampshire State College and forester of the State's Agricultural Experiment Station.

The position of State Forester of Texas, which he will assume about September 15, is one of the best positions of this kind ever offered, combining, as it will, all the forestry work undertaken by the State—administrative, teaching, and investigative. The work will be centered at the Agricultural and Mechanical College, at College Station. There will be a forestry department on equal footing with other principal departments of the college, which will administer the forestry law, including the fire protective system, management of State forests, and cooperation with private owners; and the State Forester will supervise the teaching work in forestry under the direction of the School of Agriculture, and the forest investigative work under the direction of the Agricultural Experiment Station. He will have an exceedingly free hand, and will be removed from politics as far as possible. It is expected that the relatively small appropriation of \$10,000 will be considerably increased by the next legislature as the result of a constantly increasing interest in forestry work throughout the State. Mr. Foster will bring to the position a broad experience, and the State is certainly to be congratulated on the selection

JAPAN'S FOREST LANDS

THAT the Empire of Japan has a forest preserve more than ten times the area of the New York State Forest Preserve was stated by R. Nakai, a director of the Japanese Forest Service, when he visited the Conservation Commission at Albany recently to inquire into New York State forestry methods. Mr. Nakai is in the United States on behalf of the Japanese Government, and is making a special study of reforestation and fire protection. He visited the New York State nurseries and tree plantations, and made a tour of a large part of the Adirondacks to observe the detailed workings of the State's system of fire prevention. Mr. Nakai expressed much interest in the struggle in the New York State constitutional convention to permit the commercial utilization of the forest preserve. In Japan, he said, which has a forest area of sixty-seven per cent of the total area of the country, the forests were sharply classified into "utilization forests" and "protection forests." The object of the "protection forests," he explained, is to preserve the safety of the land and further the welfare of the people. The protected area is over 18 million acres, against 1,821,614 in New York State. The forest land not owned by the state is subject to the control of the Government, according to the provisions of the Japanese forest law.

The Ornamental Evergreens

BY WARREN H. MILLER

MANY years ago, Prof. Josiah Hoopes, member of the Academy of Sciences, Philadelphia, wrote a whole book on the evergreens. It is out of print now, but should be revived for the benefit of the tree lovers of this country, for it is a fascinating volume, and it covers the evergreen families and species of the known world. It is written from the viewpoint of the arboretum owner, the gentleman with a large estate, part of which has been devoted to a more or less complete collection of the evergreens of the world that are hardy in temperate climates. There were many such in 1868 when the book was written, and are yet for that matter, for there will always be wealthy men who love to collect beautiful trees and watch them grow and develop.

But, for the most of us, these things are not to be; we lack the land, for the duties of life require a habitation so near great cities that land is sold by the lot rather than the acre. But even for us there is no reason why even a small plot should preclude planting our surroundings with our more common ornamental evergreens, and if the matter is not overdone, quite a variety may be assembled without the place taking on the appearance of a museum.

On the writer's comparatively small home grounds in the forest of Interlaken there are sixteen different species of evergreens, many of them represented by half a dozen individuals—and the writer's own criticism of his place is simply that there are not enough of them as it is! Let us get acquainted with some of the more

familiar ornamental evergreens used in house planting. Beginning with the Colorado Blue Spruce, easily the most ornamental of the spruces, the variety most often encountered is that known to nurserymen as Koster's Blue spruce. It is developed from the Parry spruce, the *Picea Parryana* of science, growing wild only in the canyons of southern Nevada, Utah and Colorado where it is known as the blue or silver spruce. As a rule it is a dull blue-green in its natural state, of little ornamental value, but occasional "sports" show a vivid light silver blue and shoots from these are grafted on seedling roots of the ordinary wild blue spruce, whereupon the resulting tree has the vivid light blue of the original shoot all over it and is known as Koster's Blue Spruce, being named after the nurseryman who first experimented with it. All the nurserymen keep it and a small specimen 2 feet high will cost you about \$1.50, the plain blue spruce of the same size costing \$1. It grows some 9 inches additional height and 18 inches spread each year, so give it at least 5 feet of distance to its nearest neighbor when planting. It seems to thrive equally well in heavy clay soil and sandy loam, provided only that the soil is well drained and not soggy and swampy.

Another standard ornamental evergreen is the *Retinospora Plumosa*, that silver-blue, fuzzy tree with dense, fronded foliage, usually trimmed close as a rounded cone or oblong ball. It is a good tree to fill in a corner in either house or hedge, and is always noticeable in any shrubbery in which it may be placed. A specimen three feet in diameter by 3 feet 6 inches high will cost \$1.25



EVERGREEN PLANTING SUITED FOR CORNER OF A PRIVET HEDGE

Left to right—Hemlock; *retinospora plumosa*, one species of the popular Japanese cedar or cypress; Norway spruce; Japanese *retinospora*, which term applies to all forms of Japanese cedar or cypress; Koster's blue spruce, and American *arbutus*

and will grow anywhere but in a swamp. A third silver-blue evergreen is the Irish juniper, looking something like a common red cedar in form but its foliage is feathery light blue-green, thinner than cedar and growing up almost perpendicularly from the trunk. It makes a tall, narrow, graceful tree, and a specimen 4 feet high and a foot wide will cost \$1.50. Whenever you want a striking vertical note in the shrubbery that is your plant. Good for a jutting out corner location where it will stand out boldly to be admired of all the world.

An exceedingly ornamental but costly shrub is the *Biota Orientalis*. It looks like a big golden-yellow egg set on end, and its leaf fronds all stick out edgewise like the leaves of a book. It is very dense and bushy, and a specimen 3 feet high would be worth four or five dollars, so the only way to rejoice in *Biotas* is to get them little

tree is symmetrical and distinctive in shape and makes an ornamental feature at some 'vantage point in front of a group of firs and hemlock. The pitch pine has coarse sap-green needles, three in a sheath, and thick bushy foliage, always a pleasing note of color in any shrubbery. Few nurserymen keep it, the substitute usually offered being the European Scotch pine. Both it and the white require at least 5 feet of room from their trunks to the nearest neighbor, and specimens 4 feet high and spreading 2 feet in diameter cost \$1 to \$1.50 each.

Among the spruces the best filler at the price is the Norway spruce, a large, handsome, dark green tree, 4 to 5 foot specimens costing 75 cents each. A good tree to put in an empty corner, to round out and soften the general contour of your house or hedge line. It ought to be planted not less than 8 feet from each face of the



PLANTING FOR A SMALL SUBURBAN HOME

Left to right—Hemlock, *retinospora plumosa*, Irish juniper, Koster's blue spruce, Irish juniper, hemlock, thread branched *retinospora plumosa* and Norway spruce

and let time do the rest. A little one 16 inches high and 8 inches in diameter costs 75 cents, but, at that, gives you a striking yellow note in your mass of evergreens.

The basis of all evergreen planting should, however, be solid green masses of color in our own native trees such as the hemlock (almost as beautiful as exotic *R. plumosa*), the balsam fir, and our white cedar, the American arborvitae. These are all comparatively cheap, running from 75 cents to \$2 in 24-inch to 4-foot specimens. The American arborvitae, being long and tall, costs less in proportion to height, a 6-foot tree costing \$1.25; while the hemlock which is feathery and bushy, is expensive in large sizes but it well repays the cost as it is undoubtedly the most beautiful of our eastern evergreens. With these will be wanted pines and spruces to give variety in shape and foliage, the white and pitch pines being the best American species, while the white and Norway spruces fill the bill for standard types of the shrubbery spruce. The white pine has five needles to the sheath, giving a feathery dark green foliage. The

building in corners, and one should be careful about planting it in front of a window when a fine view is had, for the Norway spruce grows so rapidly that in a few years it would blot out your outlook. The white spruce, native of Canada, is smaller and if possible more symmetrical in shape. With its light green silvery foliage it is a most ornamental tree; 3-foot specimens cost \$1. The balsam fir, belonging to the genus *Abies*, the pine family, has the same general type of growth, but flat needles, dark green above and silver white underneath. Its trunk is light gray, and the characteristic odor of balsam which continually exhales from the tree makes it a favorite planter.

In general your large inexpensive American evergreens should form the background of your masses of greens, with the smaller exotics in the foreground. In laying out each of the accompanying planting diagrams I had the pleasure of helping a neighbor whose house had just been finished in selecting and planting a suitable shrubbery for this place. The first is of a typical sub-

urban home, located on a new development or erstwhile farm pasturage, a fine, handsome, stucco house on a raw and treeless lot. Four Norway maples had already been perpetrated upon the front lawn by the development company, thereby ruining any possibility of a deep, restful greensward. I advised the removal of the two central ones to the rear flanks of the house. These were 3-inch nursery specimens, easily transplanted because of the large, compact ball of roots which the root-pruning and transplanting at the nursery gives them, so there was no difficulty about moving them around in the proper season, which should be after the sap is down in October.

The front bay windows of the living room faced the street and under them I advised a border of the short and slow-growing evergreens, *Retinospora Plumosa*, American Hemlock, Nordmann's Fir (a short, squatty variety with thick dark green horizontal branches) one or two *Biota*s, a slender Irish juniper at one projecting corner (but not at the other, lest a banal symmetry overtake us) and in the deep re-entrant angle behind the porch, a 5-foot Norway spruce.

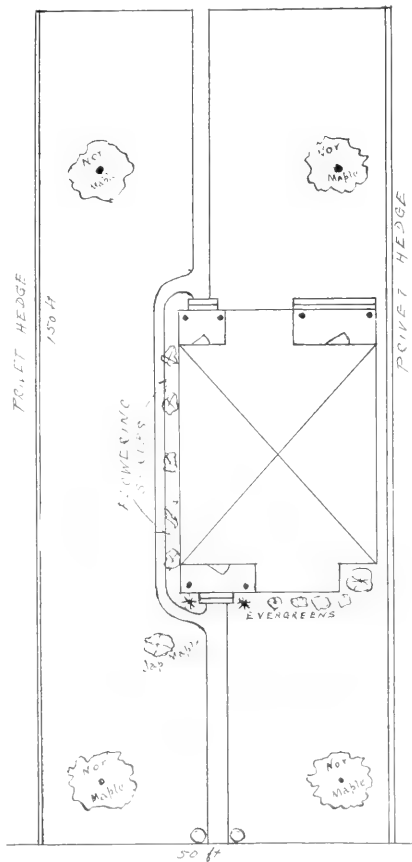
At the end of the walk leading up to the porch entrance we put in a small blue Koster's spruce on each side of the steps, this being the nearest approach to anything formal attempted. Along the south wall of the house went flowering shrubs, two deutzias, a wigelia and a forsythia (of which more anon). This was all—just a little suburban plot, which is the easiest thing in the world to clutter up with shrubs, we depended for the rest of our effect upon a small but untroubled lawn and a side border of privet hedge. I allowed him, however, one red Japanese maple, set about opposite the corner of the house, across the path on the south side on the narrow strip of lawn between it and the hedge.

The second diagram shows a rather large place, 100 by 150 feet, the house in Dutch colonial on a low knoll, with a rolling lawn sloping down to the sidewalk. A privet hedge bordered this plot on both sides, with a small corner extending for some 10 feet along the front lot line on each side. These corners were filled with evergreen shrubbery of the following selections: In the angle of the east corner a *retinospora plumosa*, tightly clipped, forming a large globular cone of feathery blue-

green foliage. In front of it a 2-foot Koster's blue spruce and a pyramidal Japanese *retinospora*, the three trees forming a triangle in the corner of the hedge. The foreground of this group consisted of a small 18-inch *Biota Orientalis* and a 3-foot Thread-Branched *retinospora* with an American pitch pine terminating the rear peak of the group. In the west corner, where the hedge corner was twenty feet on a side, the interior triangle began with a *retinospora plumosa* set in the corner, on

each front of it an American hemlock and a Japanese *retinospora*, and in front of these four trees a small arborvitae, a 2-foot Koster's blue spruce, a *Biota* of about the same size, and a Norway spruce terminating the rear peak of the group. This would become a rather large tree in time and was therefore planted some 1 feet from the hedge, and, as in this case the planted area continued back along the hedge in a long sweep planted with roses and flowering shrubs, it was followed at once with a dense bed of *rosa rugosa*, whose persistent, glossy, dark green foliage made a fitting transitional selection to the deciduous shrubs. The *rosa rugosa* is that very spiny rose bush, with the large deep red flowers like the wild rose and the great red rose-apples, persistent and ornamental all through the winter. Pruned down close it comes up denser and thicker each season and a bed of them is always a striking ornament winter or summer, either as a border for a path or for a hedge.

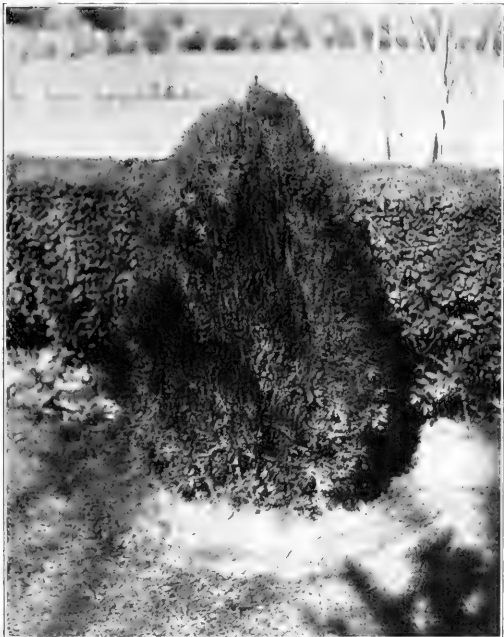
The deciduous shrubs began with a rose magnolia, a fine flower bouquet in the early spring; then two forsythias (golden bells), conspicuous in the early spring before the leaves are out; then, along the narrowest sweep of the shrubbery came the roses, lots of them, all kinds, the pride and glory of the gracious lady who presides over all the growing things about this place. Behind these the bed curves out again to the driveway terminating the lawn, and we have more space for planting. Here were the larger flowering shrubs, three deutzias forming the foundation of the group, with a wigelia and two spireas (*Van Houttei*) in the foreground. Worked into this bank of flowering shrubs are different colored azalias and similar small bushes, and, terminating the bed where it reaches the driveway is a group of the spreading hy-



Planting diagram suitable for a suburban cottage on a small lot. Frontage, 50 feet.

drangeas, the *paniculata grandiflora* variety, with their immense mass of blooms flowering in August and throughout the fall.

Behind these flowering shrubs are dahlias in a solid wall. You may think that they would be blanked from sight by the shrubs, but their dark green foliage, on the contrary, forms a veritable bank or screen behind the shrubs, while the wonderful blooms, from August to December, which line the top of that wall of dahlias are a marvel to the eye, no less! They also serve as an ef-



GOLDEN BIOTA

This is exceedingly attractive. It looks like a big golden yellow egg set on end and its leaf fronds all stick out edewise like the leaves of a lark.

fective screen to the fruit and vegetable garden back of them, which, with its tiny greenhouse and pergola showing above the top of the dahlia hedge is suggestive of solid comfort and good cheer to add to the more aesthetic joys of the flowers.

It will be noted that many old favorites seem to have been omitted from this planting. No shrubbery is complete without the old-fashioned lilacs and sweet syringias, to say nothing of the rhododendrons so often most mistakenly planted in the sun. They are, however, not in the general shrubbery, for we have a better place for them. Lilacs should be in a clump by themselves, a landmark, an emphasis for some such important details as a turn in the drive—and they were here so used. Sweet syringia has such a habit of growing so large as to almost require a bed to itself, and its striking beauty should be set off apart for the world to see. In this planting there are three of them, forming the principal

shrubs, almost the only shrubs, in the circular bed which forms the round turn of the drive. Seen down the curve of the driveway the masses of cream-white blooms of those syringias are in themselves an invitation to drive in, if only for the pleasure of looking at them, and their fragrant perfume is a snare for many an unbeliever, who, passing by, is "overtaken unawares"—and converted into a rabid gardenist forthwith.

As for the rhododendrons, an ideal place for them was found along the northwest wall of the studio, where a fieldstone chimney rose under the shade of the big forest oaks and maples left standing when the lot was cleared. Also six English ivy plants set close to the chimney base, covered it in two years' time about twelve feet up from the ground, and around the base were massed half a dozen big rhododendrons whose glossy dark green leaves and purple, white and maroon blossoms are a veritable bank of color in the springtime.

In the northwest angle of the studio, where, because of the forest trees the sun never shines except for a brief



KOSTER'S BLUE SPRUCE

This is one of the most ornamental evergreens planted. A specimen this size will cost about \$25, while the small ones are worth \$1.50

hour at high noon, we found a home for two hemlocks and a balsam fir, the latter in the angle as being the more pyramidal tree. Both of these species do well in the sun also, but where you have shade or partial sunlight they will get on quite as well, so that they are the best selection for such places, leaving the sunloving spruces and exotics for the east and south fronts of your building. The firs and hemlocks grow large, so beware of planting them under windows or in small beds and borders. Their beautiful feathery, fronded foliage and

aromatic odor should never be missing from an American evergreen planting.

The location of this property in the balmy climate of the New Jersey coast gave the owner an opportunity to plant some rare and beautiful evergreens, not hardy north of Philadelphia unless the climate is tempered by some such large body of water as the Atlantic or its bays. As the Colonial Dutch porch of the house was made of red concrete, 42 feet by 10 feet wide, laid flat at lawn level at the top of the knoll, it would ruin the effect to plant shrubbery or even vines anywhere near it. Only the most formal shrubs were allowed about the porch—two round-head box trees in red terra cotta vases between the columns of the porch and two pyramidal box trees in tubs at the head of the entrance walk. But at the southwest corner where the knoll fell off to the

ing the early spring lovely. All through the summer the tree color persists, with but a slight tinge of green, and it is not until late November that the leaves fall, when we still have a note of color in the glossy red twigs. It is a small bush, never getting to any great height, if judiciously pruned, and in this particular planting will probably reach 4 feet by 5 feet diameter at maturity.

A third plant is the thread-leaved retinospora, a quaint assemblage of feathery green ostrich plumes ascending a straight central trunk in regular whorls—a beauty, to make anyone stop and examine. In front of the group is a small intensely yellow and evenly shaped *Biota*, while, forming a thickener or background for the whole, is a bushy hemlock, a sister of the deodar in dark green.

Odd evergreens, however, quickly lead one astray into the domain of the arboretum or tree collection, a thing to



A PLANTING FOR A LARGE COUNTRY HOME

Left to right—*Retinospora plumosa*, *arborvitae* and Norway spruce with *arborvitae* on each side of the porch steps. Beyond it left to right again: thread-branched *retinospora*, Irish juniper, *biota orientalis*, *retinospora plumosa*, *arborvitae* and Koster's blue spruce.

drive, was an opportunity for a few, a *very* few, striking evergreens. Easily the most conspicuous point on the knoll, with the distances of the driveway and rear garden behind it, whatever was put there would have to measure up to the honor of being placed as it were in the limelight. So here we planted a deodar, the East Indian cedar, a silver-green fountain of feathery fronds—one of the most unique and beautiful evergreens in the world. So far it has gotten through three winters, with a board screen behind it to protect it from the northwest wind and a liberal pile of leaves banked around it. It will probably live, in all its grace and beauty, for some fifteen years, and may reach the two-century grandeur of the one planted by Buffon in the Jardin des Plants. Once in a dog's age, however, we have one of those unheard-of winters, than which the memory of the oldest inhabitant knoweth not a worse—and then the deodar will be winter-killed.

In this group also is that beauty of the maple family, the Japanese blood-leaved maple, whose deep scarlet leaves vie with the golden bells of the *forsythia* in mak-

ing be avoided, particularly on a small place. Your grounds are distinctly *not* a museum, nor can you afford to sacrifice the unity and restfulness of masses of evergreens for a bewildering variety of odd and curious trees, each clamoring for more than its share of the general effect. If you have a large place, however, a few of them can be indulged in. In northern localities the native white spruce is always an attractive tree with its regular conal growth and bright green foliage and it is hardy clear up to the Arctic Circle. Another odd tree is the queer northern cedar, a native of the Land of Little Sticks, with its dense spread of lower branches and funny little stalk of a trunk carrying a few rags of cedar foliage—a characteristic object of any sub-Arctic landscape. It appears to thrive all the better in moderate climates but still retains its cautious manner of growth, first spreading out a foundation of foliage and then sending up a wind-proof and frost-proof whip of a trunk.

In balmy climates you can also try the Umbrella Pine, a Japanese variety growing in a pyramid like a spruce,

with the needles heavy and glossy dark green, arranged in umbrella-like clusters—one of the most ornamental evergreens in the world. Still further south, where the climate approximates England's, one can grow the South American *araucaria* outside. They are plentiful in England, reaching 2 feet trunk diameter and some 45 feet in height. With us they are sold as a hothouse plant, very ornamental, the branches in regular whorls of dark green needles sticking straight out from the branch, recurved, graceful and fernlike in appearance. I should say that it would prove hardy outdoors from Maryland south.

Another beauty, not hardy in severe climates, is the silver pine, *P. Excelsa*, a graceful and elegant tree with drooping silvery foliage, the needles like white pine but longer. A 4-foot specimen will cost \$2, but the owner will get at least \$10 worth of pleasure out of it.

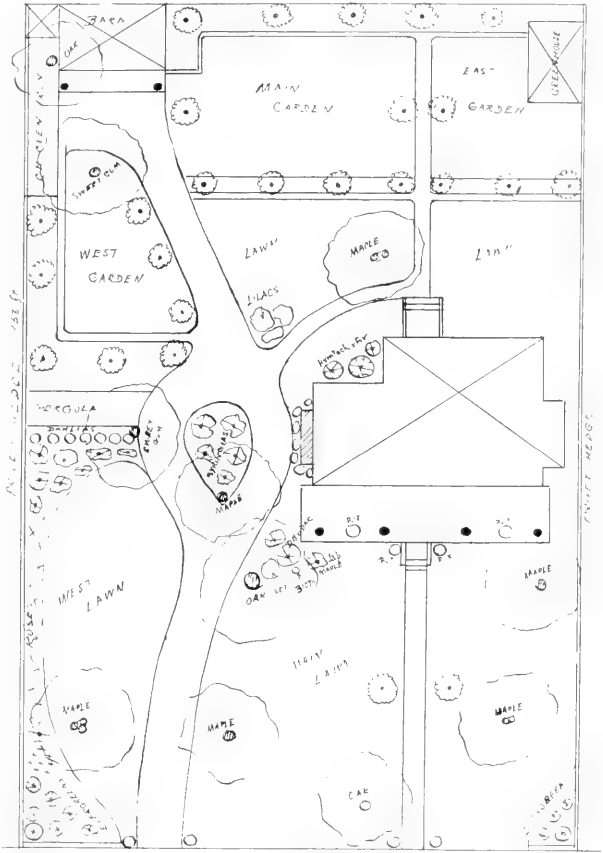
None of these specimens should be "lost" in the mass of evergreens but rather emphasized by being planted at some conspicuous place about the grounds.

A word as to the flowering shrubs. There are eleven varieties of deutzias, nine spireas, four sweet syringias, and four wigelias, so you will do well to consult a good nurseryman's catalogue so as to pick out the ones you prefer. If you just order so many of each by name the florist will bring around the simple standard varieties, but there are many beautiful hybrids and special sorts which will well bear investigation before using up your available shrub space.

In general your evergreens will come to you with the ball of roots and earth done up in burlaps, while the shrubs will have had the roots cleared of earth and packed in moss. The former can be planted with the burlaps on, as it will soon rot away in the soil. Personally, if the earth is still compact and moist, I take off the burlaps as I always plant higher than the nursery advises, knowing well the tendency of gardens to rise, year by year, as more soil and manure are added. The roots of the flowering shrubs want dipping in thick mud before planting, and then the earth is to be well packed about the roots. A shovelful of well rotted manure is spread a few inches below the surface *after* the roots have been well packed in soil and finally a mulch of soft loose soil and manure is piled about the young tree at the surface. The best time

for planting is August to mid-November; second choice, March to May first.

Finally, for the bulk of your evergreens, let me advise our American species, hemlock, cedar, spruce, balsam



Planting diagram for a suburban place with evergreens and flowering shrubs. Frontage one hundred feet.

and pine; and for shrubs the good old-fashioned standbys—pink and white deutzias, pink wigelias, cream-white sweet syringias (or mock orange); spirea Van Houttei (the dear old bridal wreath with its rows and festoons of white dandelion-like flowers) and, lastly lilacs, lavender and white, without which May is not really the month of May at all. And roses; lots of them. No special soil required, but sunlight, at least from 10 to 4. No home yet ever had more roses than it knew what to do with!



American Trees in German Forests

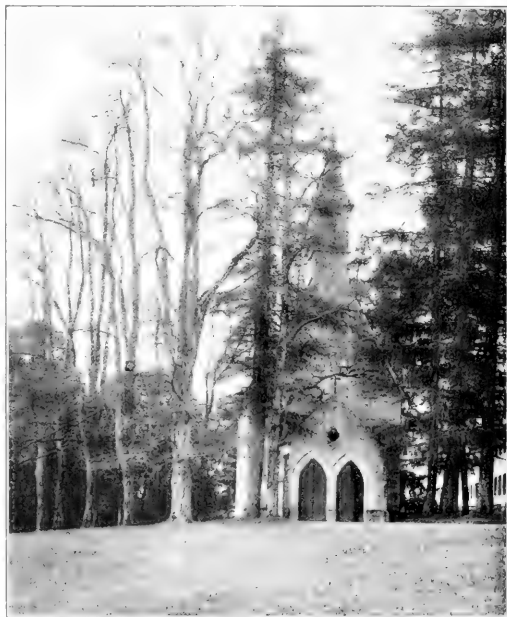
BY J. S. ILLICK

UPON examining the maps showing the distribution and the structure of the forests of Germany in the years 1300 and 1900, one will be astonished by the wonderful change that has taken place within a period that represents but a few generations of trees. Unquestionably man has played the leading part in effecting this change. A considerable portion of the history of Germany during these six centuries is written in blood. Frequent warfare between over two hundred independent states upon an area that now comprises the German Empire, and later the increase of population, the opening of agricultural lands, the development of industrial enterprises, and the destructive work of lumbermen present a picture of change and progress which enables us in part to comprehend the important rôle that man played in changing the original forest distribution.

The present structure of the German forests differs far from what nature originally placed there. Man has improved upon nature's methods by rearranging the indigenous species and by introducing exotic species. The major part of these structural changes came after the advent of forestry. The plains along the valley of the Rhine were originally covered mainly with hardwood species. The records of early military expeditions, as well as the structural material found in houses built centuries ago but still in existence, bear evidence of this hardwood forest. Today many parts of this same area are covered by a coniferous forest, in which Scotch pine is the chief participant. In the sixteenth century the Saxon "Erzgebirge" were covered mainly with fir and beech, but since the time of Henry von Cotta, the king of spruce and "father of conservative forestry," we find that these same areas are now almost completely covered with spruce. The demand for tan bark introduced the coppice system of handling oak. The substitution of chemical tannage for vegetable tannage has reduced the demand, and hence the oak coppice forests are rapidly disappearing. In many places beech and oak on account of their long rotations are being replaced by other species. A great many of the German forests are in a transition stage, which is gradual and cumulative in favor of the conifers. The present participation in the forest structure of the coniferous and broad-leaved species expressed in per cent is 67.5 and 32.5, respectively. The hardwoods before the advent of forestry had a higher percentage than they have today.

Of less magnitude than this rearrangement of the indigenous species, but of as vital significance, has been the introduction of exotic species especially from America and Japan. The main causes that actuated the introduction of foreign species were the fear of a fuel famine

commercial enterprise, aesthetic inclinations, silvicultural experimentation, and the limited number of native species of commercial importance. The first American tree introduced into Germany was the eastern *Arborvitae* in 1566. This was followed by the black locust in 1601, the bald cypress in 1640, the tulip tree or yellow poplar in 1663, the red cedar in 1664, the balsam fir in 1697, the white spruce and black spruce in 1700, and the white pine in 1705. The importation has continued, and



BLACK LOCUST TREES

Six specimens of black locust 18 inches in diameter. Trees to the right are European larch. They are located near the old castle at Herrenchiemsee, Bavaria, Germany.

at the present time practically every species native to America can be found somewhere in Germany. Some of the species that were introduced early have developed such excellent records that they are now regarded as naturalized members of the German forests. A few species are eligible for citizenship at the present time, while many other species, particularly those from western North America, have been introduced so recently that judgment with reference to their qualification for citizenship must be deferred until more complete data are at hand.

The seed of black locust was first sent to Europe in 1601. This tree was among the first plants carried to Europe, and has since been propagated so extensively that it is now regarded as naturalized in every part of the empire except the northeast. The fear of a fuel



YELLOW POPLAR TREE

Twenty inches in diameter and located in the old castle yard at Herrenchiessee, Bavaria, Germany. The trees to the left are black locust.

famine, about 1790, prompted the Hessian soldiers to make extensive importations of this species. They regarded it as the savior of the nation. The importation decreased, however, as the fear of the fuel famine subsided and as the value of the native beech became more fully known, largely through the efforts of George L. Hartig. At present one usually finds this tree in small open plantations upon poor sites, on the banks of railroad cuts where it acts as an excellent soil binder, and along avenues where it usually has been decapitated with the pruning shears until but a vestige of life apparently seems to remain. Black locust has passed its high-water mark in Germany, but has by no means fallen into disrepute. It is still planted as a lawn, park and street tree, and in the forests upon very poor and sterile sites. It seems to be freer from insect pests and fungal diseases in Germany than in America.

The red oak was introduced into Europe as early as

1740. It has at present the widest distribution in Germany of any American hardwood tree of commercial importance. In the state of Baden alone in 1909 about 136 acres were stocked with this species, ranging in age from one to eighty-two years. The younger plantations, which cover by far the larger area, show that this species grows very rapidly, suffers very much from the ravages of rabbits, and prefers fresh deep humose loam soil. In a young plantation of this species near Darmstadt 90 per cent of the specimens were peeled by rabbits, while other species mixed with it, including the European oaks, remained untouched. A stand forty-two years old had an average height of 57 feet, an average diameter of 5 inches, and contained 46 $\frac{2}{3}$ cords of wood per acre, thus showing an average annual growth of more than one cord per acre. Thinnings taken from this stand at the age of forty years brought \$6.12 per cord. One of the oldest and most interesting stands of red oak in the state of Baden, covering about 15 acres, is growing near the town of Rothenfels. It is a rather open stand averaging about 105 trees per acre and is now (1915) eighty-eight years old. The trees have an average height of 88 feet and an average diameter of 17 inches.

The rapid growth of the red oak is one of its most commendable attributes. German records show that it has grown 8 inches in one year, 18 feet in ten years, 36 feet in twenty years, 51 feet in fifty years, and that after the fiftieth year the rate of height growth decreases. It is also regarded as more attractive ornamentally than the native European oaks on account of its smooth bark, straight branches, broad symmetrical crown, and the beautiful autumnal coloration of its leaves. Most of the



NATURAL SEED REGENERATION OF WHITE PINE, TRIPPSTADT, GERMANY
Early or open and incomplete stage of regeneration

German foresters who have plantations or stands of it commend it very highly. They think that it will play an even more important rôle in the future than it has in

the past. Their opinions are based upon the results of experimental plantations extending over almost a century, and in particular upon those established during the past thirty years.

The cottonwood was introduced into Europe in 1772. It is now planted extensively in the inundation district of the Rhine, especially in the vicinity of the city of Karlsruhe. It is one of the most rapid-growing species in Germany. According to Hartig, it may attain a height of 47 to 53 feet in twelve years, and 72 feet in forty years. Near Karlsruhe, in thirty-one years one specimen attained a height of 102 feet, a diameter of 22 inches and contained more than one-half a cord of wood. Other single specimens in forty to fifty years have yielded over a cord of wood. The German foresters usually set out one-year-old plants raised from cuttings. Lately, however, they have started to raise some of the plants from seeds. This tree on account of its rapid growth, its suitability for pulpwood, and its natural wide distribution in the eastern and middle United States, should play an important rôle in the future forests of eastern North America.

The tulip tree, also known as the yellow poplar, was introduced into Europe in 1663. Most of the older specimens are found in parks, gardens, and about castles. It is not hardy in the extreme northern part of Germany nor the high mountainous region in the southern part. According to recent German experiments it can be established best if set out in spring just after it has started to put forth its new shoots. This necessitates a careful handling of the plants. In the municipal forest of Heidelberg is a young plantation covering $1\frac{1}{2}$ acres and containing about 3,500 specimens. Heidelberg is located in one of the mildest regions of Germany, and, as should be expected, the plantation is in a very thrifty condition.

Among the other American hardwoods which have been introduced rather extensively may be mentioned the black walnut, wild black cherry, and the shellbark hickory. In addition to these species one often meets experimental plantations or isolated groups of butternut,

sugar maple, white ash, black birch, and yellow birch. Many other species have been introduced which will never be used for other than ornamental purposes.

White pine, the former nucleus of the American lumber industry, was introduced into England in 1705, and shortly afterward into Germany. It was the first exotic coniferous species naturalized into Germany and Austria-Hungary. No native European conifer surpasses it in height and volume growth. In ten years it may attain a height of 10 to 15 feet, in twenty years 26 to 30 feet, in forty years 53 to 60 feet, in eighty years 92 to 95 feet, and in one hundred years 105 to 110 feet. The largest white pine trees in Germany have reached a height of

130 to 135 feet and a diameter of 5 feet.

As early as 1794 a Hessian hunting master, the forester of his day, brought some white pine seeds with him from America, with which he planted about 15 acres of land near Trippstadt, in Rhenish Bavaria. This stand has now passed the century mark and contains specimens 25 to 35 inches in diameter breast high. All the seeds which these trees produced until 1893 were collected for commercial purposes.

Since 1893 no seeds have been collected because the seed-collecting business became less lucrative and the forester in charge wished to experiment with natural seed regeneration of white pine. For the past twenty-two years nature's agents have disseminated the seeds of these pines with the result that the oldest regeneration is now closed or complete while the younger regeneration is still open or incomplete, as shown in accompanying illustrations. The natural regeneration was, however, assisted by a superficial working of the soil, and by planting open or fail spots. Extended incomplete regeneration cannot be tolerated where soil prices are high. Some of the older specimens of this stand have been cut and marketed. The prices obtained per 1000 board feet in the log in the forest varies with the diameter. The subjoined schedule will give the prices of white pine and a few other coniferous species:



WHITE PINE AND DOUGLAS FIR

Ebersberger Park Forest, Germany

Three specimens are white pine. The fence protects the plantation from deer and rabbits. The plantation is 12 years old and the tallest Douglas fir is 25 feet in height. Douglas fir surpasses white pine in height growth.

Diameter in inches outside bark butt end of log.

24-inch 20-inch 14-inch 10-inch 6-inch

| | | | | | |
|-------------------|---------|---------|---------|---------|---------|
| White pine per M. | \$49.00 | \$37.00 | \$30.00 | \$21.50 | \$12.50 |
| Scotch pine " " " | 26.00 | 23.00 | 22.00 | 18.00 | 14.00 |
| Larch..... " " " | 30.50 | 27.00 | 26.00 | 21.50 | 14.00 |
| Spruce..... " " " | 25.00 | 23.00 | 20.00 | 16.00 | |
| Fir..... " " " | 27.00 | 22.00 | 19.00 | 14.00 | |

An excellent stand of white pine is also found in the municipal forest of Frankfort located near Isenburg. In 1855 white pine seedlings two years old were planted with alternating rows of oak. The oak was entirely suppressed by the rapid-growing white pine. The fail-rows of oak were filled in with Norway spruce, but it also proved a failure owing to the strong handicap of the white pine. The result is a pure stand of white pine with rather wide spacing. In 1911 this stand had 295 trees per acre averaging 80 feet in height and 12.5 inches in diameter. The average annual growth up to 1911 was 2 cords per acre.

In the municipal forest belonging to the city of Heidelberg, white pine covers an area of over 140 acres, aggregating about 150,000 specimens, which vary in age from two to sixty-

five years. Among these 140 acres are some experimental plots. One was started in 1888 in which 2,750 two-year-old white pine seedlings were planted per acre at an expense of \$10.50. In 1908 at the age of twenty-two years, they had an average height of 26.5 feet, and a volume of 53 cords per acre. This shows an average annual increment of 2.4 cords per acre. The average annual increment between 1903-1908 was 3.8 cords per acre.

The white pine can be found in pure and in mixed stands in Germany. The lessons to be learned therefrom should be of great value to the American forester who is at present planting this species on a gigantic scale. The advantages are in favor of mixed stands which show clearer boles, and yield a better quality of wood. Destructive organisms, of which the white pine has many, are also disseminated more readily in pure stands than in mixed stands. It can also be seen from the schedule of prices given above that the early thinnings of white

pine have little value, at least less than any of the other coniferous species, and certainly less than most hardwoods. It seems advisable to recommend the establishment of mixed stands in which white pine should be the major species destined to produce quality, while the other species should be regarded as minor and temporary, and destined to produce material which can be removed in early thinnings and sold at a fair price, thus offsetting the initial constructive expense of the plantation.

Douglas fir was introduced into Europe in 1827. This was over a hundred years later than the white pine. In this relatively short period it has shown itself to be the most valuable exotic species. It is daily growing in favor with the German foresters. In Prussia alone over

350 acres were planted with it prior to 1911, not to mention the large acreage that has been planted in Bavaria, Hesse, and Saxony. It is found in pure and mixed stands. Some of the plantations show alternating rows of it and some other species, such as white pine, Norway spruce, and European larch. In almost every case the Douglas fir far surpasses the other species in height growth. Data from German nurseries and plantations show that it may reach a height of



EUROPEAN LARCH AND WHITE PINE

Plantation 20 years old located in the Ehersberger Park Forest, Bavaria, Germany. This forest contains 19,200 acres and is the largest solid forest area in Germany.

4 inches in one year, 8 inches in two years, 46 feet in fifteen years, 56 feet in eighteen years, and 83 feet in fifty-three years. It is relatively free from enemies, but the deer feeds upon it rather freely, and in some places the foresters report that it suffers from snow break and frost. In youth the plantations are usually surrounded by a fence in order to keep out the larger destructive animals. The terminal shoots of small plants are often covered with tar to prevent the deer from eating or injuring the terminal bud. Frost may do considerable damage to seedlings and transplants but seldom damages larger specimens. It recovers very readily from damage on account of its numerous adventitious buds, and in this respect surpasses most other coniferous species. Plantations are usually established by using two to four year old transplants, and spacing the plants 5x5 or 6x6 feet.

In the municipal forest of Heidelberg is an experimental plot of Douglas fir with the following data accord-

ing to Oberförster Krutina: The experimental plot was established in 1887 by planting three-year-old Douglas fir and two-year-old Norway spruce at a distance of four

In addition to the white pine, numerous other American species of pine have been introduced into Germany, and can be seen in gardens, groves, and plantations. The



WHITE PINE DURING THINNING. MUNICIPAL FOREST, FRANKFORT, GERMANY

First heavy thinning in this 58-year-old stand. About 25 per cent of the volume of the stand was removed. Light thinnings were made at an earlier date.

feet. The planting cost \$1.56 per acre. In 1903 the stand consisted of 31 cords of Douglas fir and 7 cords of spruce. In 1908 this same stand consisted of 43 cords of Douglas fir and 634 cords of spruce. The average annual increment for the five years from 1903-1908 was 2.38 cords. The height of the Douglas fir and spruce in 1908 was 15 and 32 feet, respectively.

The Sitka spruce is the only exotic species of spruce receiving forestal consideration in Germany at present. It was introduced into Europe as late as 1831, or about one hundred and twenty-five years after the white and the black spruce. Along the Rhine, in lowland and even in extremely wet areas, it seems to thrive. Upon fresh loam soil it has made a height growth of 9 feet in five years, and 11.5 feet in eleven years. It thrives upon areas where the native European species simply exists, and surpasses the latter in both height and volume growth. It suffers more from frost than the native European species, and is more subject to damage by browsing animals than the Colorado blue spruce. In 1909 the forests of the state of Baden alone contained 70 acres of Sitka spruce.

species that is receiving the greatest consideration at the present time is the Jack pine, due to its ability to grow on very dry and sterile soil. It began to be introduced on a large scale after 1890, in which year Professor Mayr brought it to light. In the vicinity of Eberstadt in the state of Hesse are large parallel plantations of Jack pine and Scotch pine. The former grows more rapidly and straighter, and seems less sensitive to snow break. More than a half million trees of this species have already been planted in the state of Bavaria. A single firm distributed more than six million plants throughout Germany in 1906. Just as Jack pine is on the rise, so pitch pine is on the wane. Most of the stands of the latter species were established with the belief that it yielded the pitch of commerce. About twenty-five years ago the mistake became fully known and since then it has been receiving little consideration. It is said to suffer considerably from cold, late and early frosts, snow, and wind. Many of the existing stands are being removed rapidly to



GIANT ARBORVITAE AND INCENSE CEDAR

In the park forest belonging to the Count von Berkhelm, Weinheim, Germany

make place for more valuable and more promising species.

The Big Tree, also known as Sequoia, from California, is common in parks and is occasionally found in

small stands. It was discovered in California in 1850 and three years later it was introduced into Germany. In the park forest at Weinheim, Germany, belonging to the Count von Berkheim, is an excellent stand of this tree in mixture with fir. This stand is now (1915) fifty years old. In 1911 the Sequoia had an average height of 55 feet and an average diameter of 14 inches. A careful count showed 64 Sequoias and 350 firs to the acre. The firs are of the same age, but have only an average diameter of 7 inches. The Sequoia prefers deep, fresh soil, mild climate and high atmospheric moisture. This park forest of Count von Berkheim covers approximately 91 acres and contains about 100 different species, most of which are exotics. Among the exotics are 30 species of American conifers and 9 American board-leaved species.

Germany has been importing American forest trees for three hundred and fifty years, with the result that we find there today the oldest and best experimental plantations of these species in the world. It is difficult to travel far in Germany without seeing some American trees. They are not only found in the forest, but are common in private and public parks and gardens, on castle grounds, and along streets. Almost every American tree can be found somewhere in Germany. It may, however, be well to remember that while the introduction into Germany of American trees has been going on for a long time and on a large scale, yet their present aggregate acreage is but a very small percentage of the total area of the German forest.

NATIONAL FORESTS TAKE IN \$2,500,000

THE National Forests turned into the United States Treasury during the fiscal year ended June 30, 1915, nearly \$2,500,000, an increase of more than \$40,000 over the receipts of the previous year, according to a statement just issued by the Forest Service. The timber sales, which amounted to \$1,164,000, yielded on account of the depressed condition of the lumber industry about \$19,000 less than those of the previous fiscal year, but the gain was made possible by larger revenues from other sources. The grazing receipts, which totaled \$1,125,000, increased \$127,000 over last year, and the water-power receipts, which amounted to not quite \$90,000, showed an increase of nearly \$42,000.

The demoralization of the turpentine industry on account of the war's curtailment of the naval stores market caused the receipts from the sale of turpentine privileges on the National Forests to drop to about \$9,000, as against nearly \$15,000 last year. The sale of special use permits, under which all sorts of enterprises, from apiaries to whaling stations, are operated on the forests, yielded nearly \$78,000, an increase of \$9,000 over last year. There was a decrease of nearly \$37,000 in the revenue derived by the settlement of trespass cases in which Government timber had been cut without intent to defraud, the revenue from this source being only a little more than \$3,000. More than \$7,000, however, was collected from other timber trespass cases. Grazing trespass cases yielded nearly \$6,000, an increase of about \$1,000; occupancy trespass cases, which occurred in only one of the seven forest districts, turned in something less than \$250; about \$60 was derived from turpentine trespass cases, and \$660 from fire trespass cases, the latter being more than \$7,000 less than the amount collected in the previous fiscal year for damage to Government property through fires carelessly or willfully started in or near National Forests.

CHUGACH FOREST REDUCED

THE area of the Chugach National Forest, Alaska, which is to be crossed by the railroad that the Government is building from Seward to Fairbanks, is reduced nearly one-half by a proclamation signed by President Wilson, returning approximately 5,802,000 acres to the public domain. This action follows classification of the land by the Forest Service, showing that the areas involved are not of high enough timber value to warrant Government protection, and means the largest elimination of National Forest land ever made by a single Presidential proclamation.

The boundaries of the forest, as redrawn by the President's proclamation, now contain approximately 5,818,000 acres, supporting about 8 billion feet of merchantable timber. On the area thrown out of the forest there is in the aggregate a large amount of timber, but it is so sparse and scattered as to be of little or no commercial value. The land remaining within the forest, however, contains the largest and most accessible supply of timber for the development of the great mineral fields to the north of Bering River, and is the region in which the Alaskan Engineering Commission has been authorized to cut 85 million feet of timber for use in constructing the Government's new railroad. On account of the time required for cutting and seasoning construction timbers, the Commission has had to purchase some lumber from Washington and Oregon, but as cutting has already commenced on the Chugach, it is expected that the Alaskan timber will soon be serving the needs of the railroad builders.

The lands eliminated by the proclamation are in three large tracts; one along the entire southerly slope of the Chugach Mountains, the second lying northeast of Seward, between Resurrection Bay and Kings Bay, and the third, northwest of the Kenai Mountains in the region around Tustumena and Skilak Lakes. In addition, the towns of Hope, Sunrise, Kenai, and Nimilehek are eliminated.

The Problem of Forest Conservation

BY W. B. GREELEY, DIRECTOR OF THE AMERICAN FORESTRY ASSOCIATION

THE important question about forest conservation now is: Will it break down in the face of concrete business necessities? Much has been done to put the public forests upon sound footing. Marked progress has been made in the development of State forest activities and in bringing about effective cooperation of many different agencies for preventing forest fires. But the critical problem of the 80 per cent of private timber in the United States has scarcely been touched. We can neither "preach, print, pray, nor ballot" the owner of timberland into the practice of forestry when it does not pay.

Forest conservation must come to grips with this problem sooner or later. Its first task is to assemble the facts and look them squarely in the face—how far the status of wood has changed from a necessity to a competitor for a place in the market, what it costs not only to grow wood but to hold and protect merchantable timber which cannot be marketed for many years, and what readjustments of our economic conceptions may be necessary to permit the thrifty use and perpetuation of the timber resources of the country. The business difficulties and needs of the forest-using industries must be understood. Means must be found whereby the handling of their resources can be adapted to the larger, permanent interests of the country; but they must be sought through mutual recognition, by the public and the forest-using industries, of the economic well-being of each other and, if need be, by mutual sacrifices. The first thing to be done is to get the situation clearly understood by everyone.

To this task forest conservation should address itself and prove its right to be written down, not as a



W. B. GREELEY, WASHINGTON, D. C.
Director of the American Forestry Association.

sporadic outburst of enthusiasm, but a sustained effort to make the most of national resources.

Tree Planting Along the Lincoln Highway

BY GRACE ROPER NEVITT

ONE of the most extensive enterprises in roadside planting ever undertaken is that of the Lincoln Highway which extends from ocean to ocean, a distance of 3,400 miles. The work is being done under the direction of the General Federation of Women's Clubs. The planting is to be individual and each state

section of the highway is under the direction of the conservation chairman of its own women's clubs. The organization from New York to California is complete and in many of the states, the trees, shrubs and flowers to be planted have been selected. In New York State, the plan for the "Sunrise Entrance" of the Highway in-

cludes the planting of white oak, reminiscent of Lincoln's career. With it will be combined Norway maples, hemlocks and white birches.

Masses of American laurel have been selected by the New Jersey women as decorative for the highway as it enters cities and towns or passes historic spots and fruit trees will be extensively planted throughout the state. The natural forests along the way, with laurels, hardy vines and perennials, have been adopted for Pennsylvania in an attempt to preserve and accentuate the native vegetation, presenting to the traveler a beautiful wild garden. Again in Ohio the wild garden effect will be used. Variety will be the aim of Indiana, the occidental plane tree, or sycamore indigenous to that state, elms, hardwood maples, golden glow and roses all figure widely in the plan. A "Lincoln motif" in plants and trees illustrative of certain of Lincoln's characteristics has been arranged in Illinois. Among the trees included in the arrangement are white oaks, to typify the national appeal of Lincoln's character, as it has the widest range of all trees, the red cedar, an evergreen, symbolizing the permanence of his fame, and flowering dogwood a reminder of the rail splitting days of the former President, since the latter shrub was prized by the pioneers for the making of wedges. In Iowa, Illinois and Indiana, it is noted that the prairie rose will mark the approach to cities, towns and spots of historic interest. The Kentucky coffee tree recalls the state of Lincoln's birth, while the wild grape, the silver bell tree, and the June-berry signify other sides of his character in the poetic conception outlined by the women's clubs.

West of the Mississippi River the highway will be bordered much of the distance by cottonwood trees. In Wyoming, the native cottonwood, quaking aspen, box elder and the old standbys in which are numbered pines and cedars find a place. Segra lilies, the state flower of Utah, the pines of the hills, and cottonwoods have been chosen for those sections of the road where vegetation will flourish in Utah. Unusual difficulties are presented to the women in the state of Nevada. The road stretches 350 miles, often through desert where for 40 or 50 miles there is no water and no possible way of irrigating. The tree planting committee of the state has expressed the expectation of securing assistance from the forestry service and from the State University. Cedars, pines, junipers are the state's native trees and can be employed along the rivers and in the mountain districts. A long lane bordered with California poppies, of golden hue, blue lupines, and the many vari-colored flowers of the California hillsides combined with pepper trees in abundance and other native trees promises an ending to the Lincoln Highway unexcelled in its attractiveness.

The planting on the Lincoln Highway itself, will be but a small part of the finished plan, for all the school yards along the route are to be beautified, and many inquiries have come to the planting committee in charge from the Southern States, which it is expected will result in road planting throughout the South with a possibility of new roads being built. In Georgia, the state Society of the Daughters of the Confederacy have already an-

nounced plans for a "Jefferson Davis Highway" which will also reach from ocean to ocean beginning at the Potomac and extending to the Rio Grande.

PROTECTING REDWOODS

FOREST owners of California are taking an active interest in effective and economical protection of the forests against fire, as is shown by the fact that three local forest protective associations have been organized in Mendocino County.

These three associations will protect over one-half million acres of redwood forests by cooperation among the owners.

These, with the Redwood Fire and Protective Association, which was organized four years ago, will place practically all of the redwood forests of that county under systematic protection. These local associations will cooperate with the California Forest Protective Association, which is actively engaged in organizing such associations throughout the timbered counties of the State, and it is expected that practically all the privately owned timberland will be under such cooperative protection against forest fires before the dry season of 1915.

In Santa Cruz County the forest and home protective association was organized early in the season and has been able to almost entirely prevent forest fires in that county. This is an especially good record because the most extensive and destructive forest fires in the State during 1913 were in Santa Cruz County. This association is also cooperating with the California Forest Protective Association.

Wherever the privately owned timberlands are adjacent to the National Forests, many of the owners cooperate with the Federal Forest Service for protection against fire and this cooperative work is being rapidly extended as the benefits are realized by both the Federal foresters and the owners.

Without doubt this cooperative system can be carried on more effectively and economically through local forest protective associations, especially as they will be able to secure the participation of small owners.

While this cooperation between the Federal Forest Service and local forest protective associations, composed of private owners, will do much to preserve the forests of merchantable timber, there are vast areas of cover growth which are not protected.

This can be accomplished only by a law providing for cooperation on the part of the State with the Federal Forest Service and private owners of timberland, which would effectively protect from fire all the merchantable timber and all the cover growth on the watersheds.

A law providing for such cooperation on the part of the State was introduced in the Legislature of 1913 by the State Conservation Commission. It was known as Assembly Bill 643, was approved by Gifford Pinchot, Federal Forester Henry S. Graves and other authorities on forest protection, and passed both the Senate and Assembly. It was opposed by the State Forester, however, and was not signed by Gov. Johnson.

Indiana's Forestry Home

By BURR N. PRENTICE

THE Indiana State Board of Forestry is planning a large forestry exhibit for the new building at the State Fair at Indianapolis, September 6 to 11. The board has now at its disposal a building well suited for its purpose. It is of the bungalow type, 24 by 36 feet. It will be occupied by an extensive exhibit of the forests of the State and their products. The results of the work of the State Board at the Indiana forest reservation are to be graphically shown. A complete dendrological collection of the timber trees of Indiana is to occupy another section; statistics and charts outlining the status of the wood-working industries of the State are to be given in a third section, while a fourth large section is to be occupied by the lumbering, utilization and timber preservation interests of the State. It is desired that no phase of the situation be omitted, to the end that this new home of the State Board during the fair may be a place of such interest to all lumbermen and those in any way interested in forestry that they will make it their headquarters while on the grounds.

For several years the Board has been carrying on a series of experiments at the State Forest Reservation, near Henryville, Ind., to determine important factors that enter into the maintenance of Indiana woodlots. It is said that in Germany negative information is considered of as much value as that of a positive nature. The proof that certain species of trees are unfit for soil and climatic conditions existing in Indiana should be as valuable to woodlot owners as the proof that certain others are particularly adapted to that climate. The Board finds that some valuable species of trees make a rapid and financially successful growth in the State's woodlots, while many other less valuable species, which unfortunately are often permitted to take up space in the woodlot, cannot be made to show a profit.

The reservation, which covers an area of some 2,000 acres, is located on some of the poorest soil in Indiana. Experiments which have been carried on there are of especial value, because this is the particular class of soil least suited for agriculture. The State Board has kept accurate growth records of the demonstration plots and reforestation work at the reservation. The large variety in the species under experimentation has brought

ings at the reservation, will form a part of the exhibit, to notice many factors of growth which are of vital interest to the woodlot owner.

All this material clearly and vividly shown, together with actual photographs of plantations and under plant-



A STATE FORESTRY BUILDING

Erected by the Indiana State Board of Forestry for exhibition purposes at the State Fair, Indianapolis, Indiana. State Forester E. A. Gladden at the entrance.

The Board announces a special feature of interest to the friends of closer wood utilization throughout the central hardwood region. This is the appearance of Mr. E. A. Sterling as one of the list of speakers. He is a well-known authority on utilization subjects and a live factor in the combat between wood and its substitutes. He will represent the new Trade Extension department of the National Lumber Manufacturers' Association of Chicago.

PHILIPPINE LUMBER FOR CHINA

The Director of the Philippine Bureau of Forestry, who has recently returned from a trip to China in the interests of Philippine lumber, reports that there is a market in China for all the lumber produced in the islands if the proper connections can be made between the producer and consumer. The Chinese dealers want a guarantee of a constant supply. They are not willing to accept one consignment, but demand that they be assured of continuous supply, even though it be small. An American formerly in the service of the Philippine Government, now in business in Shanghai, reports that there is a demand there for Philippine lumber, but there is not a constant supply, and the purchaser is never sure of getting enough of the same class to complete his particular job.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

EDITED BY J. J. LEVISON, B. A., M. F.

Arboriculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School

TIMELY SUGGESTIONS FOR THE PRUNER OF ORNAMENTAL AND SHADE TREES

SEPTEMBER is the month when pruning of ornamental and shade trees can be done to the greatest advantage. The dead branches can be distinguished from the live ones very readily at this season, the general contour of the tree can be judged with greater ease and climbing into the branches can be done more safely than on a cold winter day. The following hints will help the pruner in preventing injury to himself or others and in accomplishing his work in accordance with correct pruning principles.

HINTS ON CLIMBING

Set out the danger signs before commencing heavy pruning work.

Examine the condition of your ladder and tie its upper end to the tree before starting out.

Be sure of the strength of your branch before tying an extension ladder to it.

Do not slant the extension ladder too much.

Always watch the upper end of your ladder. Always have another man hold your ladder when you go up to tie it or when you come down after untying it.

Never remain in a tree or on a ladder while a limb is being pulled off or lowered.

Examine all rope before using it on heavy work.

In removing a heavy branch use two ropes, one to guide, the other to lower the branch.

Use caution where high power wires are running through or alongside of trees, as the insulation may be worn off and make work very dangerous, especially in wet weather.

Always consult your foreman before taking up any work where risk is involved.

Before starting out on a tree, judge its general condition. The trunk of the tree that shows age, disease or wood-destroying insects generally has its branches in an equally unhealthy condition. Greater precautions should, therefore, be taken with a tree in this condition than with a young vigorous tree.

The different kinds of wood differ naturally in their strength and pliability. The soft and brash woods need greater precaution than the strong and pliable ones. All the poplars, the ailanthus, the silver maple, the chestnut, the catalpa and willow are either too soft or too brittle to depend on without special care. The elm, hickory and oak have strong flexible woods and are, therefore, safer than any other. The red oak is weaker than the other

oaks. The sycamore and beech have a tough cross-grained wood and are, therefore, fairly strong. The linden has a soft wood, while the ash and the gum, though strong and flexible, are apt to split.



BADLY PRUNED TREE

In order to make room for the overhead wires this tree was cut as shown in the photograph and its unsightly and unnatural appearance is at once an evidence that the work was improperly done

Look out for the limb that shows fungous growths. Every fungus sends out a great many fibers into the main body of the limb, which draw out its sap. The interior of the branch then loses all strength and becomes like a powder. Outside appearances sometimes do not show the interior condition, but one can be sure that every time he sees a fungus popping out there is trouble behind it, and the limb is not altogether safe.

When the limb is full of holes or knots, it generally indicates that borers have been working all kinds of galleries through it, making it unsafe. The silver maple and the sycamore maple in this locality are especially full of borers which in many cases work on the underside

of the branch so that the man in the tree looking down cannot see its dangerous condition.

A dead limb with bark falling off indicates that it died at least three months before, and is, therefore, less safe than one with its bark tightly adhering to it.

Branches are more apt to snap on a frosty day when they are covered with an icy coating than on a summer day.

A rainy or drizzly day causes the branches of a tree to be slippery, and greater precautions are then necessary.

HINTS ON PRUNING

Always use a pole saw and pole shears on the tips of long branches, and use the pole hook in removing dead branches of the ailanthus and other brittle trees where it would be too dangerous to reach them otherwise.

Do not "Head Back" or cut off the top of a tree except where the tree is old and failing, and then under special instructions.

Be as sparing and as judicious in your pruning as possible, and do not raise the branches so high as to make the tree look like a telegraph pole.

Commence pruning the tree from the top and finish at the bottom.

Make every cut as close and parallel to the trunk as possible.

Your saw must be well set and sharp in order to make the cut perfectly smooth.

Leave no stubs, dead and dying wood, or fungus-covered branches behind you.

Do not fail to cover every wound with coal tar, not allowing it to needlessly run down the trunk.

Do not remove several large branches on one tree at a time. They must be removed gradually, the work extending over several seasons.

Prevent tearing the bark off the trunk in removing large limbs by first making an "undercut."

Make the cuts on a slant. Some trees, like the elm, sycamore, linden and willow will stand the process of heading back more than others, and the poplar is a tree that must be cut back every few years to keep its crown from becoming too tall and unsafe.

When you shorten a branch leave a few twigs at the end in order to draw the sap to the freshly cut wound and thus enable the growing layer under the bark to heal it over.

In trimming small branches or shoots, the cut must be made just above a bud.

When several branches come out from the trunk in a

whorl, they should not all be cut away at the same time lest the tree be girdled. This arrangement of branches occurs most frequently in the coniferous trees.

MT. VERNON, N. Y., AND ITS SHADE TREES

Mt. Vernon, N. Y., and its authorities deserve congratulation upon the organization of a permanent Shade Tree Commission and a municipal office and field force to care for its shade trees and work up a plan for present and future planting.

Mt. Vernon, a city of under 40,000, is one of the smaller communities supporting such a department, but shows the characteristic progressiveness of that city, and is indicative of the growing interest throughout the country in having the shade trees properly cared for. A

wealth of trees graces the streets of Mt. Vernon, most of which were planted thirty-five to forty-five years ago. The maples comprise the majority while the elms, lindens, poplars and horse chestnuts are very abundant, the rest being well distributed among some twenty-five species. The tree conditions are those usually found in all cities where systematic care has been unknown. Some of the oldest trees are showing signs of decay; and faulty spacing of many of the trees is the natural result of haphazard individual planting. The insect damage this year has been remarkably slight, especially



HOW NOT TO PRUNE TREES

In the accompanying article is much excellent advice on how to prune trees and if this is carefully followed such results as are seen in this photograph may be avoided.

when compared with the heavy inroads made by the tussock moth and other insects in some of the eastern cities. The Shade Tree Commission has made an early start and by so doing will avoid that almost treeless period from which so many cities have suffered due to lack of proper foresight.

Many European cities are famous for their far-sighted policies and the size of improvement projects which they undertake; harbors, waterways, transportation facilities, parkways and boulevards are all planned in accurate detail long in advance of actual development and are always planned with the idea of benefiting the greatest number of people. The reason may be found in the ever-present attitude of sacrificing the individual for the good of the community. In this country it is usually the individual or corporation that prospers at the expense of the municipality. Playgrounds, parks and well shaded streets are of prime importance in adding to the comfort of any community, thus making the city more attractive to strangers and more appreciated by the residents.

The American city is, however, gradually realizing the vital need of caring for its citizens and of making life more enjoyable for them. It has recently awakened to the need of more trees and parks as factors in the city beautiful and city healthful, and has already done much along these lines. Every progressive city nowadays has a tree department or is considering the organization of one. Mt. Vernon is therefore very timely in its recent choice of a trained forester to head its tree work. Mr. A. Oakley Smith, a graduate of the Yale Forest School, who fills this office, has specialized in the care of ornamental and shade trees at the Yale School and has enhanced his experience under such men as Vitale, Munson-Whitaker and others.

TREES OF THE NATIONAL CAPITAL

Washington, D. C., now has 584.18 miles of shade trees, with an average of 352 trees to the mile, according to the annual report of Trueman Lanham, superintendent of trees and parkings, presented to the District Commissioners. The total number of trees is 103,135. During the last year 3,388 trees were planted and 2,596 removed, making an increase of 792 trees.

No other city in the world can compare with Washington in the mileage of oak planted trees, according to the report. There are 52,783 miles of them here on the streets, or 28.15 miles of streets have a double row of the oak trees. During the past year more sycamores were planted than any other variety. Trimming of trees was handicapped considerably during the twelve months by scarcity of funds. More than 55,000 trees were sprayed, a vigorous crusade having been waged against the tussock moth and other insects.

BUFFALO PROGRESSING

City Forester Filer of Buffalo writes: "Plenteous rains and absence of hot weather makes the 1915 summer and spring the best we have had in Buffalo for 10 years for trees. Last year at this time the trees looked pretty burned and tough, but today they are green and fresh and beautiful." That Buffalo will in the future be "a city of trees," Forester Filer has a corps of men now at work treating the young trees all over the city, restaking and readjusting wherever needed. The tree-trimming will continue until cold weather. Twelve spraying crews have completed war on the tussock moth and started out to destroy the cocoons. Because of the consistent crusades against the tussock moth in Buffalo the specie is becoming less and less each year.



IMPROPERLY PRUNED

Shade tree on a city's sidewalk as an example of how not to cut branches. Stubs are shown projecting from the trunk and limbs while the cutting should be close to the trunk or the limb.

BAYONNE, N. J., TREE WORK

Bayonne, N. J., has some beautiful shade trees worth preserving and should have many more planted. The following editorial in the *Bayonne Review* indicates the sentiments of the city's residents:

"The shade trees of Bayonne have been remarked by many visitors as its crowning beauty. They have been surprised at the verdant streets and the heavy foliage in a city that they had been led to believe was a collection of oil tanks and tall chimneys.

"That this beautiful feature of the city has been left untended and uncared for by any public authority has also been a source of surprise to many.

"The appointment of a city forester is not a useless job. It can be made a most important one and for Bayonne, can fill the place occupied by the shade tree commissions in other cities."

QUESTIONS AND ANSWERS

Q. Some one told me that the poplar tree is not a desirable tree to plant. Please give me a reason, if that be true.

A. F. L., *Indianapolis, Ind.*

A. For general planting the Carolina and all other poplars are not desirable. They are short-lived trees and their wood is so soft and brittle that they very readily break in windstorms. They grow too fast and generally become top-heavy and dangerous. Their finer rootlets penetrate the neighboring sewer and water-pipes and their larger roots upset the sidewalk. Their leaves drop earlier than the leaves of other species and the catkins of the female tree are quite a nuisance to pedestrians in the spring. The only reason for planting the poplar is where the local soil and atmospheric conditions are so poor that nothing else will grow as well or, in case of the Lombardy poplar, its use is justified for aesthetic effects. A screen of poplars is also very desirable at times.

Q. I would like to get literature which would be of use to me on a small place, about two acres, in Dutchess County, now practically bare, except for a few ash. This is the last slope of the hills south of Fishkill where I have thought I might develop a very small nursery probably of deciduous trees. But having no practical knowledge, only general interest, I do not know what books would be of the most service.

A. R. V. H., *Lake George, N. Y.*

A. For literature, see "Studies of Trees" by J. J. Levison, and "The Care of Trees" by Dr. B. E. Fernow,

both included in AMERICAN FORESTRY'S "List of Books on Forestry." For specific instructions, kinds of plants, planting, etc., write to any of the tree nurseries which advertise in AMERICAN FORESTRY.

Q. What are the best trees to plant in front of my house in the city of New York?

A. de C., *New York City*.

A. The Oriental sycamore (*Platanus orientalis*) is undoubtedly the hardiest and generally best adapted to the unfavorable conditions of the average city street. It grows fairly rapidly, is ordinarily free from insects and disease and forms a symmetrical compact crown. The Norway maple (*Acer platanoides*) is the next best tree to plant and the Red oak, European small leaf linden and Ginkgo are still others that may be chosen. The species is, of course an important consideration, but no tree will do well on the city street unless one provides from two to four cubic yards of good loam and plants the tree with great care.

Q. We have at our summer home at Mackinac Island, two beautiful maple trees, one hard maple and the other a soft maple. The soft maple, perhaps 50 or 60 years old, seems to be dying out. The leaves are turning yellow and some of the top branches are dead. We find many small holes drilled through the bark, and into the body of the tree, as clean as though a gimlet had been used. We have removed some of the bark, and find a coating of seemingly dead wood of a brownish color about an eighth of an inch thick. Cleaning this off, we find good, live wood underneath. We have removed the bark in several places and find the same condition exists in each case. Will you kindly advise what way we should proceed in the way of treatment to save this tree?

J. R. H., *Detroit, Michigan*.

A. From your description, it seems that the living tissue of the soft maple, situated immediately underneath the outer bark, has already been injured by an insect which has emerged some time ago. If this "coating of dead wood" binds the whole circumference of the tree, then it is doubtful whether anything can be done to save the tree. If parts of the tissue underneath the bark are still good and fresh, then you might resort to "heading in," which means cutting in the whole top of the tree heavily. A soft maple will stand the treatment. This should be done in September.

Q. What shall I do to combat the elm leaf beetle?

J. E. M., *Worcester, Mass.*

A. Spray with arsenate of lead during the latter part of May and gather the pupal at the base of the tree during the first ten days in August.

Q. What is the best guard for street trees?

A. M. P., *Reading, Pa.*

A. The most useful and cheapest guard is made of wire netting, $\frac{1}{2}$ inch mesh and No. 16 or No. 17 gauge. It should be six feet high and should have a piece of hose on its upper end to prevent chafing.

Q. Can you tell me what causes maple leaves to turn reddish brown in mid-summer, and if harmful to the trees?

M. L., *Poughkeepsie, N. Y.*

A. Maple leaves generally turn reddish brown in mid-summer when the supply of water is cut off from the roots. Cultivation and watering will generally revive the trees.

Q. Can you tell me what to do for a large hickory tree which has good nuts, but few of which mature?

T. B. S., *Hackensack, N. J.*

A. The first thing suggesting itself in answer to your query about your hickory tree is that the frugality of mature nuts is due to an inherent quality of barrenness in the tree itself, something that is very hard to overcome but has in rare instances been corrected by topwork. It is necessary that this shall be done by a specialist in this line of work, and it is quite an expensive process. Would suggest that you write to Dr. Deming, Secretary of the Northern Nut Growers Association, Georgetown, Connecticut, for fuller information. It is possible that the condition might be helped by seeing that the ground about the tree is fertile and in good condition and that it has plenty of moisture, as the hickory demands more moisture than many other species.

Q. How shall I kill a grub in a maple tree?

Mrs. M. M. L., *Columbus, Ohio*.

A. Inject carbon bisulphide into the burrow and clog the orifice immediately after injection with a bit of soap. The soap will prevent the deadly gas generated by the carbon bisulphide from coming out. The following day remove the soap and paint the wound with coal tar.

WORK FOR THE MONTH OF SEPTEMBER

1. Prune the shade and ornamental trees in the Fall before the leaves drop.

2. Collect and destroy the eggs of the tussock moth and cocoons and egg-masses of other insects.

3. Remove borers in fruit trees and look out for borers in other trees.

4. Mark with white paint all dead and hopelessly diseased trees which are to be cut down in winter. At this time one can see them better than in the winter time.

5. Visit the nurseries this month and select the plants required for planting in the Spring of 1916. At this time one can have a wider choice of material at absolutely staple prices. The plants may be left standing in the nursery for delivery in the spring.

Children's Department

Devoted to imparting information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.

By BRISTOW ADAMS

HOW A TREE GROWS

THROUGHOUT its life a tree grows only at the tips of the twigs and at the tips of the rootlets.

When any part except the very end of stem, or branch, or root is once formed, it keeps its same place and grows neither up nor down. Thus a nail driven into a tree trunk will always be the same height from the ground, no matter how old the tree may become. While the tree may push up higher or down deeper, its branches once formed remain in exactly the same position which they had when they first sprouted. Many persons suppose that the whole tree pushes up in height. Not many years ago there was a story current that a man had set his barn upon willow posts, and that the posts grew up in the air so that at the end of a few years he boarded in the lower part of the barn and had another story. This process continued indefinitely until he had a regular skyscraper, and then converted it into a silo. While this story may have started as a joke, it was repeated in many newspapers and periodicals as an interesting fact. That it is not true is proved by the fact that "blazes" or axe-marks cut in the bark of trees by our earlier surveyors have remained in exactly the same position for hundreds of years, perhaps being grown over by the bark as the tree increased in girth.

THE PARTS OF A TREE

A tree is composed of three parts, the head or the crown, the trunk or bole, and the roots. Each one of these three parts is further divided into other parts; in the crown are branches which in turn form into branchlets, and these into finer sprays or twigs which bear the leaves and fruit. Just as the branches are divisions of the bole or trunk, so the roots are divided into rootlets which are covered with root hairs.

Each of these parts is necessary and helps to carry on the tree's life. The roots have two purposes: First, they absorb the water which contains the tree food that comes out of the soil; and, second, they hold the tree in place by anchoring it firmly to the ground. Some trees, such as the maple, have wide-spreading roots that keep near the surface; others like the hickory develop a deep tap-root which goes almost straight down.

THE trunk or stem also has two duties to perform. It holds the branches up, and rises to a sufficient height so that it can bear these branches and leaves where they can get the sunlight. In the for-

ests, the topmost branches of the tree extend farthest, reaching up and up to the sunlight. For this reason, the trees which grow in dense woods, closely surrounded by their neighbors, are usually straight, and tall, and free from side branches. The forest-grown tree is the one that is most useful to the lumberman because from it he can get long, straight boards and poles, without knots and cross grains, which are made by branches that grow out from the stem.

A tree which grows in the open can find its light on all sides, and it thus reaches out with limbs that extend along the trunk from the ground to the very top, getting the greatest amount of sunlight from all sides as well as from the top. These round, short, low-headed trees are of the kind which grow in open meadows; under them the cattle find grateful shade in summer.

The second duty of the trunk is to form, with the branches, the channels through which the food material goes from roots to leaves, and back again, through each growing part. In cross section, the tree shows on the outside a layer of bark which protects it from injuries. The bark is not alive and cannot stretch with the growth of the tree, so that it gradually cracks and breaks up into plates or ridges, but it is being constantly built up by new layers from the inside. The very thin layer next to the bark, known as the cambium, is the living, vital part of the trunk. It builds on its outside this layer of bark and, on its inside, a layer of wood around the trunk. Just inside this cambium layer is what is known as the sapwood, which is generally lighter in color than the middle part of the tree, or heartwood, and is made up of a number of rings of growth, one of which the tree puts on every year. Within this sapwood the sap moves up and down and this part of the tree is, like the cambium, a living portion of the growth. Inside the circle of the sapwood are other rings of heartwood to the very center. This heartwood portion no longer has life, but serves its purpose as a column of strength and support.

The leaves grow on the outermost portions of the tree, since they must be where they can receive the sunlight. It is for this reason that the trunk lifts the branches on high, and the branches hold the twigs far out, and the twigs divide into the finer sprays so as to spread the leaves and hold them well into the sunlight.

The cambium layer is a coat of growth over all parts of the tree, with its roots and branches. This cambium layer, with the aid of leaves and rootlets, manufactures a substance which goes to make up the wood of the tree, and about half of this wood substance comes from the air and the other half from the water and soil. The water and the soil dissolved within it are taken in through the roots, and the air is taken in through the leaves. The material from the roots is carried up through the larger roots, through the outer layers of the trunk, clear to the leaves, where the water is given off into the air. But the food parts are kept and mixed with the parts of the air which the tree uses; the two combined become the stuff of which the tree is made.

THE leaf is a factory. The green pulp in the leaf is part of the machinery, which is set in motion by the power of the sun. The finished product is largely starch. This starchy matter is stored in the sapwood to be used for the growth of next year's leaves, but since starch cannot be directly used by the plant in that form, it must be changed to sugar. Thus the leaves, also, are obliged to do double work and have to digest the food which they have manufactured for the tree's use. They change the starch to sugar and to other substances which form parts of the tree's diet.

The tree works very fast and finishes most of its task of growing by midsummer. The autumn leaf is one which has completed its work, and the green starch machinery has been withdrawn and is safely stored in the woody part of the tree. The leaf may then be gold or red, for it has in it only materials which the tree can no longer use. It is a mistake to think that the frost causes the brilliant colors of the foliage. These colors are caused by the natural old age of the leaves and the departure of the green material, for when the leaf takes on its brilliant color it is ready to depart from the tree. Its duty is done, and a thin layer grows between the stem and the twig to which it has been attached, and when this growth is finished the leaf drops of its own weight, aided, perhaps, by the autumn winds.

EVERY step in the growth of the tree is recorded in the twigs and in the trunk. Those who have learned to know the meaning of leaf scars can tell how old a branch is, and can tell the struggles through which that branch has passed. The layers of growth are also recorded within the trunk, and one can tell just how old a trunk or branch may be by counting these annual layers or rings. Most of the material in these rings is deposited in the spring or period of greatest growth activity. The spring part of the annual ring is therefore more porous and generally lighter in color than the summer portion. Some rings are wide and others are narrow, and the width of the rings and their formation show whether the tree has had good years or bad years. A very dry season will leave its mark on the tree in the shape of a narrow annual ring, because the tree could not make much growth without enough moisture. Even injuries are recorded, and a bad fire scar in one year may be fol-

lowed in after years with narrow growth because the tree was poorly nourished on that side which was exposed to the fire. Such an accident is likely to make the tree grow twisted or crooked so that the trunk instead of being round will be oval in shape. Other trees, exposed to harsh winds, will not grow as rapidly on the exposed side as on the other, and these, too, may grow in distorted or lopsided forms. When one learns to look for such records the trees will tell their own stories.

A SUCCESSFUL TREE PLANTER

RICHARD JAMES DONOVAN, a lawyer of New York City, has just completed the planting of 130,000 pine trees at Pine Park, Franklin County, New York. Seventy thousand of these pine trees were planted this spring and the entire planting has been completed in three years. The work, which is known as under planting, is located about Pine Lake, Lily Pad Lake, Rainbow Lake and Clear Pond, in the townships of Franklin and Brighton in the Adirondack Mountains between Loon Lake and Lake Placid.

Mr. Donovan says: "The trees are thriving and the loss has not been more than 2 per cent of the entire planting. These trees were all purchased from the State Conservation Commission at prices ranging from \$1.50 per thousand to \$1.00 per thousand, depending upon the age of the tree. The cost of planting is only from \$3.00 to \$5.00 per acre and from 600 to 1,000 trees are planted. A good man will plant 1,000 seedling trees in a day."

He finds from experiences of tree planting that guides and all natives living in the vicinity have become intensely interested in the protection and care of newly planted forest from fires. There have been no fires in the vicinity since tree planting began and the burning of oil on the locomotives by the New York Central and Delaware & Hudson Railroads and the patrol which follows each train from station to station during the dry season, and the look-out signal stations established by the State on Loon Lake Mountain and St. Regis Mountain appear to give complete protection to the forests.

Mr. Donovan further says: "Tree planting is a splendid investment because it rapidly enhances the value of the land, makes it more salable and in a few years will develop a fine timber and lumber forest and adds to the scenery in that charming mountain and lake region and gives protection to the birds and wild game and improves the water sheds. It makes better shooting and fishing. Every owner of land and every native Adirondacker ought to become an enthusiastic tree planter. The interest that it stimulates and the outdoor life that it cultivates is a fine asset to people both for health as well as for financial gain. The Adirondacks, with its 1,800 lakes and numerous pure streams and lofty mountains, ought to become nature's greatest playground and health resort on the earth, and it will be if people plant trees and maintain the existing forest by protection from fires. Its healthful climate is unsurpassed. The Adirondack region is truly America's Killarney."

Wood Preserving Department

By E. A. STERLING

The Modern Application of Wood Preserving Methods—Various Treatments and the Use of Treated Woods

SINCE the September issue of the AMERICAN FORESTRY gives special attention to yellow pine, it may be stated that this wood has been more extensively treated against decay than any other. In 1914 10,600,000 yellow pine railroad ties were treated out of a total of 44,000,000, the only wood used to a great extent being oak. For construction timbers of all kinds, particularly bridges, trestles, and marine work treated yellow pine leads the list with Douglas fir second.

New uses for treated yellow pine are being developed, with the result that the user gets better service and the producer is able to market the lower grades and utilize all parts of the tree more closely. It remains to extend a more general knowledge of the possibilities of wood preservation to the smaller consumers. Railroads and other large corporations are at least partially awake to the possibilities, but the home builder, the farmer and the head of small companies has not been educated, nor informed, as to what treated timber will do for him, nor where nor how it can be obtained. In fact it is difficult to make retail distribution of treated lumber at the present time because the user doesn't know what he wants, and the retail yard man doesn't carry it in stock, and the big treating plants and lumber manufacturing companies have not developed this class of trade. It is in keeping with the possibilities of yellow pine for treatment that the Southern Pine Association and some of the manufacturers are vigorously taking up the matter.

CLOSELY related to the preservative treatment of wood against decay by creosote or zinc chloride is the fireproofing of wood. Large timbers stand up well under a severe fire, and the character of contents rather than the building material determines the fire hazard. While sprinkler systems are considered the best protection in any type of building, the fact remains that fire retardants are desirable under certain conditions. Realizing this condition, the National Fire Protective Association has recently published an excellent report on "The Use of Wood in Building Construction," which contains results of experiments with various fire retardant materials, including shingle stains, paint, and various mineral salts. It is impossible to summarize this report other than it shows that there is very little difference in the inflammability of various kinds of untreated wood, and that ammonium salts and sodium borate gave more satisfactory results than other chemicals, and that paint is a fire retardant. Those interested in the subject can obtain further information or copies of the report by writing to the National Fire Protective Association, Boston, Mass.

CREOSOTED wood block pavements are rapidly becoming recognized as the most satisfactory of all street paving material. They are noiseless, durable, sanitary, and if properly treated and laid are distinctly economical. The failures in the past which have in some cases prejudiced cities against wood blocks have been corrected, so that there is no excuse now for the existence of any wood block pavement which doesn't meet all of the modern requirements of service. The improvements in the methods of treatment and laying are largely the result of organized activity by various associations representing either the lumber interests or wood preserving plants.

The latest and strongest organization to take up the matter is the Southern Pine Association of New Orleans. Their publications on Creosoted Wood Block Pavements show irrefutably through the statements of civil engineers, paving experts, street commissioners and citizens' leagues, backed further by the opinions of government experts, that creosoted wood block is the one ideal pavement. All interested in the subject should obtain the bulletins of this organization. Another factor leading towards greater efficiency in the handling of this whole subject is the cooperation recently arranged between the Southern Pine Association and organized manufacturers of creosoted wood block.

MUNICIPAL progress in creosoted wood block paving work is indicated by a few examples of recent activity in various cities. Memphis, Tenn., is to pave Main Street and part of Front Street for a total distance of 3,642 feet; Cincinnati has just finished putting down 11,000 square yards of creosoted pine block pavement. The blocks in the first case replace cobblestone and asphalt, and in the second, granite blocks. The city of Philadelphia in July awarded contracts for wood block paving on three streets, two of them carrying some of the heaviest traffic in the city. In New England at a recent outing of the Cambridge, Mass., Board of Trade a vote of the 300 members present showed 270 in favor of wood blocks. On the Pacific coast, where the use of wood blocks is not as thoroughly established as in the east, experimental sections are being laid in many of the cities. In Seattle a contract has been let for wood block pavement on Twelfth Avenue, and through the activity of the West Coast Lumber Manufacturers' Association and the local creosoting interests the efficiency of this form of pavement is being demonstrated. In Florida there is a growing realization that the local material, on which much of the prosperity of the state depends, is the best available for street and

road pavement. It follows, therefore, that creosoted longleaf pine blocks are being advocated and used, thereby stimulating local industries, and at the same time giving the best possible service.

EVERY progressive farmer has or needs a silo. This has been so evident and the developments so rapid that the prospective buyer is confused by the claims of silo manufacturers representing many materials. While brick, tile, cement and even galvanized iron have been used, unbiased opinions hold that the wooden silo is by far the best. To overcome any possible objections to wooden silos on account of decay or shrinkage the Acme Tie Co., of Reed City, Mich., has during the past year put on the market what is known as the "Acme Creosoted Stave Silos." The staves are given an empty cell rueping treatment of six pounds of coal tar creosote per cubic foot. They come out of the cylinders thoroughly impregnated, yet with no surface oil to contaminate the silage or make the erection work objectionable. The completed creosoted silo is rendered entirely immune from decay, checking and shrinking, and the necessity of repeated painting is removed since the creosote is permanent.

The question of whether the creosote will taint the silage is covered by statements and experiments by vari-

ous agricultural colleges and individuals. Prof. F. M. White, of the University of Wisconsin, states that "Staves of any material should either be painted or creosoted. . . . If used on staves the staves should be soaked in the creosote rather than painted, although painting is of some value. There will be some odor of the creosote in the silage, but the cattle will soon become accustomed to the smell and no harmful effects follow." A practical farmer in Iowa states that "I have four silos, one is creosoted, have fed from them two years, and will positively say that the ensilage in the creosoted silo is as sweet and nice around the walls as in the others, no effect of the creosote whatever; have never tightened the hoops on the creosoted silo and it has been in use two years. I will recommend them highly." Another farmer who has used a creosoted silo for five years reports that, "The silage is not tainted by the creosote, at least not to any extent. The stock relish it, it seems to me."

An important point in connection with what is bound to be substantial developments in the use of creosoted silo staves is that a superficial treatment by painting or dipping does not give the same satisfactory results as pressure treatment by an empty cell process. In the former case there is much more likelihood of free surface oil and contamination.

Woodlot Values Worth Investigating

THE marketing of farm timber presents some of the same difficulties, but in an aggravated form, that the farmer meets in selling other crops, says a Forest Service contribution to the Year Book of the Department of Agriculture, just issued. The farmer finds it hard to get enough for his timber. Most farmers now sell their saw timber on the stump to a mill man, such sales ordinarily being made for a lump sum. The mill man, experienced in estimating, goes through the woods and sizes up the quantity and value of the timber he wants. The owner, being a farmer and not a lumberman, seldom knows anything about estimating timber and has only the vaguest idea of what it ought to bring. The consequence of this condition is that the farmer often receives only a small fraction of the actual market value of his stumpage.

Astonishing examples of what a farmer may thus throw away are often encountered by foresters, continues the article. For instance, a Massachusetts farmer sold a million feet of timber to a portable sawmill man for \$1,200, and thought he had obtained a good price. His neighbor, however, who knew something about timber, got \$1,000 for the same quantity of white pine from the very same portable mill man. The first farmer, on account of his ignorance, practically presented the mill man with \$5,800; the second owner was wise enough to

learn before he attempted to sell his timber how much he had and what it ought to bring him in money.

The productive capacity of the 200 million acres of farm lands throughout the country which either have or should have timber growing on them is enormous, says the article. This area is larger than all the national forests put together, and with an annual growth of 200 board feet per acre of saw timber—a moderate allowance under the practice of forestry—it would produce annually forever about 40 billion feet, or the equivalent of the entire lumber cut of the country, in addition to not less than 120 million cords of firewood.

These figures, continues the article, probably never will be realized, for the reason that the present area of farm woodlands is much greater than it will be eventually. For example, woodland comprises 31 per cent of the entire farm area of the South, and undoubtedly much of this land will be put to other uses than timber growing. Nevertheless, the farmers of the United States now own at least 250 billion feet of saw timber and 1 1/3 billion cords of cordwood, and this timber should produce a substantial part of their incomes. Farmers ought to make the most of their timber, and the public should be interested in this question for the reason that the vast aggregate of farm timber should be available to supplement the other sources of the general supply.

The Lumber Industry Inquiry

LUMBERMEN have great hope that the inquiry by the Federal Trade Commission into existing conditions of the lumber industry may result in some form of relief which will overcome the prevailing business depression in the lumber trade and aid it to return to a profitable basis. To this end the lumbermen of the middle west, south, north and the Pacific slope openly placed before the members of the Commission at Chicago and elsewhere all the facts they had and suggested various methods for relief, the chief of which were the curtailment and regulation of production with the sanction of the Government and the increase in consumption encouraged by laws favorable to such an increase.

How important the hearings are to the lumberman is evident when so influential a journal as the *St. Louis Lumberman* says:

"In our opinion, the Chicago proceeding was epoch-making for the lumber industry. It was something out of the ordinary in externals and 'features.' One realized that it was the first of a series of sessions to be held in the West; that the lumbermen were honored by the precedence given them over other Western interests for the presentation of their case; that the chosen and elect of the lumber manufacturing business were brought together before the Commission from all over the country, and that, generally speaking, this newly created federal body was 'starting something.' . . . The two days spent by the Commission in hearing the lumbermen marked the beginning of new and better history for the lumber interests, because of the very plain meaning of the creation and the clothing with legal powers of such a body as the Commission."

As to the much-discussed question of the legal power of the Commission, the same paper says:

"Manifestly, that body must stand in relation to business in the future as the Interstate Commerce Commission has stood in relation to the railroads of the country. Both the legislation and the machinery connected with this new federal agency necessarily have a purpose in the abridgment of the barbarities of anti-trust statutes and a turning toward a more enlightened policy of law-administration touching corporations and associations."

The *New York Lumber Trade Journal* harbors some doubt as to whether the Commission has the power to accord the relief requested by the lumbermen but sees benefit in the hearings notwithstanding. It says:

"Some are skeptical as to the Federal Trade Commission being able to realize to any degree the hope which its sponsors had in their minds when the law creating it was enacted. This, time alone can tell. Nevertheless, the special data, as well as the testimony given by distinguished lumbermen at the hearing, men who have devoted a lifetime to the industry

and who know its every ill and need, was replete with facts which it is well for the Government to know and consider, and particularly so by reason of the previous governmental antagonism to the industry. This hearing and testimony rendered should result in some good irrespective of whether the Federal Trade Commission is able to accord any material relief."

With a distinct legal trend of mind is the editorial expression of the *Lumber Trade Journal*, of New Orleans, relative to the powers of the Commission. It emphasizes the fact that these powers are vague and indefinite.

"No one is in position to say that the Commission has power to grant affirmative relief, so that the agreements sought can be put into effect," it says. "An able brief was presented which argues that the Commission has such power. The act, however, is indefinite. If the Commission has the power to say that certain acts are legal, is it not placed on a parity in power with the United States Supreme Court? Action is begun by the Government in the courts to test the validity of the order of the Commission, the case reaches the Supreme Court, which decides that the Commission has made a mistake, that it has no power to decide that the acts it authorized were not violations of the anti-trust laws, while in fact they were. Isn't the Supreme Court the highest authority? There is no appeal from its decisions. Then what authority has the Federal Trade Commission? It is stated that the Commission naturally will not make any orders without consulting the Department of Justice, so that its orders will really have the sanction of the Government, and that no legal action will follow. There are others who maintain the Commission can only investigate, draw conclusions, suggest remedies for the action by Congress into laws. If Congress will act on such recommendations, granting the relief requested, the money that is spent by the Commission will have been well spent, but if the Commission cannot do anything that will benefit the business of the country, all will be wasted."

Some hope of relief is voiced by the *Mississippi Valley Lumberman* in saying:

"If the Federal Trade Commission takes the only logical action which can follow from this exposition of the situation in the lumber manufacturing industry, the hearing will result in the greatest good that has come to the lumbermen of the country in the history of lumbering. The situation will soon become intolerable unless some step is taken to relieve it, and we believe that recommendations to Congress on the part of the Commission will be heeded and the needed relief granted. In connection with the study of the industry recently undertaken by the Departments of Commerce and of Agriculture, the need of the lumber trade for legislation of a constructive character will be plainly set forth."

Of the conservation feature of the existing situation this same publication says:

"Emphasis was laid on the fact that existing conditions are the foe of conservation, since manufacturers are absolutely unable to manufacture a considerable portion of the tree at a profit, and it must be left in the woods to rot. It was pointed out that the southern pine manufacturers are able to utilize only 70 per cent of the timber on any given tract, with the result that the remaining 30 per cent is absolutely wasted."

Even more optimistic in tone is the comment of the wide-awake *Southern Lumberman*, for it says:

"That the lumber industry is standing on the threshold of a new era of governmental aid and co-operation seems a safe prediction as a result of the hearing afforded the lumbermen by the Federal Trade Commission in Chicago. This belief has a firm foundation in the friendly spirit of cooperation exhibited by the Commission in its conduct of the hearing, and its manifest desire to be of real help to the industry.

"It is a source of extreme gratification and relief to note such an attitude on the part of a governmental commission. It is a relief to feel that in the future the industry may proceed without the constant fear of being heckled and investigated by inquisitorial bodies as has been so unfortunately the case in recent years. That the lumbermen were confident of being met in the friendly manner in which they were received was apparent from the frank and open nature of their statements and their determination, as expressed by one of them, to 'lay their cards on the table, face up.'"

How helpful the Forest Service may be to the lumbermen, and how much they need its help the *Hardwood Record*, of Chicago, tells in stating that the lumbermen at the Chicago hearing lacked, in many instances, positive information, this being particularly noticeable when they were called upon to reply to some leading questions.

"At first thought," says the *Hardwood Record*, "the compilation of this information appears to be too gigantic and complicated a task to seem practical, but it is within the lumbermen's power to have the task performed without any effort or expenditure on their part if they will but embrace an opportunity that is now offered which can be broadened if they will but make it known that they wish it to be. We refer to the present investigation of lumber and lumber markets as being carried on by the Federal Forest Service. This investigation as originally planned was to have covered the entire lumber industry in all of its departments from the stump to the finished article made from wood and to embrace all woods. Due, however, to the fact that no one is particularly or directly interested in seeing that each wood is given its fair share of attention, and inasmuch as it seems to be expedient to cut down the scope of the investigation on account of insufficient appropriation, the Forest Service officials in charge of the work eliminated the investigation of many of the important woods and are now dealing only with a limited territory and in a rather limited way. The

point is that if the lumbermen would make it known to the Forest Service that they urgently desire that the investigation be made comprehensive of all industries affiliated with the lumber industry, and all industries directly dependent upon the lumber industry, the Service would be able to secure without undue trouble sufficient funds from other sources to make this study one of real importance while it is being done, rather than of merely casual importance in a general way and of no direct importance as far as its being representative of the entire industry is concerned."

Original ideas are to be expected in the *Lumber World Review*, of Chicago, and here is what appears in the hearing:

"It would only be a begging of the question for either the Federal Trade Commission or the lumbermen to now bring up in *real earnest* the plea that neither party to the arrangement had understood the purpose or the cause which brought this event to pass.

"It has come directly to us—first by careful attention to all the proceedings and by another source of information of a perfectly legitimate character—of which all well-regulated newspapers avail themselves—that the Commission's purpose was to discuss the conditions which surround *only* the *foreign* lumber trade of the United States.

"Whether or not the lumber manufacturer understood just what the Commission wanted, it is very sure now that when the Commission sorts out the information that it secured, classifies and weighs it all, it will find itself in possession of *facts* that it could have little dreamed might exist concerning *any* great industry in this 'land of the free and home of the brave.'"

Warning the lumbermen not to depend too much on the ability of the Federal Trade Commission to alleviate the present situation, the *American Lumberman*, of Chicago, says:

"Its powers, of course, are not so fully defined as they will be later. But they do not—nor will they later—include the right to negative or render ineffective any statute now in existence relating to combinations 'in restraint of trade;' neither can the Commission run counter to decisions of the federal courts construing those statutes. Consequently to see how the Commission can render first-aid to the lumber industry at this time is rather difficult, particularly as most manufacturers are of the opinion that curtailment of production is the only remedy in sight. Certainly the laws of the United States as they stand today have not yet been construed as permitting any sort of agreement or understanding among producers that will result in curtailment, nor would it seem to be in the power of the Trade Commission to sanction such agreement or understanding."

When the Commission will make a report it is impossible to say. A mass of evidence has been collected and it will take some time to digest it, but the lumbermen are hoping that the report will be ready for presentation to Congress early in the coming session.

Editorial

THE NEW YORK CONSTITUTION

AS WE go to press, the conservation clauses of the new Constitution of the State of New York have reached what promises to be their final form. Efforts to materially change the old clause prohibiting constructive uses of the State forest lands have failed, and the State is undoubtedly committed for the next twenty years to the policy of preserving her immense area of 1,600,000 acres "forever as wild lands." Minor changes were adopted, one legalizing the occupancy of State lands by a few squatters who have continuously occupied the lands since before the State obtained title; one permitting the construction of a single highway of sixty miles to connect the Old Forge with the Fulton Chain of Lakes; and one which permits the Conservation Commission to remove at State expense, but not to sell, dead and down timber. Not only is the cutting and sale of all classes of timber prohibited, but, with the above exception, no roads or trails can be built which involve the destruction of green trees—and this means that no highways can be built. The leasing of lands for camp sites and other occupancy is prohibited.

This means that New York is to maintain, protect, replant and pay town taxes upon an area of land more than half the size of the State of Connecticut for the purpose of preserving a wilderness whose sole use is as a possible recreation ground for the people of the State. But will the people, whose property it is and who maintain it, derive the full benefit from this enormous project? State parks *should* exist for the benefit, not of the largest taxpayers, but of those to whom other avenues of recreation are cut off. Theoretically, the State lands are open to all. Practically, they are largely inaccessible and useless, save to a few hardy spirits, young men who can rough it on foot or by canoe; or as an adjunct to large private holdings and maintained at State expense for the incidental benefit of those who have residences and equipment in the vicinity. To be of service to the public, to restore health to invalids, to provide easy access for families with young children, in short, to serve as the lungs of the State where those who need it may find health; is this the real purpose of those who fought for these amendments? Let other States beware of the example set by New York, and provide, as does Pennsylvania on her million acres of State forests, that roads and trails shall be constructed to all parts of her domain, that campers be encouraged by a system of permits and that the State lands become actually and not merely in name, a real park which the people can use to the fullest extent.

Except in its remotest parts, this country has outgrown the wilderness stage of its development. Yet sentiment strikes deep and we preserve vast areas where

the trees shall be allowed to rot and fall so that the chickadee may not lack a hole in which to build his nest. Why is it that we cannot learn the lesson of the greatest good to the greatest number? A comparatively small acreage, *well located*, and made accessible to the public, will, if preserved in its natural condition, be of far greater value to immensely larger numbers than the entire Adirondack wilderness "kept forever as wild lands." Wealthy land owners can then fence in their estates if they desire and big-game hunters and other worshippers of solitude may still find what they seek, well within the reach of their purse. It would be instructive for the framers of New York's Constitution to visit the Pennsylvania State Tuberculosis Sanitarium, located on the Caledonia State Forest near Chambersburg, made accessible by a well-constructed road and supported entirely by State funds for the benefit of its unfortunate invalids.

From the first, this reactionary policy of reducing the State lands of New York to their lowest minimum of usefulness to the public has been strengthened and made possible by the fear of vandalism and the impression that lumbering is a synonym of forest destruction, breeds forest fires and corrupts State officials. We admit that unrestricted lumbering conducted for the sole purpose of removing the entire merchantable stand, does just this, and that where there is anything to be obtained by it, efforts would be made in the future as in the past to obtain privileges dishonestly. In the light of the unfortunate forestry experiment at Axton, where a policy of clear cutting to remove old defective hardwoods was pursued in order to plant conifers, the New York public became deeply distrustful of "scientific" forestry, for to them a slash was a slash, and clear cutting with replanting too closely resembled clear cutting with no planting at all, especially when no disposal of the slash was made. It is not a matter of surprise that after nearly twenty years this incident should be cited as one of the strongest arguments against permitting the cutting of timber on the State reserves. Foresters who urged the adoption of the timber cutting clause were simply regarded as allies of the lumber interests seeking to benefit themselves as well as the lumbermen at the expense of the State.

What is the truth of the matter? Every acre of State land should be put to its most beneficial use, for the good of the greatest number of persons. It is not a crime to sell State or National timber, provided its sale *does not interfere with the use of the forest for recreation*. This is true no matter if circumstances dictate the clear cutting of portions of the forest. That 90 per cent of most large tracts may be lumbered without such interference

by a judicious preservation of lake shores, trails and road belts has been proved time and again, and the only persons who would be materially benefited by the sacrifice to the "wilderness" of the entire area are those to whom the mere idea of having prevented the "spoliation" of State lands is a moral satisfaction. It does not diminish the game nor decrease the streamflow, since the "brush" cover is as favorable to both as the high forest. Under regulated lumbering, slash is disposed of, fires are kept out and reproduction is secured. No other kind of lumbering is contemplated under State or National management. Nor are lumbering and clear cutting necessarily synonymous. To note the difference between logging on private lands without regulation, and cutting under proper public supervision, one has only to inspect the thousands of acres cut over on the national forests in the yellow pine belt of the West, where it takes close observation to discover that there has been any cutting, even after the removal of two-thirds of the merchantable stand.

We insist that an incorruptible and efficient State forest administration is a possibility in New York under

the new Constitution, just as it is an accomplished and indisputable fact in the National Forest Service. Such an administration can be trusted with the proper management of State timber, including the cutting and marketing of mature trees for the utilization and improvement of the forest. We hope that America will eventually show herself as intelligent as continental countries and able to solve the comparatively simple problem of proper utilization of State forest and waste forest land for the best good of all. But this result will never be obtained, in New York or elsewhere, while any one selfish interest demands the sacrifice of public rights and equity to the fulfillment of a sentimental dream. The American Forestry Association stands squarely on the platform of State and National forests developed to the greatest degree of usefulness to the State and its people, partly by strict forest preservation, partly by utilization of mature timber. It equally opposes those who would disrupt and destroy such forests and those who would condemn them to remain perpetually as wild lands for the preservation of a remembrance of a prehistoric epoch.

FOREST SERVICE METHODS APPROVED

IT IS gratifying to see that lumber trade papers believe timberland owners may learn something to their advantage by studying the methods by which the Forest Service so capably administers the national forests. The *Southern Lumberman*, in an editorial on August 7, suggests that the adoption of Forest Service methods would put money in the pockets of private owners of timberlands. The editorial says:

"Though the conduct of the national forests by the Government can in no sense be compared with private enterprise as a business venture, the revenues derived from the forests by the Government and turned into the Treasury by the Department of Agriculture through its subsidiary branch, the Forest Service, are by no means

without interest. Though the Government pays no taxes and borrows money at half or less than half of the rate of interest which private enterprise has to pay, some of the sources of revenue from the forests as shown in the report of the service might prove valuable suggestions to other holders of large tracts of timber awaiting development. It will be noted that grazing and special privileges form a good portion of the sources of revenue from forests. What the Government finds a market for in this way, other timber holders might also find worth exploiting either of their own initiative or by rental, as is the case with the Government. There are certain of these and perhaps other sources of revenue which could be realized as a valuable means of lessening carrying charges on large tracts of timber held either in reserve by manufacturers or for speculation by investors."

SEND THE MAGAZINE TO YOUR FRIENDS

EACH member of the American Forestry Association is urged to send to the Secretary the name of one or more friends who might be interested in the AMERICAN FORESTRY magazine. Upon receipt of the name and address, a copy of the enlarged and improved magazine will be mailed, without charge, for examination. It is the ambition of the Association's

officers to make the magazine so valuable that the desire for it will produce a large and steady increase in membership. It must be seen and read before its value is appreciated, and the members can best assist in having it seen by sending names and addresses of friends, to whom free copies will be mailed. The stronger our membership, the more effective our work for forest conservation.

Trees As Sign Posts

Varieties of trees, instead of unsightly signs, are to give warning of approach to railroad crossings, bridges and dangerous turns on the Lincoln Highway, according to an announcement by Elmer C. Jansen, chairman of the American Institute of Architect's general committee on the highway. Mr. Jansen, who recently finished a trip over the Illinois section of the highway, said the tree feature was part of comprehensive plans for the restoration and preservation of nature's beauties along the transcontinental road.

Cutting Walnut Trees

A newspaper dispatch from Leavenworth, Kans., says: "There will be no walnut trees left in this part of Kansas and across the river, in Missouri, if the European war keeps up much longer. At present three bands of men are cutting walnut trees down and sawing the lumber into 12-foot lengths, shipping them to the East by fast freight.

The walnut lumber is wanted for gunstocks for rifles for the European armies. All trees more than 6 inches in diameter are purchased, and a good price is paid for the lumber. Those selling the trees have not been informed what country the wood is destined for.

H. S. Sackett in Charge

Early in August the United States Forest Service opened an office in the Federal Building in Chicago, Mr. H. S. Sackett being placed in charge. Mr. Sackett is engaged in making inquiries for the Forest Service into the cost of manufacturing lumber and procuring reliable data on lumber cost, a work which the lumbermen are doing what they can to assist and encourage.

Wood Pulp for Explosives

A recent newspaper cablegram from London says that the Germans will soon be using wood pulp as a substitute for cotton in making explosives, following a discovery made by a German chemist. The wood is ground, cooked and changed into a liquid. Then it is cleaned, pressed into sheets and by the addition of certain chemicals becomes a desirable substitute for cotton as a basis for various explosives.

Forester Will Raise Fruit

"E. M. Griffith, former State Forester of Wisconsin, will go South, purchase a tract of fertile land in the sunny climate, and raise fruit where the wicked cease from troubling and the weary are at rest. If Mr. Griffith does as well in the fruit business as he has done with forestry, he will be a valuable acquisition to the State that receives him as a citizen," says the *Hardwood Record*, of Chicago.

Favorable Fire Season

Reports recently received by the Western Forestry & Conservation Association, from all protective agencies in the Northwest, show practically no loss of timber through forest fires up to the middle of August.

Favorable weather conditions and careful preparations for the season are the chief factors which have so far made for a clean record on the part of patrol organizations. Following the plan of previous seasons each protective agency began, well in advance of dry weather, to get its territory in the best possible shape for successfully combating any fires which might become started. Additional lookout points were equipped, telephone lines extended and repaired, new trails constructed, and every effort made to secure the best possible cooperation between the various patrol organizations. These efforts are now bearing fruit in the prompt detection and suppression of all fires which become started.

Although the beginning of August saw conditions much more favorable than those of a year ago, there is still time for the woods to become dry and only the greatest care and vigilance will prevent fires from starting during the next few weeks.

Gift to a College

The State College of Forestry at Syracuse has just received a very valuable gift of over 120 mounted game and water birds, and 21 mammals from Congressman Peter G. Garry and his brother, Robert L. Garry, both of Providence, R. I. This collection was secured for the college through the interest and help of Dr. William T. Hornaday, director of the Zoological Garden in Bronx Park. Dr. Charles C. Adams, Forest Zoologist of the College, had presented to Dr. Hornaday earlier the urgent need of the College for mounted birds and mammals. Soon after this Mr. Robert L. Garry wrote Dr. Hornaday about the disposal of the Garry game collection, as it will be called by the College, and Dr. Hornaday recommended that the collection be turned over to the State College of Forestry at Syracuse.

Idaho's Good Record

Idaho experienced a few small forest fires in July and early August, none of which have caused loss of timber. Only the normal force of patrolmen is on duty, but every precaution is being taken to see that fires are promptly discovered. The Forest Service has this season constructed several emergency warehouses where fire-fighting tools, available for immediate shipment to points needed, are stored. This is in addition to the tool supply which each National Forest maintains.

To Save Shade Trees

John J. McInerney, counsel for the New York Motor Federation, will try to secure the passing of a measure at the next Legislature protecting the shade trees along State highways. Many of the fine old trees along the State roads are dying for need of a little skillful care, Mr. McInerney says, and this care should be given by the State as it is in other parts of the country.

Studying Forest Animals

Alvin G. Whitney went to the New York State College of Forestry during the summer as an advanced student to take up ecological studies of forest animals with Dr. C. C. Adams, Forest Zoologist. Mr. Whitney is a graduate of Dartmouth College and has taken advanced work in forestry at Yale University and went to the New York State College of Forestry after some time in the employment of the United States National Museum and the Biological Survey of the United States Department of Agriculture. During the coming year he will investigate several problems in the relation of birds and mammals to woodlands.

Slight Fires in Oregon.

Oregon experienced no forest fires worthy of mention during July. A few fires escaped as a result of slash burning but were speedily extinguished without loss of green timber. About 300 wardens are on duty outside of the National Forests and this number will probably be slightly increased if rains are not forthcoming within the next few days. The need for strict enforcement of the forest laws has been especially emphasized this season, and a campaign to eliminate the smoke nuisance has been vigorously carried on.

Lookout Stations

An inspection of the forests in the Pine Mountain and Cumberland sections of Virginia and Kentucky was recently made by State Forester R. C. Jones, of Virginia, and State Forester J. E. Barton, of Kentucky, to select sites for building lookout stations through the mountains as a protective measure to reduce the number of forest fires throughout eastern Kentucky and southwestern Virginia. The Eastern Kentucky and Southwestern Virginia Forest Protective Association recently organized in Jenkins, Ky., has also made plans to build "lookout" stations through the mountains of Elkhorn, Boone's Fork, Beaver Creek, Long Fork and Shelby. The Consolidation Coal Co., one of the largest timberland owners in this section, has subscribed 100,000 acres to the association, while other interests have subscribed considerable areas. The Leslie-Perry County Forest Association met at Hyden, Ky., August 5 and discussed plans looking to

the care and preservation of the forests of the two counties now included in the association.

Russia's Forests

Russia now occupies first place among the nations of the world in the extent of its timber resources, the value and quality of two-thirds of which are practically unknown. The total area of the empire is about one-seventh of the land surface of the globe, and 39 per cent of it is under forests. Those in European Russia cover an area of 474,000,000 acres; in Finland, 50,500,000 acres; in Poland, 6,700,000 acres; and in the Caucasus, 18,600,000 acres; a total of 549,800,000 acres, exclusive of Siberia. In the Ural Provinces, forests cover 70 per cent of the area, in the northern Provinces 68 per cent, and in the four lake Provinces 57 per cent. It is estimated that in western Siberia alone there are 465,000,000 acres of virgin forests, and eastern Siberia, while not so richly endowed, has sufficient timber to supply the world's demand for years to come.

The Government owns 285,598,941 acres of forest land in European Russia, 12,826,387 acres in the Caucasus, 360,519,435 acres in Asiatic Russia, and 288,742,000 acres in the Amur region, a total of 947,686,763 acres. Twenty-three per cent of the forest land belonged to landed proprietors and 9 per cent to the peasantry in 1910.

The principal timber lands of eastern Siberia are in the valleys of the Amur River system, which cover an area of about 2,000,000 square miles. Of this area, only about 400,000 miles is considered available for timbering, but according to local calculations, allowing 45 merchantable trees to the acre, this would give some 11,520,000,000 trees. As the time required for these trees to mature is placed at 100 years, 115,200,000 trees could be cut per annum without diminishing the forests, with proper reforestation methods.

The Russian Forestry Department places the total timber land in Siberia at 810,000,000 acres, of which two-thirds can be successfully placed on the market.

Forest Fire Insurance

What is believed to be the first forest fire insurance policy ever issued in the United States, and so far as can be learned, the only one of its kind in existence, protects the forest plantation of Arthur H. Hacker in Pike County, Pa., says *The Hardwood Record*. Mr. Hacker's woodland was principally chestnut, but the blight forced him to cut the timber. In the spring of 1914 the cut-over area was planted with white pine seedlings and transplants, a total of 35,000 being used for the purpose. The chestnut timber was of rather small size but the proceeds paid nearly all the cost of restocking the area.

In order to protect himself against loss

by fire the owner commissioned his broker to insure the tract. After considerable difficulty this was finally done and on May 9, 1914, an Eastern insurance company issued a policy. The form used is the standard fire insurance policy of the States of New York, New Jersey, Pennsylvania, Connecticut and Rhode Island, but the following clause is inserted: "On young pine trees to cover pro rata on each tree; situate on side of Raymond's Kill Creek on which residence is located, on premises known as 'Woodside,' about one mile westerly from Shanno's, Dingman's Township, Pike County, Pennsylvania." The amount is \$750 and the premium rate is 10 per cent, a prohibitive figure for ordinary plantations. This company has no intention of entering the forest fire insurance business and does not care to assume such risks as a general proposition.

Forest fire insurance is fairly common abroad and eventually will become so in this country. Accordingly the policy just described has especial interest as being the very first attempt, so far as known, in the United States.

Forest Management Plan

Six graduate students in the Department of Forestry, Cornell University, have recently completed a detailed working plan for a 3500-acre tract in the Catskill Mountains. This tract lies at the headwaters of the well-known Esopus River, the main feeder of New York City's mammoth Ashokan Reservoir, and hence is of great value as a protection to this and other streams arising in the vicinity. The tract is divided into steep upper slopes and more gentle lower slopes, about half of the 3500 acres being in each of the two slope types.

The work was done in connection with the training given to its students by the Cornell Forest School as a part of the course in the management of large forest tracts.

The Cornell forestry authorities state that logging operations should be conducted under an orderly and well-planned system which will insure the improvement of the forest by use, and at the same time will not impair its value as a protection to stream-flow. Timber cutting under such a plan, the Cornell foresters say, will yield a revenue and safeguard the public interest.

Estimating Maine's Forests

O. W. Madden, of the James W. Sewall office, Old Town, Maine, is engaged in making a thorough timber estimate of about 100,000 acres in the northern part of Maine for the state. This work is being carried out under the directions of the Board of States Assessors for purposes of valuation, and it is expected that the data gained thereby will greatly assist in equalizing

taxes. Mr. Madden expects to be in the field until November.

Fires Cause Small Loss

Washington reports some thirty-five forest fires during July, all promptly extinguished, and with small loss of timber. The Washington Forest Fire Association has eighty-seven men on duty, and the state, through its own and the Federal Weeks Law appropriation, nearly as many more.

Montana Escapes Fires

Montana reports a most favorable forest fire season as compared with last year. The Northern Montana Forestry Association has had no fires in its territory and as all precautions have been taken to discover and extinguish fires quickly the season may pass with little or no damage.

Courses in City Forestry

The raising and care of forest trees for streets, home grounds and parks while not the principal work of the forester is nevertheless closely connected with the proper development of forestry. With a growing interest in city planting and the beautification of home grounds and country properties, there is an increasing demand for men trained thoroughly for the carrying out of city street and park work and other phases of arboriculture. This demand the New York State College of Forestry is filling by offering professional courses in Arboriculture or City Forestry which will train men thoroughly and effectively for every phase of work connected with the planting, care and protection of shade trees, whether upon private grounds, in streets or parks. A number of men are already taking up this course.

New York City Trees

As a result of the special fund given to the Department of Parks of the City of New York, by John D. Rockefeller, Jr., Prof. Laurie D. Cox, Landscape Engineer of the State College of Forestry at Syracuse, is working during the present summer with the Hon. Cabot Ward, Commissioner of Parks of New York City. Professor Cox is making a study of the forest trees of New York City, the various methods used in the planting and protection of trees and of the organization of tree planting work. Professor Cox is a graduate in Landscape Architecture of Harvard University and went to the State College of Forestry at Syracuse last year after four years as Landscape Engineer for the City of Los Angeles. The results of the studies carried on by Professor Cox during the summer will be presented in a formal report to the New York City Department of Parks.

The Canadian Department

BY ELLWOOD WILSON

Secretary, Canadian Society Forest Engineers

The two most important questions in Canada from the standpoint of conservation are still those of settler's fires and fake settlers. Fire protection has made enormous strides in the past three years, but its further progress is almost barred by these two difficulties.

In order to make the subject intelligible a few words of explanation are necessary. All of the lands in the Provinces were in the hands of the Provincial Governments and these are practically only disposed of in one way and that is to settlers, one hundred acres to each settler, who is required by law to clear a certain proportion of his lot each year, erect certain buildings and to make cash payments at the rate of thirty cents per acre. At the end of three years, if all conditions are fulfilled, he receives a patent or the freehold of his lot.

All timberlands which are still unsettled and remain in the hands of the Government are "licensed" or leased to lumbermen at a ground rent of so much a year and a certain price per thousand feet board measure on all timber cut. A diameter limit is imposed below which no timber can be cut. The original reason for this diameter limit was so that the lumberman could not cut off all the timber, which would spoil the land for settlement, as there would be no timber for houses and fences. If settlers were confined to certain districts apart from the licensed lands, there would be no fire risk, but lots are sold every year from lands already under license and the clearing operations are a great menace. There are good laws to regulate such clearing but they have never, until six years ago, been enforced, and few of the people even know of their existence. Then, too, judges are very reluctant to impose fines and the Government in trying to punish the settlers is hampered by members of Parliament, who do not like to see their constituents fined.

The only thing possible is an educational campaign which should really be carried on by the Government by means of circulars, lectures with lantern slides, circulars and talks in the schools. These means are all employed in improving the condition of the farmers and should be used in educating them in the proper care of the forests.

The question of fake settlers, while not so grave, is still dangerous. This abuse has been largely overcome but needs to be exterminated. Men take up farms pretending to be bona fide settlers, cut off the timber and then leave the lots. This is often engineered by sawmill men, who provide the money and buy the cut. The

debris from this heavy cutting is a grave fire menace.

The Deputy Minister of Lands and Forests of Ontario, Mr. Aubrey White, C.M.G., died suddenly at Muskoka on July 14. Mr. White was one of the early active members of the Canadian Forestry Association and tried to work out the best plans for forest conservation. He was President of the Association in 1904-5 and presided at the Quebec meeting. He was for two years Honorary President and after that a Director. Mr. White held very strong views as to what was the best way to promote forestry progress and was probably prevented by his chiefs and political needs from carrying out his views, but it is to be hoped that the handling of Ontario's timberlands will now be brought up to date. Personally Mr. White was a charming man and he will be much missed by his friends.

Mr. Clyde Leavitt, Forester to the Dominion Railway Commission, the Conservation Commission and President of the Canadian Society of Forest Engineers, spent three days recently inspecting the work of the Laurentide Co., Ltd., at Grand' Mere, going over the plantations, nursery and experimental cuttings, looking over roads and fire lines. Plans for the work of the Canadian Society of Forest Engineers were also discussed with the Secretary, Mr. Ellwood Wilson. Mr. Leavitt also attended a meeting of the St. Maurice Forest Protective Association which discussed the advisability of proceeding against some flagrant violators of the Forest Fire Laws. It was decided to take action against three of these, making test cases and the Association's lawyer was instructed to proceed. A report of all the fires to date this season was made by the manager and discussed. The total number was twenty-five, divided as follows: Settlers, 13; employes of companies who are Association members, 7; unknown, 4, and hunter, 1. Three fires were started by men who wanted work. The most serious situation disclosed by this report was the lack of active cooperation by employes of companies who belong to the Association. This is due to lack of interest on the part of heads of Woodlands Departments, which attitude is seen by their subordinates and reflected in their conduct. Among the fires set by settlers several were set in one section where fake settlers are operating. They sell their timber to a sawmill owner, who is powerful politically.

The publicity campaign being carried on by Mr. Robson Black, Secretary of the Canadian Forestry Association, shows that can be done along these lines and is really the most important part of the work of the Association. Education is at the bottom of all progress and those who have endeavored to help along the cause of conservation are compelled more and more to realize this. The material furnished to the papers and magazines and the number of these using it show the value of this work.

The July number of the *Canadian Forestry Journal* is an excellent and most readable one.

Mr. Henri Roy, of the Quebec Forest Service, has been elected an active member of the Canadian Society of Forest Engineers, and Mr. E. S. Holloway, Engineer of the Canada and Gulf Terminal Railway, an associate member.

Mr. S. L. de Carteret, Forester for the Brown Corporation, has made some very interesting growth studies on trees growing in latitude 48 degrees north. His results show that the average volume per cent of mean annual growth is for white spruce, 0.69; for black spruce, 0.64; for balsam fir, 1.36, and for jack pine, 0.99. The periodic annual growth of last inch is on the average for white spruce 1.50 per cent, for black spruce 1.48 per cent, for balsam fir 3.08 per cent, and for jack pine 1.59 per cent.

The Dominion Forest Service has under consideration the commencement of experimental forest work and the probable establishment of one or more experimental stations all under the charge of one head. This will be a long step in advance and will supply a great deal of information which is badly needed in practical work. Growth of trees and stands can be studied, the best mixtures to plant, the relative values of natural and artificial regeneration, the effects of light on different species, the costs of various logging methods and their effects on stands can all be studied to advantage.

Mr. F. J. Campbell, the progressive manager of the Canada Paper Company of Windsor Mills, Que., has just had an expert looking over the timberlands of that company, to advise him as to best methods of handling these lands so as to put them in the best possible condition for future production. This company will probably institute a good method of slash disposal and start a nursery for their planting needs. They have excellent limits which will well repay careful treatment, as they are all within twenty miles of their mill, easy stream to drive, and the process used in making pulp allows them to utilize all sizes and species of wood.

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The Department of Lands and Forests of Quebec, in cooperation with the Laurentide Company, Ltd., have set aside a tract of about four square miles of practically virgin timber to be used as an experimental tract. The Chief Forester, Mr. Piché, and the Company's Forester will decide on methods of cutting and brush disposal and these will be carried out under careful supervision, and the costs of different methods and their effects on the stands and on regeneration will be carefully studied. Much valuable information should be obtained.

An order-in-Council will soon be passed by the Quebec Government making it obligatory on all timber operators to clean up their lands to a depth of 100 feet from the edge of the right-of-way of any railroad passing through their land.

The Laurentide Co., Ltd., will finish its season's planting operations by planting 90,000 Norway Spruce, three-year-old seedlings. Plantations previously made have made exceptionally good growth this season.

British Columbia Notes.

Another result of the efforts made by the Provincial Government on behalf of the lumber industry is announced by the Minister of Lands, the Admiralty having agreed to turn over to the British Columbia Government, for one voyage from this Coast to the United Kingdom, the steamer "Grahamland" now at the Falkland Islands. The "Grahamland" has an interesting history, having been, until the destruction of Admiral von Spee's squadron, the German collier "Josephena," when she surrendered to one of the British warships. The ship was offered through the Agent-General, to the British Columbia Government for the transport of a lumber cargo to the United Kingdom, not necessarily for amiralty purposes, and this being so, all timber shippers were notified and asked to make offers for the vessel, the amount of the charter being \$6,600. The bid of the Cameron Lumber Company, of Victoria, was accepted, and the "Grahamland" is expected to arrive for August loading. Her capacity is given as 550 standards equal to 1,100,000 feet, and the securing of such a vessel at a time when tonnage is scarce by a British Columbia firm even at such a high figure is a matter for congratulation.

The last weekly telegraphic reports received by the Minister of Lands concerning the forest fire hazard were very encouraging, every district reporting several days of rain accompanied by cool weather. A few fires occurred in slash, but were extinguished without trouble and expense, the fire stopping in every instance as soon as green timber was reached.

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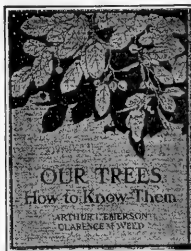
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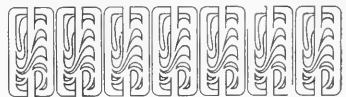
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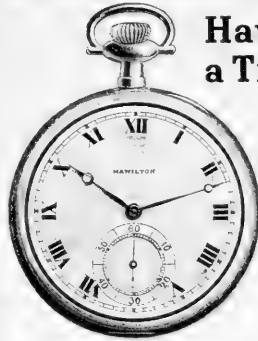
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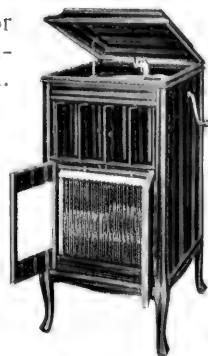


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American Forestry

Vol. 21

OCTOBER, 1915

No. 263



THE CHESTNUT

The American Forestry Association

Washington, D. C.

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IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

Federal Administration and Management of national forests; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners; non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

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Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

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The Magazine of the American Forestry Association

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October, 1915. Vol. 21

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THE DAY OF NO TIMBER

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American Forestry

VOL. XXI

OCTOBER, 1915

No. 262

The American Chestnut Tree

By SAMUEL B. DETWILER

Identification and Characteristics

OUR native chestnut tree is one of our best known and best loved trees because of its beauty and utility. It grows from southeastern Maine west to southern Michigan and south to northern Virginia, southern Indiana and along the Appalachian Mountains to northern Georgia, Alabama and Mississippi. The bright foliage, attractively-shaped leaves, toothsome nuts and stately form give distinction and character to this highly valuable commercial tree of our forests.

The finest chestnut trees in the world are found in the southern Appalachian Mountains, especially in western North Carolina and eastern Tennessee. A tree with a diameter of 17 feet has been recorded from Francis Cove, North Carolina. Commonly, the mature trees are 3 to 5 feet in diameter and 60 to 90 feet in height, but there are numerous specimens 7 feet or more in diameter, 100 to 120 feet high. In Pennsylvania, New York and the New England States chestnut trees have mostly grown from stump sprouts, and are therefore comparatively small.

When growing in the forest, a chestnut tree will bear only a moderate amount of shade, and the crowding of adjoining trees causes the early death of the lower branches. For

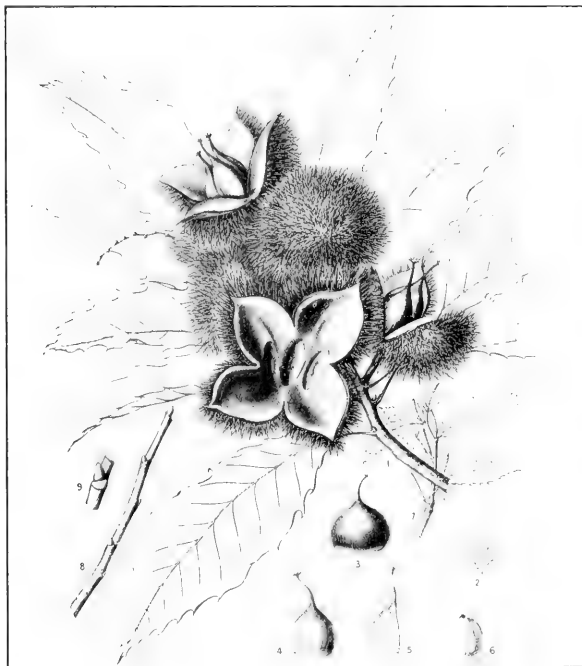
this reason forest-grown chestnut trees nearly always have long, straight, clear trunks, branching out into rather small, rounded tops. In the open the trunk is short, dividing into three or four heavy horizontal branches to form a broad, beautifully rounded head.

The chestnut has many features that distinguish it from its neighbors at every season of the year. Its grayish brown bark somewhat resembles that of the red oak because of the broad, flat, irregular ridges, but is readily known by the darker gray color, deeper fissures,

and the smaller and more flaky scales of bark on the ridges. Very young trees have smooth bark. Later the ridges develop, separated by shallow fissures, and in old age these fissures become quite deep.

The buds are one of the best means of identifying this tree in winter. They are dark brown, about one-quarter inch long, egg-shaped but usually sharply pointed. The buds stand singly on strong-growing branches. Every fifth bud stands directly above the one from which counting begins, and if a string is drawn from bud to bud it will form a spiral, passing twice around the branch from the first bud to the fifth one.

After most of the trees have well developed foliage, but be-



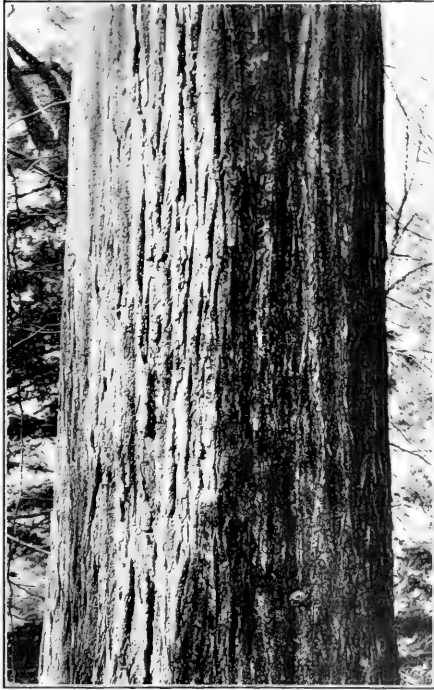
From "The Silva of North America" by Saraght, Houghton Mifflin Co., Publisher.

LEAF AND FRUIT OF CHESTNUT

1. Fruiting branch.
2. Spines (enlarged)
- 3 and 4. Nuts.
5. Vertical section of a nut.
6. Kernel of nut or seed.
7. End of young twig with new leaves and undeveloped flowers.
8. Winter branch.
9. Bud and leaf scar.

fore the oaks have put forth their leaves, the chestnut buds open and the tiny leaves unroll. Though inconspicuous, there is grace and beauty in the artistic symmetry and delicate coloring of the baby leaves—rose, yellow and exquisite shades of green. On short branches that bear the fruit, the leaves form a leafy star, giving variety to the appearance of the foliage.

In form the leaves are slightly like those of the beech. They are six to eight inches long and about two inches



BARK OF THE CHESTNUT TREE

The grayish-brown bark somewhat resembles that of the red oak because of the broad, flat, irregular ridges, but is readily known by the darker gray color, deeper fissures and the smaller and more flaky scales of bark on the ridges. Very young trees have smooth bark.

wide, wedge-shaped at the base and tapering to a sharp point. The margins are coarsely toothed and the veins prominent and regular. The "ant cows" (plant lice) love to feed along the veins on the lower surfaces of the chestnut leaves. In the Fall the leaves assume soft shades of yellow and red, but soon lose their brilliancy.

Early in July the chestnut tree becomes one of the most striking features of the landscape. Long after other trees have bloomed, it suddenly blazes into a wealth of odorous, cream-colored blossoms. These are the clustered catkins of the pollen-producing flowers. The flowers that produce the nuts are separate from the others and much less noticeable, because they consist of small spikes with a few green, scaly blossoms. These two kinds of blooms do not usually appear at the same time

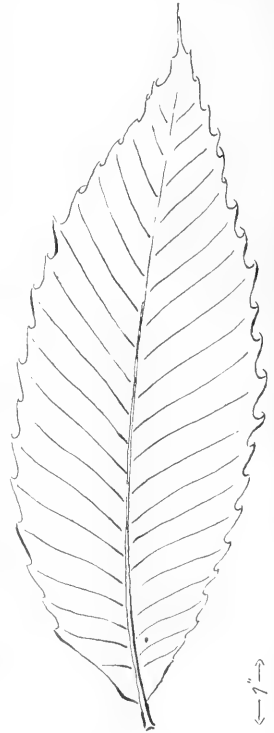
on one tree. The wind carries the pollen from tree to tree and thus effects cross-pollination.

Two or three, or sometimes only one, of the nut-producing flowers are fertilized and grow into prickly burs. At first the young burs are very small, but by the middle of August they are full-sized. The sharp spines which make the bur a sort of vegetable porcupine are Nature's protection against injury to the sweet nuts until they are fully ripe. The Indians called the chestnut tree "O-heh-yah-tah"—"the prickly bur." The first heavy frost of Autumn causes the bur to separate into four parts, disclosing two to four shining nuts resting in a bed of soft brown velvet.

Chestnut trees do not grow well if the soil around their roots is disturbed, as is shown, in regions where blight is not prevalent, by the dead tops of many trees in closely grazed pastures and on the road sides. They are easily injured by fire and have many insect enemies. Various species of borers injure the bark, the wood is very apt to be perforated by small worm holes, the foliage is frequently injured or destroyed by leaf rollers and leaf-eating insects, and the nuts are often infested with the chestnut weevil.

The most serious enemy of the chestnut tree and one that apparently means its ultimate extinction in this country is the chestnut bark disease or "chestnut blight." All species of chestnut and the chinquapin are susceptible in varying degrees to the bark disease. The chestnut bark disease was brought to this country from China or Japan, and the Chinese and Japanese chestnuts are highly resistant. The chinquapin is slightly resistant, but the American and European species of chestnut have thus far shown no power to withstand the disease.

Although comparatively little has been heard about the chestnut blight in the past two or three years, there is no evidence that it is progressing more slowly or that it is less virulent than formerly. The bark disease is generally prevalent from Maryland to Connecticut, as far west as the mountains, and scattered infections occur as far west as east-



CHESTNUT TREE LEAF

The leaves are six to eight inches long and about two inches wide, wedge-shaped at the base and tapering to a point. The margins are coarsely toothed and the veins are prominent and regular.

ern Ohio and eastern West Virginia, and in southern Virginia and North Carolina.

The chestnut tree is noted for rapidity of growth and for its ability to sprout freely. The rate of growth varies with the conditions under which it grows. An average growth in diameter is about one inch in three years. Under normal conditions the chestnut tree lives to a great age. It grows on a great variety of soils, but does best on porous soils of moderate depth and fertility. It is well suited with rocky hillsides and gravelly



CHESTNUT TREE IN WINTER

Trees may be identified in winter when they have lost their leaves by the general contour of the branches and by the bark. The student will do well to study them so thoroughly that it becomes easy to identify them at any time of the year.

or even sandy soils, but it is seldom found on limestone soils.

The chestnut produces great numbers of vigorous sprouts from the stumps of young and middle-aged trees. These sprouts grow more rapidly than seedlings during the first thirty years of their life, and in the past, because of this valuable characteristic, the chestnut has been one of the most profitable trees in the farmer's woodlot. It is easily grown from seed but natural seedling growth is usually not abundant because the nuts are so highly prized for food by squirrels, mice and other animals, as well as human beings. In view of the relentless destruc-

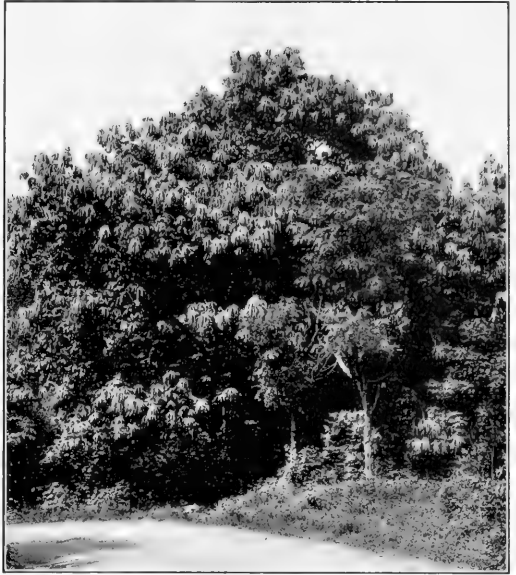


Photo by Edith R. Mosher, U. S. Forest Service.

CHESTNUT TREE IN BLOOM

Long after other trees have bloomed, the chestnut, early in July, suddenly blazes into a wealth of odorless, cream-colored blossoms and becomes one of the most striking features of the landscape. These blossoms are the clustered catkins of the pollen producing flowers.

tion of the chestnut by the bark disease and its many other enemies, the planting of this species is not advisable.

The wood of the chestnut is of a brownish color, light in weight, coarse grained, fairly soft, of medium strength, easily worked, and the grain has a pleasing pattern. It is durable in contact with the soil, on account of the high tannic content, which ranges from five or six per cent in young trees to ten to fourteen per cent in very old trees. The wood has a great variety of uses.

The nuts of our native chestnut are superior to the European and Japanese species, and to a less extent, to the Chinese. Chestnuts are an important article of food in Italy and some other foreign countries. They are



Courtesy of Manual Arts Press

AREA OF CHESTNUT GROWTH

This map shows the general range of the chestnut, which is confined to the States east of the Mississippi.

made into flour from which bread is made. They are also served for food in a variety of other forms and possess a high nutritive value.

There are a number of varieties of cultivated chestnuts mostly derived from the European chestnut. Until the advent of the blight, chestnut orchards for the production of nut crops offered a source of revenue from waste land. Chestnut orchard trees must be grafted, as varieties do not come true from seed.

The chinquapin is the chestnut's nearest relative, native to this country, that assumes tree form. It is usually a shrub and the leaves and burs cause it to resemble a chestnut in miniature. The nuts are small and shaped like an acorn, but are very sweet and delicately flavored. It is possible that a variety of chestnut immune to the bark disease may be bred by crossing the Japanese or China species with the chinquapin, creating a variety superior to any which now exists.

Commercial Uses of Chestnut

By P. L. BUTTRICK

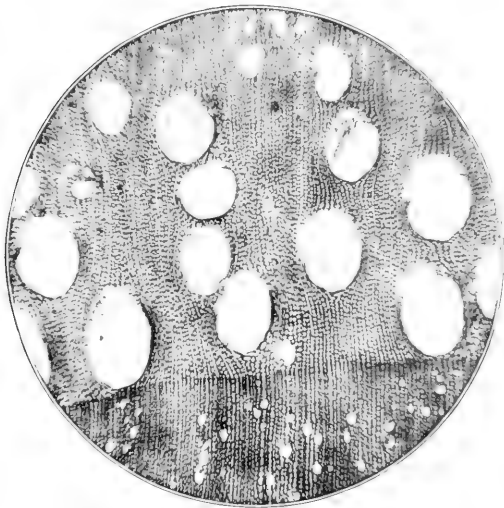
MOST people if asked to name the leading hardwood tree of the United States would probably say, "oak." But that is really no answer for oak is not the name of a single kind of tree, but of many. There are about sixty species of oak in the United States, many of which are of economic importance and help to make up the total cut of that wood

and cordwood for the manufacture of tannic acid and paper pulp, none of which are included in the six hundred million feet of lumber. It is probably safe to say that chestnut has the largest cut of any single species of hardwood in America, for no such enormous amount of material not sawed into lumber is cut from any of the other hardwoods mentioned. Aside from the amount of its cut, it is certainly fair to consider chestnut as one of the leading hardwoods of America.

It also has other distinctions, one being a universal name, something of which few trees can boast. A chestnut tree is always a chestnut tree no matter where it grows. Contrast this with such a tree as the longleaf pine, surely a distinctive enough tree for a distinctive name, yet it has twenty-seven recognized ones. Even our old standby, the white pine, is occasionally found masquerading as the Weymouth pine. Chestnut has even given its name to other trees. We have a chestnut oak and a horse chestnut. The first was named because of the resemblance of its leaves to its namesake, the second because its fruits resemble to a degree those of the true chestnut.

It is most numerous and important in the Southern Appalachian Mountains, where in the State of North Carolina it forms 27 per cent of the total stand, and is the most numerous tree in the forest, occasionally forming almost pure stands, although generally growing in mixture with other hardwoods such as oaks and tulip poplars. Conditions are much the same in eastern Tennessee and southwestern Virginia. In these States most of the stand is composed of virgin timber, but outside of the Appalachians, most of the chestnut is second growth and is apt to be composed of sprouts from old stumps, often several generations having grown up and been cut from the original seedling stump. Here as elsewhere chestnut is apt to have, for its companions, various of the oaks.

No reliable estimate has ever been made of the total stand of chestnut in the United States. It is doubtful if it exceeds 30,000,000,000 feet and is probably nearer 20,000,000,000. The bulk of the supply, as might be expected, is in the Southern Appalachians. North Carolina alone has a stand of 3,375,000,000 feet. Kentucky is estimated to have between 3 and 4 billion feet. It is doubt-



Courtesy Manual Arts Press.

ENLARGED CROSS-SECTION OF CHESTNUT WOOD

Line of demarcation between two annual rings of growth distinctly shown. That portion with small pores and constituting lower one-fourth of picture is summer wood of one annual ring, while the upper three-fourths of picture with large pores is the spring wood of the next succeeding annual ring

which in 1910 was three billion feet. The next highest name is maple which has a total cut of one billion feet, but maple, like oak, is a generic name and covers many different trees. Yellow poplar, better known as the tulip tree to most people, has a cut of about seven hundred million. Red gum and chestnut follow with about six hundred million each. If we include the vast amount of chestnut which is cut for shingles, telephone and telegraph poles, railroad ties, piles, fence posts, mine props

ful if any of the other States in the Southern Appalachian have stands exceeding 4,000,000,000 feet, and no State outside that region with the possible exception of Pennsylvania would come anywhere near that amount.

It is difficult to say how the amount of chestnut compares with that of other hardwoods. It is certainly less abundant than all the oaks grouped together, but may surpass any of them alone. There is without doubt much more of it than of yellow poplar, or any of the higher priced hardwoods such as cherry and walnut. Beyond that it would be unwise to venture, since the other important hardwoods do not generally occur in the same region as chestnut and we have therefore no standard of comparison.

CHARACTER AND USES OF THE WOOD

The heartwood of chestnut is light brown in color, while its sapwood is yellowish or whitish. Chestnut belongs in the same plant family as the oaks, yet its wood



Courtesy Penna. Chestnut Blight Commission.

CHESTNUT FOR RAILROAD CROSS-TIES

Chestnut stands fifth in the list of woods used for railroad ties. These ties are usually gotten out of woodlots by farmers and small dealers and sold to the nearest railroad.

can be easily distinguished from them by the apparent absence of medullary rays, which are those markings that give such a pleasing appearance to quartered oak. These rays are of course present in chestnut but are very inconspicuous. Chestnut is neither a very strong nor a very hard wood, not nearly so strong or hard as oak, but it is very even grained and durable. It will outlast almost all the oaks and most other hardwoods, its durability being due to the high percentage of tannin which it contains. It is light in weight and easily worked and does not warp readily. A cubic foot of absolutely dry chestnut wood weighs 28.07 pounds. The same amount of white oak weighs 46.35 pounds, of red oak 40.76 pounds, of white pine 24.02 pounds, of longleaf pine 43.60 pounds, of yellow poplar 26.36 pounds, of basswood 28.20 pounds, red spruce 28.57 pounds. This places chestnut in the class of light weight woods, and since railroad freight rates on lumber are based on weight rather than board measure, this gives it an advantage in marketing over many of its heavier competitors. A table

of shipping weights gives dry chestnut as weighing 2800 pounds per 1,000 board feet. Tulip poplar and the tulpeo are given the same; basswood and butternut, the latter an unimportant wood, are given as 2,500. All other hardwoods are higher.

This lightness, freedom from warping, durability and reasonable strength, and the high percentage of valuable chemical substances which it contains, together with its great abundance have given chestnut a greater variety of uses than almost any other American hardwood. It



CHESTNUT BOARDS

Both of these are tangential or bastard cut and show the attractive grain often found in the wood

touches almost every phase of our existence. It serves as a shade and ornamental tree on our parks and estates. Its wood is used in the building and decoration of our houses and the manufacture of our furniture. We sit down in chairs made of chestnut and transact our business at desks, ostensibly of oak, but generally of chestnut veneered with oak, we receive messages from the distance over wires strung on chestnut poles. We sit in a railroad train and read newspapers into whose composition chestnut pulp has gone, while our train travels over rails supported on chestnut ties and over trestles built of chestnut piles, along a track whose right-of-way is fenced by wire supported on chestnut posts. On the



Courtesy Penna. Chestnut Blight Commission.

A CHESTNUT SHINGLE MILL

While seventh on the list of woods used for shingles, chestnut is the leading hardwood used for that purpose, its nearest competitor being oak. Shingles made from it are very durable and weather to an attractive shade. These shingles sell locally for from \$2.50 to \$3.75 a thousand.

some train travel goods shipped in boxes and barrels made of chestnut boards and staves. Even the leather for our shoes is tanned in an extract made from chestnut wood. In the Fall we munch hot roasted chestnuts and many housewives feel that they are a necessary part of dressings of various kinds. At last when the tree can serve us no longer in any other way it forms the basic wood onto which oak and other woods are veneered to make our coffins.

ITS EARLY HISTORY

The early settlers encountered chestnut pretty well up and down the eastern coast of the United States, and when food was scarce, if we are to believe our school histories, they were glad to make use of its succulent nuts as a serious part of their diet, even as did the Indians. Surrounded as they were by an unsurpassed wealth of timber, far in excess of their immediate needs, the earliest colonists were able to pick and choose, taking only the best and finest for their homes, using the rest for fencing and fuel, or burning it to rid the fields of its presence. In early New England white pine was the chief building material. Later when the local pine was exhausted it was necessary to fall back upon native hardwoods. Oak and chestnut then began to

be used and many Revolutionary and early nineteenth century houses were built of hewn oak and chestnut frames, oak floors, and chestnut sidings and shingles. Later the opening up of the virgin pineries of northern New York, Pennsylvania and the Lake States flooded the country with white pine and local woods ceased to be so largely used for building, particularly in the cities, but country houses and barns are even yet frequently framed of local hardwood timbers, and one does not have to go back many years to find barns built of heavy hand-hewn chestnut beams put together with wooden pins. Building of such construction will outlast the modern framed buildings built of lighter materials and put together with nails.

In the Appalachian Mountains, even as far north as Pennsylvania, to this day log cabins are built of chestnut logs, sometimes in the round, sometimes hewn square.

The earliest use of chestnut still remains one of its important ones, for chestnut has been a fencing wood since Colonial times. Few woods split lengthwise easier and straighter than chestnut, or are lighter or more durable. Fence rails made of it will last a life time. The early settlers built their fences of chestnut rails,



Courtesy Penna. Chestnut Blight Commission.

CHESTNUT FOR TELEPHONE AND TELEGRAPH POLES

Next to cedar, chestnut is the leading wood for poles in the total amount used annually. When the advent of the telephone and telegraph created a demand for poles it did not take long before the value of the chestnut was realized and east of the Mississippi it outranks all other woods for this purpose.

piling them in the familiar snake or zigzag fashion. This form of fence, often called the Virginia rail fence, requires no posts. All that is needed to build one is an ax, plenty of rail timber, and the ability to work. The early settlers had all three. Later in the north a form of fence came into use in which the rails were mortised into the posts set in the ground. The advent of barbed and woven wire has banished both forms of rail fence in all save the most remote districts. But it has not interfered with the supremacy of chestnut as a fencing wood, for wire must be stretched upon posts. There are woods which make better fence posts than chestnut—red cedar, black locust and osage orange, for instance—but none of them are so widely distributed or universally abundant as chestnut, and thousands of chestnut posts are set annually. Some are sawed, some used in the round, some split out roughly, and some carefully turned to an even taper or an ornamental form. Posts of larger size are frequently used for the foundation of shore cottages and other buildings which are built without cellars. They are not as lasting as cedar, but are easier to obtain in large dimensions, and sufficiently durable.

The advent of the telegraph and telephone created a demand for large poles. At first, apparently, many woods were used indiscriminately, but for a long time the value of chestnut for this use as well as for trolley and electric light poles has been fully realized. Taking the country as a whole, cedar is the chief pole wood, but east of the Mississippi, where chestnut is available in large quantities, it outranks all other woods used for the purpose, and even taking the United States as a whole, 20 per cent of the poles used are chestnut. The reason for its popularity are: its convenient form, tall, straight and slender; its durability; its lightness and its abundance. A 30-foot chestnut pole, 25 inches in circumference at the top, if seasoned, would weigh about 1,000

pounds. A white oak pole of the same dimensions would weigh about 1,700 pounds and would be but little if any more lasting, but would cost much more. Along the sea coast there is considerable demand for piles for docks, trestles, cribwork and the like. Chestnut trees of the proper dimensions, but not straight enough for poles, can often be used in this way.

When white oak and locust began to become too valuable to be used indiscriminately as a tie wood, the railroads of the east adopted chestnut as one of their lead-



HEWING OUT CHESTNUT RAILROAD TIES

Chestnut is one of the leading tie woods of the United States. It is very durable, but because of its softness it wears out under heavy traffic before it rots. Chestnut sprouts from the North make better ties than the slower growing seedlings of the South.

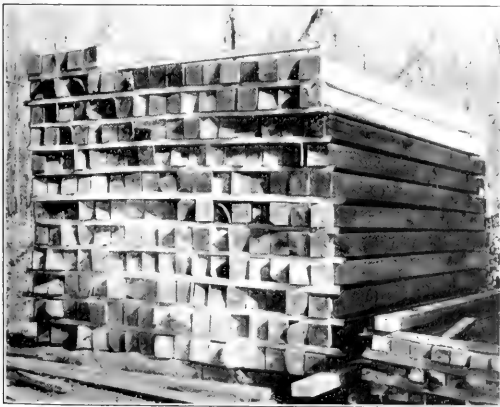


Photo by P. L. Buttrick

CHESTNUT FENCE POSTS

Chestnut, because of its abundance and lasting qualities when in contact with the soil, is one of our leading fencing woods. The advent of barbed wire has decreased the use of rails, but the demand for posts continues. Posts are used in the round, split out, sawed or turned to fancy patterns.

ing woods for this purpose. It was almost as durable as the other woods and much more abundant, but as traffic began to increase and heavier rails and train equipment began to be used it became evident that chestnut, because of its softness, would not stand up to heavy traffic conditions on main lines, and as the use of ties treated with chemical preservatives increased it was found impossible satisfactorily to treat chestnut. For these reasons it has now been largely relegated to use on light traffic branch lines and trolley roads. Nevertheless, it still remains the leading tie-producing wood of New England and the Eastern States. The second growth chestnut of the North is apt to be harder and heavier than

that from the slower growing virgin trees of the South and consequently makes better ties.

The early settlers soon learned that chestnut did not make very desirable firewood, and their descendants have not forgotten the fact. Dry chestnut burns easily and quickly, but it snaps and crackles, throwing out sparks profusely. This makes it undesirable for the fireplace. Yet it is one of the best of hardwoods for kindling, since it splits easily and ignites quickly. Old chestnut rails, posts, etc., frequently find an end to their usefulness as kindling wood. Sometimes chestnut is used in rural dis-



Photo by P. L. Buttrick.

CHESTNUT CORDWOOD USED AS A SOURCE OF TANNIC ACID
Chestnut does not make good firewood, but it is rich in tannic acid and in the South the farmers cut and haul it to the railroads for shipment to the plants where the acid is extracted.

tricts, where the gas range is not, as "summer wood." The fact that it ignites and burns quickly renders it desirable when a light, quick fire is wanted.

CHESTNUT WOOD AS A SOURCE OF TANNIC ACID

Chestnut cordwood, however, has other uses than its rather precarious one of domestic fuel. It is occasionally used in brick ovens, and for annealing brass, but by far the largest use is as a source of tannic acid, for chestnut wood is rich in that substance. Its tannin content averages more than 8 per cent, occasionally running as high as 12 per cent. Hemlock and chestnut oak barks, formerly the chief source of the substance, run somewhat higher, but their wood does not contain enough tannin to pay for its extraction. Over two-thirds of all the tannic acid produced in the United States is now extracted from chestnut wood and bark.

It is used in the manufacture of leather and the dyeing of silk. In the first case, the acid combines with the albumens of the raw hides to form leather, and in the second, the various coloring matters which all vegetable tannins contain act as a dye on the silk fabrics. Although the tannins from the various woods and barks are all alike chemically, they differ in their action upon the hides

because of the various other organic substances and coloring matters which they always contain. The tannin derived from chestnut oak bark is said to give the best results, both in body and color, for sole leathers. Hemlock does not impart such a good color and is used for the less expensive leathers. Chestnut is largely used in mixture with oak tannin for the preparation of leathers of medium grade.

The industry of extracting tannic acid from chestnut wood is largely confined to the South. Chestnut grown north of southern Pennsylvania does not contain a high enough percentage of tannin to make its extraction profitable. The industry centers in southwestern Virginia, western North Carolina and eastern Tennessee, where some twenty plants, with a combined product of perhaps 1,000 barrels of extract per day, are at work. The process is very simple. The cordwood is ground up into small chips, placed in tanks and leached out by hot water. The product is then evaporated to dryness or the required degree of concentration. Although cordwood is gener-

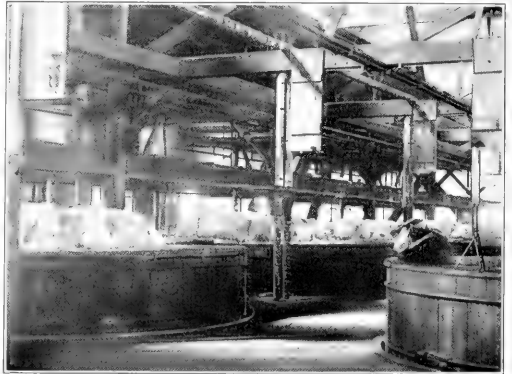


Photo by North Carolina Geological and Economic Survey.

INTERIOR OF A TANNIC ACID EXTRACTING PLANT

Chips of the chestnut wood are placed in the tanks, the tops of which are shown here. Hot water is then added which leaches out the acid. The foam is caused by the boiling of the solution. Tannic acid is used in the manufacture of leather.

ally used, sawmill waste is sometimes employed. Wood from dead timber is more in demand than from live, and some of the plants in North Carolina run almost entirely on wood cut from the numerous dead trees standing along the eastern slope of the Blue Ridge. About 100,000 long cords of chestnut wood per annum are used in this industry in North Carolina alone, while Tennessee uses about half that amount, and the total production is reported to be about 250,000 standard cords per annum.

A few paper pulp plants in the South use chestnut in the manufacture of their product. The plant which uses probably the largest amount of this wood for the purpose has or had a contract to supply the Government with the paper for its postal cards. The tannic acid is first extracted from the wood in the manner described above and chips are then reduced to pulp by the soda process. The chief objection to chestnut seems to be its

color. The pulp must be bleached to a greater extent than that made from lighter colored woods, which fact increases the cost of production, but in view of the great abundance of the wood and its cheapness it is not probable that this objection will greatly weigh against its use.

All the uses to which chestnut is put that we have so far mentioned may be called rough uses. It does not necessarily require a sawmill to manufacture railroad ties, telephone poles, fence posts and cordwood. They are largely gotten out of the woods and sold by farmers and small dealers. There is hardly a New England or Middle States farmer who does not cut ties, poles, and posts from his woodlot in the winter when regular farm work is slack. In parts of the South, farmers regularly depend for a part of their income from the revenue derived from selling chestnut cordwood to the tannic acid and pulp plants of the section. There is no other tree which contributes so many rough products to our modern life, nor in such amounts. Yet the amount of it sawed into lumber entitles it to fifth, practically to fourth, place among all hardwoods or groups of hardwoods cut in this country.

CHESTNUT LUMBER

Chestnut lumber is used for house construction, both interior and exterior. For interior work it is used both for trim, casing, etc., in plastered houses and for ceiling and siding in buildings where plaster is not used. It takes paint well and finishes attractively in the natural wood, but is too soft for flooring or for other places where there is excessive wear. Its local uses for dimension materials has already been touched upon. Yet in spite of its many uses for building and construction it is much more in demand for house furnishing than house building. It is, in fact, one of our leading furniture woods, quite probably surpassing any one of the oaks in volume used, yet, with the exception of panels in wooden bedsteads, kitchen furniture and the less expensive chairs, bureaus and tables, we see little furniture finished in chestnut. Its great use comes as a core stock for veneers, for most of our furniture, even the better grades, is veneered. Tables, desks, bureaus, cabinets and the like are often made of chestnut and covered with thin veneers of oak, maple, cherry, walnut or expensive tropical woods such as mahogany or rosewood. The essential wood of pianos is frequently chestnut, onto which other woods are veneered. Sometimes furniture made of more desirable woods where it will

show is of chestnut elsewhere. This is particularly true of bureaus.

There are two reasons for the popularity of chestnut in the furniture industry. First, it is abundant, light, holds its shape well, does not warp, is not affected by moisture, and can be obtained in wide widths. This makes it desirable for use by itself. Second, its open, porous structure, combined with freedom from knots, pitch or blemishes, and the frequent presence of numer-



Courtesy Penna. Chestnut Blight Commission.

CHESTNUT USED AS INTERIOR TRIM

Chestnut is used for house construction, both in the interior and exterior. It is desirable for trim, casing, etc., in plastered houses, and for ceiling and siding in houses where plaster is not used. It takes paint well and finishes attractively in the natural wood, but is too soft for flooring or for other places where there is excessive wear.

ous small holes, called pin holes, or shot holes, caused by a boring insect, known as the chestnut timber worm, enable the glue which binds the core to veneer to take a good grip, in addition to the other qualities mentioned before, makes it the leading wood for veneer cores. A special grade of chestnut called "sound wormy" is used for this purpose and is in much demand. Chestnut also has a special advantage when used with oak in that its similar color and superficial resemblance in plain section enable it to be finished on sides and ends of tables, desks, etc., whose tops are veneered with oak.

Coffins are hardly to be classed as furniture, yet they are made of much the same woods, and the process of manufacture is quite similar to that of many more cheerful articles. The coffin manufacturers probably use more chestnut than any other wood. It is used solid in coffins and coffin boxes of the less expensive grades, and as a backing for veneered coffins of higher price.

A glance over previous sheets reveals the fact that we have failed to mention chestnut as a shingle wood. Most of our shingles are of soft wood; western red cedar, northern white cedar, cypress, yellow pine, hemlock and

white pine are the leaders. Chestnut is seventh on the list, but it is the leading hardwood, its nearest competitor being oak. In 1909 91,766,000 chestnut shingles were manufactured, which was three times that of all the oaks combined. No other hardwood was important enough for mention. The above figure presumably does not include the large number of hand-made chestnut shingles made in the Southern Appalachians. Chestnut shingles are very durable and weather to an attractive shade. Their chief disadvantage seems to be that the tannin in the wood leaches out and in time rusts the nails with which they are layed. It is also hard to get

otherwise unaffected, so that the wormy material is itself divided into the same grades as the non-wormy. A list of the grades and the wholesale prices per thousand feet board measure for lumber produced at representative southern mills for the first half of 1913 (when lumber prices were more normal than at this writing) is as follows:

| | |
|--------------------------------------|---------|
| Firsts and seconds 4/4..... | \$43.40 |
| No. 1 common 4/4..... | 29.40 |
| No. 2 common and sound wormy 4/4.... | 13.20 |
| No. 3 common 4/4..... | 10.00 |

The prices prevailing at the mills in the early part of 1913 for the various grades into which sound wormy is sometimes divided were as follows:

| | |
|----------------------------------|---------|
| Firsts and seconds 4/4..... | \$17.00 |
| Quarter sawed 4/4..... | 16.50 |
| No. 1 common and better 4/4..... | 14.00 |
| No. 2 common 4/4..... | 10.50 |
| No. 3 common 4/4..... | 8.50 |

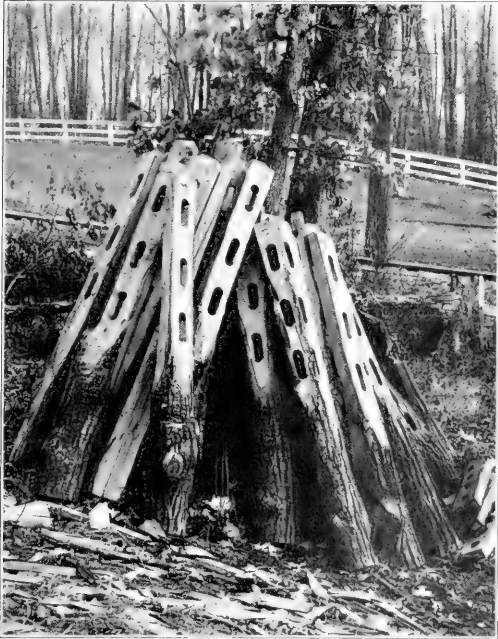
At times sound wormy has averaged as high as \$18.00 per thousand. The average mill run price at southern mills at the period of the above quotations was \$16.50. Chestnut from the southern mills generally commands higher prices than that produced by portable mills from the woodlots of the North, chiefly because of its superior manufacture and grading.

The ten leading States in production are West Virginia, Pennsylvania, Connecticut, Tennessee, Virginia, North Carolina, Kentucky, Maryland, Massachusetts, New York. With the exception of Connecticut and Pennsylvania, the leaders are all in the Southern Appalachians, where over 55 per cent of the total was produced.

Despite its present supremacy, chestnut was long unrecognized as an important producer of lumber. The old lumbermen of the Appalachians took only the poplar and the cream of the oak and basswood, but now operators are going back over the old cuttings and taking the chestnut along with the rest of the other trees.

CHESTNUT AS A NUT TREE

Chestnuts whether roasted or in turkey dressing require no introduction. There are no statistics to show how many bushels of chestnuts are marketed every fall, but one has only to visit the produce houses in our large cities at the proper season—or, better still, the country stores and express offices in the small towns in the Appalachian Mountains—to realize that it is large indeed, for the bulk of the nuts on the market come from these mountains. With the first frost, the women and children seek the woods to collect the freshly fallen nuts, taking them to the country stores, where they are sold or exchanged for other commodities. The storekeepers ship them to market as speedily as possible, for there is always a rush to get the earliest nuts in, since they command the highest prices. As high as \$3.00 per bushel is sometimes paid for the first arrivals. Later the price may drop to almost nothing when the market will absorb no more, but as winter approaches it rises again. Realizing the value of the nuts, some of the mountaineer farmers have selected suitable tracts of chestnut growth on



Courtesy Penna. Chestnut Blight Commission

MORTISED CHESTNUT FENCE POSTS

A great deal of the blight-killed chestnut of Pennsylvania and adjoining States is being used for this purpose

much chestnut shingle stock free from the worm holes previously mentioned, and these cause them to leak. It seems as though it ought to be possible to work up a market for chestnut shingles to be used as side shingles on cottages and suburban residences. Their attractive gray color when weathered is as pleasing as white cedar, and the supply is unlimited. The use of galvanized nail should overcome one difficulty, and leakage through the worm holes would not be important if shingles were laid on sides instead of roofs. Chestnut shingles sell locally for from \$2.50 to \$3.75 per thousand.

GRADES AND PRICES

Chestnut lumber is divided into two groups according to whether or not it contains worm holes, since they are liable to be found in wood of almost any quality. While these worm holes lower the grade, the wood itself is

favored situations, and thinned out the trees so as to develop specimens with large crowns, which results in increased nut production. These places are locally called chestnut orchards. There have been in various parts of the country, notably Pennsylvania, from time to time regular chestnut orchards established for growing chestnuts, but most of them have made use of horticultural varieties of the various European or other exotic chestnuts, since their nuts are larger than those of our native tree. In some cases, however, this exotic stock has been grafted onto our native trees. The coming of the chestnut blight put a summary end to the productivity of most of these orchards. Experiments in spraying and hybridizing different species of chestnuts valuable for nut production to produce a blight-resistant



Courtesy Penna. Chestnut Blight Commission.

CUTTING SLACK STAVES FROM CHESTNUT STAVE BOLTS

Chestnut is one of the five leading woods used in the slack stave industry.

form may, if successful, allow these orchards to be re-

established.

Chestnut in the Future

ASIDE from its value for all sorts of uses, chestnut was long regarded as a valuable woodlot tree, because of many of its other qualities. A tree to succeed in the average farm woodlot must be quick growing, and chestnut is easily that; there are few hardwoods in its range which grow faster. In the South chestnut sprouts frequently attain fence-post size in 10 or 15 years, and tie size in 25 years. In the North farmers used to be able to depend on obtaining ties from chestnut trees 35 or 40 years old. Another fact which gave the tree such a value in the woodlot was the prolificness with which it sprouted. If you cut down a chestnut tree, you get many chestnut trees in its place, for, unless the tree is very old, a large number of sprouts spring up from the stump and grow like weeds, in a few years forming a group of thrifty young trees. In New England and the Middle States farmers took advantage of this sprouting capacity, which is possessed to a lesser degree by the other hardwoods of the region, and cleared off their woodlots every 30 or 40 years, trusting to the sprouts to grow up and form a new stand. It was a rough application of the well-known forestry system known as the *simple coppice* system.

The combination of desirability for many uses, particularly those not requiring extensive manufacture, together with its rapid growth, have made chestnut the leading woodlot tree of the Northeast. When foresters began to study woodlot conditions, they discovered much about the chestnut which the farmers already knew, and

they advocated not only favoring the tree in the woodlot, but its extension, and many chestnut plantations were made as a result of their advice.

But its popularity was short lived, for today, notwithstanding all its good points, it is no longer upon the forester's list of desirable trees, and, far from encouraging it, he is advocating its removal from the woodlot as speedily as possible. Enemies now attack this tree on every side, and it is very poor forestry to favor a tree against which nature has so definitely set her hand. The chestnut has been practically exterminated over whole sections where formerly it was common, and in many others it is now being destroyed by the wholesale. Its enemies bid fair to destroy it as a commercial tree, perhaps to push it to the borders of extinction.

One of these enemies has risen with almost drastic suddenness. Less than fifteen years ago the chestnut blight was unknown to the scientist or the woodsman. Seven years after the discovery, in 1904, near New York City, of this undesirable alien from northern China it was conservatively estimated to have done \$25,000,000 worth of damage. At present it is found from Maine to North Carolina, and it is thought that it will all but exterminate the chestnut in the Northern States, where already it has destroyed its commercial value in many places, and may invade the South with like disastrous results. At a recent meeting of the lumbermen of southern New England it was the consensus of opinion that ten years or less will see the end of chestnut as a com-



Photo by P. L. Buttrick.

UTILIZATION OF CHESTNUT

This Southern Appalachian farmhouse is built entirely of chestnut. Everything except the boards over the windows and at the gables is hand hewn—side boards, rafters, shingles and floor boards. The rail fences in the background are built of chestnut posts and rails. Even the poles supporting the haycock are chestnut. All the material was cut from the forest growing close by.

mercial species in that section, for no way has been found to definitely check its ravages, although the National Government and some of the States have spent large sums in the attempt.

So the forester is recommending the removal of all chestnut of commercial value in the region of blight infestation in order that it may be marketed before it is destroyed, for dead chestnut deteriorates rapidly in value. At the same time the removal of much of the chestnut may help to check the rapid spread of the disease.

The other enemies of the chestnut have confined their attacks largely to the southern portion of its range. They have been at work much longer than the blight and have in the aggregate caused a much greater damage, but their ravages spread less rapidly, and have not been as fully discussed or studied. In fact, there is much that we do not know about them. There seems to be a combination of insects, fungous diseases and fire, or perhaps something more deep seated, such as a widespread but obscure soil or climatic change, of which the others are but manifestations or subordinate causes, destroying the chestnut in the South. The trees generally die in midsummer and, unlike blight-killed trees, seldom sprout from the stump after the trunk is killed. Certain insects, notably the two-lined chestnut borer (*Agrylus bilineatus*), are almost always found under the bark of the dead or dying trees, but whether as cause or effect has sometimes been a matter of dispute.

Formerly chestnut grew pretty well over the entire South, east of the Mississippi River and north of Florida. But about seventy-five years ago it began mysteriously to die out throughout the lowland portions of the region and today it is a disappearing straggler of no commercial importance everywhere except in the mountains, its former abundance being attested by old stumps, rotting logs, weathered fence rails, and the tales of the old inhabitants. Even in its Appalachian stronghold, where it reaches its

greatest development and abundance, this strange dying off is going on in a few sections. At this time it is particularly active along the lower slope of the eastern side of the Blue Ridge, where whole mountain-sides are covered with gaunt white trunks of trees killed within the last few years.

Thirty years or less at the present rate of cutting will exhaust the supply of virgin chestnut timber in the Southern Appalachians, and outside of that region there is little to fall back upon save the second growth from such scattered woodlots as have escaped destruction. If the blight and the other agents of destruction continue their devastation, it looks

as though within our lifetime the chestnut will have to be added to that melancholy list of American plants and animals, like the buffalo and the black walnut tree, of which we say "formerly common, now rare."

ALASKA'S FIRE LOSSES

CHIEF FORESTER H. S. GRAVES, on his return to Seattle from Alaska recently, was quoted by a newspaper as saying that enormous damage has been done in Alaskan forests by fire. Mr. Graves said: "The great interior river systems were originally wooded. I would estimate that in the last fifteen years there have been burned not less than a million acres a year.

"This summer, which was unusually dry, the total loss is one or two times the average. Yet the government is not taking a single step to protect these forests.

"In August I passed through more than 100 miles of forest burning or recently burned, along the Valdez-Fairbanks trail. Many culverts, bridges, corduroy and telephone poles had been destroyed.

"The actual damage to the Valdez trail itself is as much as it would have cost to have prevented fires."

WOOD PULP IN ARGENTINA

AS THE result of experiments carried out by a Swedish paper expert, it has been ascertained that Argentina produces a tree in abundance which provides excellent raw material, better even in quality than that usually employed in making paper pulp in both Europe and the United States. This tree is the *Araucaria imbricata*, a picture of which may be seen in AMERICAN FORESTRY for August, page 850.

The Principles of Landscape Forestry

The Art of Managing Pleasure Woods, in Which Profit
Is of Less Importance Than Sport or Beauty

BY WILHELM MILLER

Division of Landscape Extension, Department of Horticulture, University of Illinois.

DURING the eleven years when I frequently visited great estates I had the good fortune to meet many persons who owned exceptionally beautiful woodlands. When my advice was asked about the management of these woods I at first referred the owners to the regular foresters. But soon I began to receive complaints that the professional men could not get the point of view of their clients. One trouble was that the commercial forester wanted to cut down at once all the trees that the owners valued most. When profit is the aim it is quite right to harvest mature trees, but when a man is keeping woods for pleasure he does not like to see all his biggest trees cut down. A man of twenty or thirty may be willing, because he expects to see another generation of trees grow to their full beauty, but a man of fifty or sixty expects to enjoy his woods only ten or fifteen years. Therefore, much has to be planned for that brief period, especially when the next generation may not keep the place. Your Wall Street man is not a sentimentalist in business, but he is a sentimentalist about his country home and he has a peculiar sense of comradeship with mature trees. He recognizes that they have a long record of solid achievement, like his own. He himself would not like to be rudely set aside by the world just when his judgment is best, and he does not like to have his trees swept away just when their beauty is mellowest. The thought of selling such trees for profit is as repulsive to him as betraying one's friends for money. The average captain of finance would rather spend money to prolong their lives. And, under the circumstances, can you blame him?

The great mass of mankind has a similar attitude about street and shade trees, and that is one reason why the tree-mending enthusiasm swept the country a few years ago. As an editor I encouraged that movement, and even now I cannot believe, as some do, that it has done more harm than good. On the contrary, tree surgery has saved thousands of grand, historic trees that otherwise would have perished of neglect. Moreover, it has educated the general public to take better care of trees. The commonest charge made against the tree surgeons is that their prices are too high. Granting that this may be true, and



Photo by A. G. Eldredge.

BEFORE REVEALING A VISTA INSIDE THE WOODS

Across this stream is an uninteresting mess of young trees, mostly of short-lived species, like the soft maple. The removal of three small trees near the center of this photograph will give a fine terminal feature or vista-point.

a serious matter with people of moderate means, it is not an unmixed evil, for the more a person pays to save a tree, the more he is likely to love all trees and to help to save them. Another complaint that commonly reached me was that the tree doctors' system of charging by the

half the trees, but a man dislikes sacrificing a tree into which he has put a lot of money. Landscape gardeners assert that they often have trouble about cutting or improving views because of trees that have been much patched by menders. I believe that the tree surgeons can be often employed to advantage in their specialty, but I have yet to meet one who understands the principles of "landscape forestry," as people are now beginning to call the art of managing woodlands for pleasure rather than profit. For the best advice, owners should turn to those landscape gardeners who have special knowledge of this subject.

DRAINAGE OF WET WOODS

One of the first principles in the design of pleasure woods is to make them healthful and comfortable. There are generally swampy spots where mosquitoes breed, and some of these may be the malaria-breeding kind. A good landscape gardener understands enough about engineering to solve such problems, without the needless destruction of beauty which engineers commonly inflict. It is easy to drain woods too thoroughly, so that the water-loving flowers will not thrive. The landscape gardener is always on the watch for a chance to make a water-lily pool by digging out part of a swamp. In such case the mosquito problem is solved by means of goldfish. Another point the engineer is likely to miss is a chance for a bog garden, where the finest hardy orchids, pitcher plants, and fringed gentians can be grown in beautiful sphagnum moss. These bog gardens are not as wet as



Photo by J. Horace McFarland.

A POOR VIEW OF WOODS FROM OUTSIDE

The ordinary woodlot has a sharp browsing line made by cattle. The commercial forest is still more artificial, especially when composed of a single kind of foreign tree, set in rows and trimmed up. Neither type has charm because one can see straight through the woods and nothing is left to the imagination.

day or hour gives them a selfish interest in making as much work as possible. Consequently, they are said to put a lot of expense into old wrecks that have little beauty or other value. City foresters declare that the average street would be improved by cutting out about



Photo by A. C. ...

A BETTER VIEW OF WOODS FROM THE OUTSIDE

every makes a piece of woods look deep, rich and mysterious. The fringe at the left is composed mostly of Western crab apples, *Pyrus locustis*, like the one in bloom at the right.



A VIEW FROM THE INSIDE OF A WOOD TO THE OUTSIDE

The shrubby border at the edge of a forest should be opened whenever there is a good view of farmhouse, water, hill or other attraction. This is the home of an Illinois farmer, Mr. J. H. Sconce, of Sidell, as seen from the woodlot which he has restored with native shrubs and wild flowers.

the name may suggest, for they have good, dry walks. I have seen some famous examples in England that contained many choice species of lily, primrose, azalea, and rhododendron that bloom only in bog gardens. There is a good American example near Haverford, Pa., on the estate of the late Clement A. Griscom, where the tall, yellow-flowered pitcher plant of the South makes a wonderful impression.

DRIVES

A second principle in landscape forestry is accessibility. The lives of society people are so full that some estate-owners rarely visit their own woods more than once or twice a year—especially if there are no drives. Some ladies cannot walk far, and even the most enthusiastic trampers often feel in the mood for a woodland drive. I believe that Mr. Julius Rosenwald has done well to have his main drive follow the ravine from the entrance to the house, at Ravinia, Ill., for in this way he is sure to see the main woodland beauties of his summer home every day. His case is somewhat exceptional, however,

and should not be considered a precedent for violating the sanctity of deep woods by allowing noisy motorists to speed through. It would be a shame to spoil Starved Rock Park, for instance, in this way. Architects are apt to extend one of the axes of the house far out into the landscape, and their straight drives through woods are often painfully artificial, to say nothing of missing some of the finest natural features. Some of the famous lanes made by Mr. Paul Cravath and others near the country club at Glen Cove, N. Y., come under the head of landscape forestry and have caused a revival of riding under delightful conditions. Some sort of wood road is nearly always necessary for practical purposes, such as the removal of dead trees and other inflammable material. Mr. Bayard Thayer, of Lancaster, Mass., prepared for the coming of the gypsy moth by making a road system so elaborate that every tree can be reached by spraying.

TRAILS

The making of trails seems to appeal to all classes, rich and poor, old and young—probably because it awakens the spirit of discovery. I have known very wealthy men who never cared to do any gardening with



AN OUTLOOK THAT HAS BEEN MAINTAINED FOR A QUARTER OF A CENTURY

This cutting was made by W. C. Egan, of Highland Park, Ill., to give a glimpse of Lake Michigan. The passing boat is more apparent to the eye than to the camera and is more picturesque when framed by foliage than when seen in the open.

their own hands to don khaki and pick up the hatchet with the greatest enthusiasm when they once got the idea of blazing trails. A man who has created an immense new business may be afraid to lay out a system of trails in his own woods, without expert advice, until he understands how the finest vistas are quickly created by intelligent use of the axe, rather than by the slow and pottering work of raising flowers from seeds. We can grasp the main features of the great art of vista-making by briefly considering, first the general appearance of the

The most beautiful woodlands in the world, according to many experts, are those which have the very real quality commonly known by such impractical-sounding names as seclusion, mystery, or charm. This effect can generally be secured simply by restoring to the woodland its natural fringe of shrubs and small trees, such as hawthorns, dogwoods, and viburnums. I once took a photographer from New York to Massachusetts to picture the superb edging of Mr. Thayer's woods. Under Prof. Sargent's direction Mr. Thayer had cut heavily into his



Photo by Mrs. Lew Wallace, Gale Farm, Galesburg, Ill.

A NATURAL GLADE IN TYPICAL MIDDLE WESTERN WOODLAND

Just the place for a campfire, players' green, or wild garden. Like a sentinel, at this natural gateway, stands a hawthorn, with horizontal branches that connect this type of woodland with the great prairie outside

woods in the landscape, second the views from the interior to the outside world, and third the vistas that are wholly inside the woods.

VIEWS OF WOODS FROM OUTSIDE

Seen from house or grounds, the average farm woodlot is a singularly unromantic proposition compared with wild forest. This is chiefly due to the browsing line made by cattle, since they eat the foliage as high as they can reach. I am not denying that the familiar deer parks of England look very good to the unaccustomed eyes of an American, for this type of beauty has been ripening for a century or more, and the wide-spaced trees are all handsome specimens. But the ordinary American woodlot is crowded with undeveloped trees, and, worst of all, one can see right through them at a glance. There is nothing left to the imagination except, perhaps, the amount of money the farmer got for the hogs that have destroyed every growing thing beneath the trees.

forest so as to bring his most valuable trees into view from the house. These are white pines, which were formerly lost in the woods, but now have developed splendidly on the side exposed to the sun. These stately evergreens are now connected with the meadow by a self-grown border of hawthorns and other shrubs which are attractive the year round, while in the spring they make a show of blossom such as the ordinary cow-spoiled woodlot never gives.

Such a shrubbery border should not be a complete circle, for the woods look much more inviting when one can see a driveway entering them, and it is often best to cut deep enough into the woods to make at least one fine view from the living room. Mr. Thayer has cut many acres of big trees in order to get a series of fine woodland views from his terrace. One cut goes clear through the main forest in order to show a lake. Another goes into the wood far enough to reveal a magnificent mass of mountain laurel. Country clubs are now



Photo by Fuermann.

A GLADE CARVED OUT OF A MIDDLE WESTERN WOOD BY A LANDSCAPE GARDENER

This is one of a series of outdoor living rooms in the woods, each of which is entered through a pair of stratified hawthorns like the one in the picture on page 972. Designed for Mr. Hibberd, of Winnetka, Ill., by O. C. Simonds. This glade is bordered with native pilox and madonna lilies. Col. F. O. Lowden has one bordered with wild flowers. A wilder and more permanent effect can be had with native shrubs.

beginning to do things like these, as the old straight gashes commonly made on links cannot long please the cultured members of society.

VIEWS FROM INSIDE OF WOODS TO THE OUTSIDE

Owners of pleasure woods generally wish a drive or walk around their forests near the edge. This instinct is justified, for most people tire of any one type of scenery unless they are refreshed by occasional glimpses of a different sort of beauty. Therefore, the owner and his advisor should go clear around the woods, keeping near the margin, to locate the best and worst outlooks. Often it is necessary to screen some unsightly object, for it is unpleasant when roaming the woods to come suddenly upon the village dump, a neighbor's barnyard, the shacks of laborers, or a line of poles and wires. It is very pleasant, however, after having no glimpse of the outside world for a quarter of an hour to come unexpectedly upon a masterful cutting that reveals a beautiful house in the distance, especially if it is your own home. Mr. Harvey J. Sconce, of Sidell, Ill., who is one of America's genuine country gentlemen, has a good view

of his house from his woodlot. I shall never forget the thrill with which I first glimpsed the dome of our National Capitol down a man-made vista through the woods. There must be hundreds of people around Washington who might make a dramatic framework for this great architectural picture. One of the earliest vistas in the Middle West was cut through woods at Gambier, Ohio, to show a church spire, while another looks down to a small river. Sometimes a broad slash is necessary for a mountain view, like the best outlook to the Orange Mountains from the Essex County park system in New Jersey. Most people, however, having no chance for a view of noble buildings or some great natural spectacle, are apt to overlook the little vistas. The landscape forester can often discover many of these fine bits by the very simple expedient of bending the knees up and down. One is able to see farther through rather dense woods from such a position than when standing upright. It is not always necessary to own costly ocean or lake frontage in order to get such glimpses. For example, Col. H. L. Higginson, at South Manchester, Mass., has a fine view of the sea through woods, and Mr. W. C. Egan,

whose three-acre place at Highland Park, Ill., has been an inspiration to many thousands of home-builders, has maintained for twenty-five years a cutting through his woods which affords the tiny picture of Lake Michigan shown on page 971.

A dozen little vistas through woods to such simple features as meadow, rocks, tree, brook, or waterfall will lift a commonplace woodlot into the class of art works.

VISTAS INSIDE THE WOODS

I sympathize with those people who like absolute wildness and heartily believe in leaving a portion of the woods entirely alone, if such a thing is possible. Ordinarily, however, when woods are simply neglected, insects and diseases kill or disfigure most of the trees, while the survivors grow too high for their leaves, flowers, and fruits to be seen with ease. Moreover, one can hardly see even the trunks of the biggest trees because the little ones are in the way. To enjoy a century-old oak one must be able to see it far off enough to get an idea of its height, spread, and character.

Consequently, it is generally wise to cut vistas to the largest trees and to make these vistas parts of the system of drives and trails. Any beginner can understand this principle, but if he cuts at one operation all the small trees surrounding a big one, he is likely to kill the best tree by too much sunlight. It is often prudent to thin about one-fourth of the surrounding trees. By this method the central tree becomes gradually accustomed

to enduring more light. Anyone who thus pays honor to a favorite tree, as suggested in this article, is not likely to go back to the old sentimentalism which forbids all use of the axe. On the contrary, he is likely to become ardently enthusiastic about landscape forestry. He tramps the woods to discover the largest rocks, and those of the strongest stratification, finest color, richest moss, or rocks with trees growing through them. He seizes upon every glade as a chance for a campfire, players' green, or wild garden. And he tries to bring all the best features into a system of trails. Some prefer to carry a can of red paint, instead of a hatchet, and give a dab with the brush to every tree that is to feel the axe during the winter or whenever convenient.

WILD FLOWERS

One of the main objects of landscape forestry is the production of great masses of wild flowers that will multiply without care and betray no work of man. It is pleasant to see thousands of hepaticas, blue, white, and pink, or of bloodroot flowers glancing in the April sunlight, wild blue phlox by the acre, and American bluebells carpeting the forest floor so thickly that one cannot step off the trail without crushing the flowers. (See page 975). The woods were once as floriferous as the picture below and the modern watchword is restoration. A landscape gardener of Chicago has sent me an itemized list of \$6,000,000 worth of work that he has done since



Photo by Jens Jensen, Landscape Architect

RESTORATION OF THE WILD FLOWERS IS ONE AIM OF LANDSCAPE FORESTRY

This natural "sun-opening" in a Wisconsin forest is full of the large blue flag *Iris versicolor*, suggesting the abundance of wild flowers before man's interference. Mr. and Mrs. C. L. Hutchinson have an iris glade in their woods at Lake Geneva, Wis.



Photo by G. A. Eldredge.

A FAVORITE THEME OF RESTORERS—AMERICAN BLUEBELLS

Perhaps the finest blue flower of the woods in spring is *Mertensia pulmonarioides* (*M. virginica*). The sky-blue trumpets have a perfect foil in the pink buds. Large colonies have been restored by Mr. and Mrs. Cyrus H. McCormick, at Lake Forest, Ill.

1901, in which restoration is the leading idea, and much of this has been done in woodland. One of the finest restorations I have seen is at the summer home of Julius Rosenwald, Ravinia, Ill. Here, water has been supplied to a typical ravine of the Lake Forest region, and canoeing is now enjoyed for a distance of 1,000 feet on a winding stream whose wooded banks are brilliant with wild flowers in such profusion as one never sees in woods that are open to the public.

METHODS OF WILD GARDENING

A masterfully simple method of producing great colonies of wild flowers is to thin out the trees enough to encourage wild flowers but not enough to encourage grass. You remove most of the crooked, diseased and spindling trees and sacrifice many perfect saplings of the short-lived species in favor of the long-lived kinds. Such work should generally be distributed over four years. It makes a marked improvement in general appearance at once.

This method can be supplemented by broadcasting seeds of desirable species that can be cheaply collected

in the neighborhood. Occasionally one finds great quantities of berries, such as wild grapes, viburnums, dogwood, shadbush, bittersweet, and partridgeberry. Sometimes it pays to buy seed in bulk from seedmen. I have never seen any large results from haphazard sowings; it is better to keep good records of the kind and quantity sowed, the location, date, and circumstances. There is a good deal of waste in this method and it is not the quickest way, for perennials rarely bloom the first year from seed. Hawthorns and the like do not germinate until the second year and are slow-growing.

For immediate effect it is necessary to use plants rather than seeds. Since these cost more, they are set only at the points of greatest interest. For example, vines and shrubs are planted at the entrance to the woods, and perennials are put beside the trails, from which they will gradually spread to the heart of the wood. Beside the spring or brook one plants forget-me-not, marsh marigold, sweet pepper bush, winterberry, or hobble bush. Where winter color is wanted, bittersweet, Washington and cockspur thorn, mountain ash, partridgeberry and wintergreen are often suitable.

Those who wish to carry the subject of landscape forestry further will enjoy collecting a small library of inspiring and helpful books. "The Wild Garden," by William Robinson, is a classical work which every country gentleman should possess. A delightful way to learn the wild flowers, etc., is to have some of the popular, illustrated books like Dane's "How to Know the Wild Flowers," a similar work of pocket size by F. Schuyler Mathews, Keeler's book on shrubs, and "The Tree Book," by Julia E. Rogers. In propagating plants of all kinds Bailey's "Nursery Book" is valuable. There are many dealers who sell bird houses and other apparatus for



Photo by A. G. Eldredge.

AFTER REVEALING A VISTA INSIDE THE WOODS

This magnificent specimen of the burr or mossy-cup *Quercus macrocarpa* will be brought into the lives of the children in the excellent kindergarten at Brookfield, Ill., if three small trees are sacrificed. The oak is about three feet in diameter and more than a hundred years old.

attracting the birds. Write to the United States Department of Agriculture for McAtee's "Plants That Attract Birds" and ask the National Association of Audubon Societies, 1914 Broadway, New York, for its literature, especially about Baron von Berlepsch's methods of attracting woodpeckers, since these are the greatest destroyers of insects that harm forest trees. Bailey's Standard Cyclopaedia of Horticulture describes every species of tree, shrub, vine, and wild flower that is offered for sale in America, and practically everything worth having can be had from nurserymen or collectors. As it is not customary to print the names of tradesmen in articles, I have deposited with the editor of AMERICAN FORESTRY the names and addresses of four or five nurserymen and collectors who advertise every wild plant that the average person can think of and many more.

Some of these catalogues are attractively illustrated and anyone who owns a bit of woods should send for all of them.

THE LARGEST TREES

THE American Genetic Association of Washington, D. C., has announced the award of two prizes of \$100 each for the location of the largest nut-bearing and non-nut-bearing trees in the country.

The largest nut-bearing tree is a valley oak on the ranch of B. F. Gruver, San Benito County, Cal., in the foothills of the Sierra Nevada Mountains. This lordly tree measures 37 feet 6 inches in circumference. It is near the city of Stockton, and the natives, who declare that it produces a ton of acorns every year, take pride in it.

It is expected that the "discovery" of this tree will be at once a surprise and a disappointment to the friends of the famous Hooker oak of Chico, Cal., named for the English botanist, Sir Joseph Hooker, who, in 1872, declared that, so far as encyclopaedic knowledge went, it was the largest oak in the world. Several persons sent in photographs of the Hooker oak, which, however is only 21 feet 8 inches in circumference, although it rises to a height of 105 feet.

The largest tree in the non-nut-bearing class of hardwoods disclosed by the contest is a sycamore near Worthington, Ind. This tree is 150 feet high, after having had its height considerably reduced by lightning and wind. It has a spread of 100 feet and its trunk 1 foot above ground is 45 feet 3 inches in circumference, while its east branch measures 27 feet 8 inches around and its west branch 23 feet 2 inches.

The second largest nut-bearing tree disclosed by the contest is a chestnut 3 miles from Cresmont, N. C., on the main range of the Big Smoky Mountains which divide North Carolina and Tennessee. This tree is 75 feet high and has a circumference of 33 feet 4 inches.

It is announced that the contest confirms the fact that the sycamore is the largest hardwood tree in North America. Yellow poplar ranks next to sycamore in point of size among the non-nut-bearing hardwoods. One of the photographs submitted in the contest was of a yellow poplar near Reems Creek, N. C., which is estimated to be 198 feet in height and 34 feet 6 inches in circumference.

TO A MOUNTAIN ABOUT TO BE LUMBERED

BY PAULINA BRANDRETH

A monument of ageless time
Snow-piled against the evening skies,
Thy slopes in timbered splendor rise,
Each tree encased with frosted rime.

And lo! upon thy glistening crown
Benign, the rising moon looks down.
O mountain, could thy forests be
Left to the moon's sweet charity!

The Bird Department

By A. A. ALLEN, PH.D.

Assistant Professor of Ornithology, Cornell University

The Departure of the Birds

EVER since the last of July the birds have been leaving, but the diminution in their numbers has been so gradual and the entrance of others from the north has been so inconspicuous that probably few people have realized that a migration has been in progress. It is not until October that most of us recognize that the birds are departing. For the fall migration is very different from that of the spring.

In the spring the coming of the birds is so conspicuous a part of the change from winter to summer that it has been heralded since biblical times and even earlier. But in the fall there are no bright colors, no joyous songs to announce the passing. In silence the birds slip past us and few are the chronicles that record the travels of the modestly attired wayfarers which, after the nestling season, begin the long flight to the south, some of them travel over 8,000 miles from Alaska to Patagonia, many of them but a few weeks out of the nest and making the journey for the first time, and all with no compass to guide them.

THE DEPARTURE OF THE BIRDS

It is not surprising that birds in migration have fascinated mankind, not surprising that governments employ scientists to study and investigate them and little wonder that thousands of people, scientists and laymen, spend much time following the birds in an effort to learn their secret. The facts which have been discovered have relieved us of much of our ignorance but the great mystery of how migration originated still remains and we can, at best, offer but theories to account for it.

Let us first consider some of the more interesting phases of migration that modern investigation has thrown light upon. It is now a matter of common knowledge that all birds do not migrate. Many species in the north are able to accommodate themselves to the rigors of winter and never pass out of the neighborhood in which they are raised. The chickadees, nuthatches and woodpeckers that come to one's feeding station in winter, in northern United States, remain in the spring to nest in the vicinity, while in the south, the familiar mockingbirds and cardinals are ever present. The farther south one goes, the larger is the percentage of non-migrant birds until one reaches the tropics where no real migration occurs. Even here, however, the coming and going of our northern species are conspicuous features of the bird life, and there is probably no place in the world where migrating birds are never seen. In places of the same latitude, however, migration is more pronounced in some

than in others, reaching its maximum in eastern United States and western Europe, and being much less pronounced in the southern than in the northern hemisphere.

Between the birds that do not migrate at all and the Arctic tern which migrates 10,000 miles twice a year between its Antarctic wintering ground and the Arctic shores where it nests, there are all gradations of migrants.



A PAIR OF BOBOLINKS

These birds nest in the northern part of the United States and winter in Brazil. Each year after traveling ten thousand miles they return to the same meadow.

Some birds like the meadow lark, robin, bluebird and chipping sparrow which nest throughout most of United States and Canada, merely withdraw into the southern part of their breeding range during the winter while their places are taken by such birds as the tree sparrow, snow bunting, pine grosbeak and siskin that nest in northern Canada and migrate in winter as far south as northern United States. Other species that nest in northern United States and Canada, such as most of the flycatchers, warblers and vireos, pass out of the United States

entirely and spend the winter in Central America or northern South America. A few species like the bobolink, night hawk and golden plover, pass over the mountains of northern South America to winter on the pampas of Brazil and Argentine, while a few others amongst the shore birds, the knot and yellowlegs, for example, wander to southern Patagonia.

One of the strangest features of the migrations of some of these birds that winter in South America is



THE CHICKADEE

One of the birds that does not migrate and which is enabled to accommodate itself to the rigors of the northern winter. The nuthatches and woodpeckers also share the northern winter with it.

that they pursue different routes in the spring from those in the fall. The golden plover, for example, which nests along the Arctic coasts of North America in the fall, fly southeast to Labrador and thence due south to South America, a few stopping along the Atlantic coast. But the majority fly directly over the sea, a distance of about 2,400 miles, to the north coast of South America and thence to Argentine. At this time of the year they are never seen in the Mississippi valley. In the spring, however, they strike United States along the Gulf coast, and all migrate up the Mississippi valley, at this season never being seen along the Atlantic coast.

But this double route is the exception. The vast majority of birds just move southward after the breeding season, following the routes where food is most abundant, shunning areas where food is scarce, until they finally reach their winter quarters. In the spring they move northward along the same highway.

The fall migration is marked by much more dallying than the spring and by much more wandering, some birds delaying their actual migration by trips to the north, east or west. There is no hurry so long as food is

abundant, and some birds like the snipe, woodcock and many species of ducks remain until pressed for food by the killing frosts or the formation of ice over their feeding pools. Most species, however, start southward while food is still abundant.

The fact that so many species leave long before food becomes scarce makes the reason for their going the more strange and brings us to the question of why they migrate and how they know when it is time. The regularity with which birds arrive in the spring has been observed since ancient times, but it has not been until the modern investigations that we have understood the delicate physiological adjustment which records time for the bird almost as accurately as a timepiece. The physiological cycle is as precise in a healthy bird as is the revolution of the wheel of an engine. The bird's year begins with the slightest increase in the size of the reproductive organs, for they are not, as in some of the higher ani-



THE MEADOW LARK

These birds, which nest throughout most of the United States and Canada, merely withdraw into the southern part of their breeding range during the winter while their places are taken by such birds as the tree sparrow, snow bunting, pine grosbeak and siskin that nest in northern Canada and migrate in winter as far south as northern United States.

imals, of constant size throughout the year. The increase is a sign that the breeding season is approaching and with migrating species there comes the concomitant instinct to migrate and the bird begins its journey to the breeding ground. If there were no such thing as weather, if food were always equally abundant, the bird would arrive at its nesting ground on exactly the same day each year. Indeed, this is said to be the case with some of the sea birds, notably the puffins, which are little affected by the weather. They spend the greater part of the year

at sea, but each year on exactly the same day they appear on their breeding islands.

The first birds to migrate, like the robins and blackbirds, are the least punctual because in the early spring the weather is least settled. The later migrants become more and more punctual as the weather becomes more uniform until with those birds coming after the first of May we can prophesy the day of their arrival at any place with considerable accuracy.

Now if birds had no enemies and always hatched their first eggs successfully, it is probable that the fall migration would be equally regular, because after the breeding season the reproductive organs begin to decrease in size just as they grew in the spring. But many birds have to make several attempts before they raise a brood successfully, and while they are still feeding their young in the nest, others of their species are ready to leave. Some species, however, wait for a second or even a third brood, but the majority are ready after the first brood to enter once more upon a care-free existence. Some species, like the swallows and blackbirds, assemble in large, conspicuous flocks before migrating, but others just slip away unnoticed, usually the old birds first, followed later by young of the year. It is the periodic changes in the reproductive organs, then, that tells birds when to migrate and the concomitant instinct impels them to go.

But this does not explain how and why birds came to migrate in the first place. It may explain how the instinct is maintained, but not how it has been developed. For this, of course, we have to resort to hypotheses. Without going into detail, it may be interesting to review the one which receives greatest credence today. It is founded upon two beliefs which we now look upon almost as facts: first, the origin of bird life upon this continent, and secondly, the coming of a glacial period or ice age when most of the birds were again driven out.

In North America, it is undoubtedly true, that we have received our birds from two sources: from South America and from Asia by way of Alaska. We know this because some of our species are almost identical with those of Europe and Asia, while others are very similar to South American forms found nowhere else in the world. If we can imagine the South American birds, in ages past, gradually spreading northward because of an overcrowded condition or because of the natural instinct, inherent in most organisms, to cover as much territory as possible, we would find them eventually coming into a land which, while similar to that of their progenitors during a part of the year, was entirely different during winter and unsuited to their needs. They were, therefore, able to occupy it only during the summer months and each winter had to retire southward. This would have been sufficient to eventually form a migrating instinct of considerable power and regularity, but it does not explain all the variations in route and distance travelled which we see today.

During the numerous geological ages that have ensued since birds first came into North America, the continent and the climate have seen great changes. North America

has changed from a mild, semi-tropical land to one covered with snow and ice and back again to a land of decided seasons. If we think of birds as having become established during the semi-tropical times, even without any decided migrations, we can still think of them developing this instinct to migrate under the stress of the slowly approaching ice age, the birds being driven southward to seek quarters in an already overcrowded tropics, and striving northward with each returning spring and



THE TREE SPARROW

This bird nests in northern Canada and in winter migrates to the northern part of the United States. Just what the sense is which directs migratory birds to return to the same place year after year the scientists do not know.

recession of the glaciers only to be forced back again the following winter.

One might follow this thought into great detail and show how the various routes followed by birds between North and South America may have been evolved, but we cannot take space for it here. There remains one other problem which seems even more mysterious than the origin of migration, and that is how birds find their way.

Each year the bobolink after traveling 10,000 miles comes back to the same meadow, and the oriole comes back to the same tree. The robin and the phoebe come back to the former nests and construct others close by or even on top of the old structures. What is it that guides them on their long journey and brings them back so precisely? It is instinct, we now say, a sense which,

not having ourselves, we are unable to understand. That sense which directs the carrier pigeon back to the home loft, five days' journey distant, is probably the same that guides all birds on their migrations, and we call it a sense of direction. There have been numerous observations to support this theory and some modern experiments upon terns carried in the hold of a ship 1,000 miles out of the range of the species, which, when released, flew back directly to their nests, have conclusively shown that birds do have this sense. But just what the sense is and what controls it we have yet to learn.

BIRD LIFE IN OCTOBER

October is a month of changes. The killing frosts have nipped the leaves and every gust of wind sends fluttering showers to the ground. The gray skies, the purple hills and the golden trees are preparing us for winter. Bird life, too, is changing. Although some of our summer birds, even among the warblers and flycatchers, still cling to their posts, before the month has run its course all but a few of the hardy seed-eating sparrows and blackbirds will be gone. The last of the transient visitors that nest in northern Canada and winter in Central or South America will pass through and the hardy winter residents will arrive. The waterfowl which have been straggling along since the middle of

August or September are now receiving added impetus from the northern forests, and toward the last of the month great flocks will fill the air and cover favored ponds.

Thickets and the borders of woodlands now teem with various species of sparrows, and overgrown fields, where they are busy consuming great quantities of weed seed, resound with their calls. A few vigorous individuals among the song sparrows and white-throats have more than regained the vitality lost through the moulting season and now sing with almost spring-time fervor. The majority, however, if they sing at all, do so in subdued tones that are difficult to recognize.

Certain shrubs and vines now bear fruit that attracts many birds. The wild grape and the Virginia creeper are thronging with late thrushes and the bayberry draws flocks of myrtle warblers. If one has been feeding the winter birds in previous years, they will now begin to come back to the feeding station in search of the food which they grew accustomed to find.

October also begins the real hunting season when the sportsman dons his khakis and tramps the woods for grouse and woodcock or wades the marshes for ducks and snipe. It is legitimate sport and these are birds pre-eminent as game birds that serve man best in this capacity.

Forestry at the Exposition

AMERICAN FORESTRY ASSOCIATION DAY at the Panama-Pacific Exposition is Wednesday, October 20. The meeting will be held in the Lumbermen's Building on the Exposition grounds, the president, Dr. Henry S. Drinker, president of Lehigh University, presiding. Foresters from all over the United States, Pacific Coast members of the Association and others who are attending the Exposition at the time will be present, and with them will be numbers of the leading lumbermen and loggers of the West.

President Drinker will speak on the forestry situation in the United States and F. C. Knapp, vice-president of the Western Forestry and Conservation Congress, will talk on the relation of the western foresters with those of the east. P. S. Ridsdale, editor of AMERICAN FORESTRY, will tell what the magazine is doing in furthering forestry throughout the entire country and Director E. A. Sterling will read a paper on the work of forest protective associations in the East, prepared by W. R. Brown, president of the New Hampshire Timberland Owners' Association. Chief Forester Henry S. Graves, will speak about the Government and the lumber industry. H. D. Langille, of Portland, Ore., will discuss the relations of timber owners and fire protective organizations; E. A. Selfridge, Jr., president of the California Protective Association, will talk about taxation and for-

estry and there will be other discussions and addresses on subjects related to forestry.

The first day of the week, the eighteenth, will be devoted to a meeting of the Society of American Foresters, also at the Lumbermen's Building. There will be addresses by Chief Forester Graves on the forester's ideals; by Coert Dulbois on the forester's opportunities; by D. T. Mason on what the Society has done and is doing for foresters; by Dr. B. E. Fernow on the forester's professional ethics; by G. M. Cornwall on the forester's duties toward lumbering; by F. E. Olmstead on the lumbermen's duties toward forestry; by Judson F. Clark on the place of logging engineering in forestry; by A. F. Fischer on the forests of the Philippines and by H. M. Curran on the forests of the Argentine Republic.

Tuesday, the nineteenth, will be devoted to meetings of the Western Forestry and Conservation Association to be taken up largely by addresses and discussions on the various problems of forest fire protective work, and on Thursday, the twenty-first, the Pacific Logging Congress will meet in annual session. The remaining two days of the week will be spent by those who wish to go on an excursion to the redwood logging camps of the Pacific Lumber Company and the Hammond Lumber Company at Scotia, Eureka and Samoa in northern California.

National Conservation and Water Powers

By HERMAN H. CHAPMAN

Professor of Forestry at Yale University. Chairman of Committee on Policy and Legislation, American Forestry Association.

IN the July number of AMERICAN FORESTRY (page 818) appeared a review of a recent publication on the Conservation of Water by Storage. In this review emphasis is placed upon the question of national regulation of water powers in such a way that a casual reader might conclude that the entire theory of government retention of ownership of national resources is wrong, and results in waste rather than in promoting conservation. The quotation, among others, which is of greatest significance reads:

"The Conservation movement, originating in a wise demand for the economical use of our natural (*not national*) resources, has too much *deteriorated* into a demand that those resources be *retained by the National Government* and not permitted to be developed by private capital except under restrictive burdens."

The average American of the old school has been brought up to believe, first, that public lands and their resources exist solely for the purpose of acquisition by private parties for their personal benefit; second, that

public jobs are sinecures to be striven for and obtained by those who have sufficient political influence to secure them. Opposed to this doctrine of *laissez faire* is the theory that the nation should retain and manage the remnant of its once enormous timber resources together with publicly owned grazing lands and water powers, and that the trained civil service employes of the government are capable of administering these resources to the mutual benefit of the public and of the capitalists who develop them.

There is no question of the sincerity of those who champion the doctrine of private acquisition and uncontrolled exploitation of public resources in the interests of prosperity and progress. The writer at one time believed that he had as much right to a timber claim in northern Minnesota as anyone else, although the only possible use to which he could have put it was to have sold it to some lumber company.



INTAKE RESERVOIR FOR PLANT NO. 2, NEVADA-CALIFORNIA POWER COMPANY

This plant, on Bishop Creek, Inyo National Forest, California, is one of a series of five developments on Bishop Creek, four of which are under Forest Service permits. The power is employed in mining, irrigation pumping, and general use in southern California. A permit for the construction of an additional plant has been applied for. The present aggregate installed capacity is 50,000 horsepower.



DIVERSION DAM FOR PLANT NO. 2 OF THE PACIFIC LIGHT AND POWER CORPORATION

This is on Big Creek, Sierra National Forest, California. Practically all the land used by this company is within the Sierra National Forest. Further developments contemplated by this company on the same forest will utilize power sites both on Big Creek and on the San Joaquin River.

Let us admit the force of these arguments. Business must be profitable to exist, and the welfare of many regions depends largely on the prosperity of certain large enterprises.

But, is it impossible to do business with Uncle Sam, and cannot the general welfare be better protected in this way? Water power representatives answer emphatically No! Regulations are burdensome; they reduce profits; and uncertainty of tenure through revocable leases, makes it impossible to secure capital for such investments except at greatly increased rates. It is asserted that those who insist that the nation should retain its property in waterpowers do not grasp the intricate financial and engineering problems involved in waterpower development, and are enemies of true conservation, for while they hamper and prevent capital from developing these powers, millions of horsepower are running to waste, never to be recovered or used!

The specific claim made by opponents of national ownership is, that the retention of public lands controlling waterpower and the system of leasing under permit has retarded and hampered the development and conservation of these western waterpowers. To prove this, statistics can be cited to show that the ratio of developed to total available power in western states is very low when compared to states east of the Mississippi. This is true, but does it prove the point? *Water power is a commodity, which must be marketed and used.* To utilize power, one must have factories, lighting systems, large

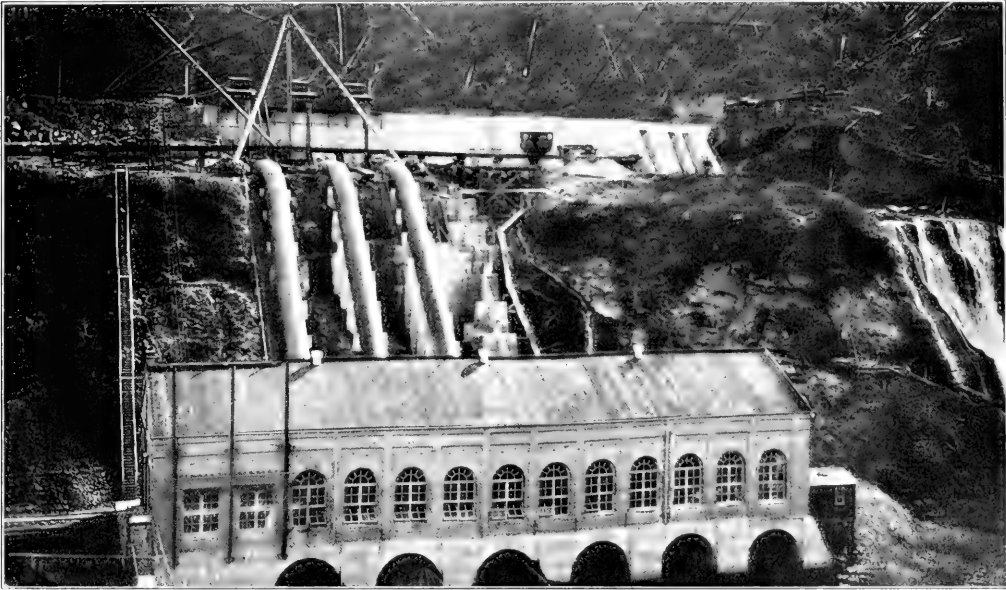
towns, a reasonably dense population, and many natural resources to use as raw materials in manufacturing. Profits depend, first upon the market for power, second upon the cost of installation and service, third, upon the price of power. National ownership exerts no influence upon demand for power, and its effect upon costs is confined to a small, almost insignificant charge based on the amount of power developed, and to the "intimidating" effect on borrowed capital or bonds, which might increase the rate of interest or prevent the financing of the enterprise. It is self-evident that investors would prefer to own these powers outright, and that insistence on the principle of leasing has probably caused delay and dissatisfaction in many instances. In spite of this, the *waterpower industry in many portions of the west is at present overdeveloped.* In California alone, for the year 1914, the maximum demand for power was less than 60 per cent of the installation. (Hearings before Committee on Public Lands, U. S. Senate, 63rd Congress, 2nd Session, Page 556.) The power development under lease on national forests is increasing, at present, relatively much faster than elsewhere. During 1914 there was an increase of 36 per cent in the total capacity of all prospects for which permits had been granted, and the actual output of electric energy increased in this one year 150 per cent, or from 111,000 to 266,000 horsepower. If, as indicated, there is a surplus of waterpower in excess of market requirements, in the west, lamentations at the waste of unused powers seem strangely out of place and

create a false impression. Waterpowers cannot be used under any conditions until they are needed. There is at present, on national forests, a total of 1,067,621 horsepower for which permits are outstanding, and the waterpowers already in operation produce 266,797 horsepower.

Instead of immediately increasing the amount of power development, there is reason to believe that the effect of private ownership might be just the reverse, and that a powerful motive for desiring absolute ownership is the opportunity which it insures of holding possession of valuable powers, and keeping off competitors, until the time comes when it will be profitable to use these powers.

Meanwhile, *unprofitable waterpowers remain the property of the nation until such time as they are needed.* It is so obvious that the leasing system instead of preventing, *tends to secure the maximum development*, that it would have been well for the champions of private ownership had they made overdevelopment the basis of their objections rather than retardation, and it is notable that much of the opposition to the passage of improved and amended legislation so long sought by conservationists, is based on this feature of insistence on development as a condition of holding leases.

It is not claimed that the present system is perfect.



CAZADERO PLANT OF PORTLAND RAILWAY LIGHT AND POWER CO., CLACKAMAS RIVER, OREGON.

This public-service corporation is planning to develop additional power through new construction under a Forest Service permit, on the Oregon National Forest. The plant here shown is not under permit, since it does not involve use of National Forest land.

The principle naturally striven for, that of a reasonable profit, urges consolidation of power interests and elimination of competition as a means of assuring this profit.

The present system of leasing effectually prevents artificial restriction of power development. A government permit is granted only on condition that construction work be begun within a specified time. The applicant secures a priority right, and is then given time to prepare surveys and specifications, and to further investigate markets and cost of installation. If he decides that the venture will prove profitable, the lease is granted and actual development work must begin. If not, the permit is cancelled, and another applicant is given opportunity to consider the prospect. The inevitable effect of such a system, provided the terms are equitable, is to secure development at the earliest moment when economic conditions appear to justify the venture, and to absolutely prevent the holding of power in an undeveloped condition as a means of influencing the power

Leases revocable at the option of the Secretary should be made irrevocable (but subject to cancellation on failure to observe the terms thereof) and renewable previous to the expiration of the period of 50 years for which they run. Other modifications are possible without sacrificing the principle of national ownership. The Ferris bill (H. R. 16673, 63rd Congress 3rd session), embodies the principles for which the advocates of *national conservation* contend, and to which those who are not opposed on principle to all government control are substantially agreed. But of late there has been a growing movement to repudiate this bill, and it is the probable intention of waterpower interests to attempt to secure from this coming Congress a radically different measure, which will give them their absolute control of national waterpowers, free from all interference. The proceedings of the waterpower convention called in Oregon for September should throw some light on this subject. Efforts may be made to confuse the issue of national

retention of publicly owned power sites with that of national interference in the regulation of private water-powers,—the purpose being to arouse indignation against unjust and tyrannical interference with state and private rights, under cover of which Congress shall be persuaded to part with what the nation now and always has owned, and has the right to hold.

But the danger of the attack on the conservation of publicly owned waterpowers lies in the effort to drag down in a common ruin the tremendous achievements in other lines of *national* conservation secured in the last quarter century. On what authority is the statement

proclamation created the National Forests totalling 160,000,000 acres in the United States, exclusive of Alaska.

Were the pioneers of this movement, Dr. B. E. Fernow, F. H. Newell, Edward A. Bowers, Gifford Pinchot, Henry S. Graves, and others fighting for a chimerical dream when they vigorously opposed this principle of private acquisition and demanded that of the remaining public lands those which were suitable only for forest production should not be allowed to pass out of the hands of the national government? What motives actuated Presidents Harrison, Cleveland, McKinley, Roosevelt and Taft, all of whom exercised widely the power given them to make these reservations?

The idea which has moulded this entire national policy is that these public forests can be best protected and maintained in a productive condition under continued national ownership. It was held that under a policy of retaining these forest lands, the government could secure reforestation, protect watersheds, prevent fires, and require conservative methods of lumbering, thus preventing the waste and destruction of this national asset, to the permanent benefit of the public, while under private ownership these results would not be attained.

But merely to reserve and lock up these resources has never been the aim of conservation. "A wise demand for their economic *use*" correctly states the case. The real issue lies as to methods by which this use can be best perfected. The lumbering and manufacture of standing timber, the development of waterpower, and the use of other resources demand the investment



PLANT NO. 1 OF THE PACIFIC LIGHT AND POWER CORPORATION

This plant, on Big Creek, Sierra National Forest, California, is one of two power houses constructed by this company on Big Creek, with an aggregate installed capacity of 94,000 horsepower. The power developed is used in the operation of electric railways in and about Los Angeles. This company's permit covers an ultimate development of 230,000 horsepower on the Sierra National Forest.

made that the conservation movement originated "in a wise demand for the economic use of natural (but) *not national* resources," and that the demand that these natural resources be *retained by the national government* constitutes a *deterioration* of the conservation movement. Once and for all, let it be understood that the conservation movement in this country began with and still centers on the struggle for retention of national ownership of public lands and resources.

Conservation as a public issue originated about 35 years ago, when the founders of the American Forestry Association declared their intention of securing congressional action authorizing the permanent retention by the national government of the title to forested non-agricultural lands. This idea finally found expression in the law of 1891, under which successive presidents have by

of large amounts of capital and the establishment of a systematic business. Only three possible methods present themselves for accomplishing these ends, namely, the assumption of such investment and business activity by the government; the retention of ownership only by the government and the investment of private capital in the business, under lease or contract; or the sale and disposal of the property itself to the capitalists who desire to develop it. The first is State Socialism and has never been advocated by conservationists. The third is individualism and would utterly destroy this national policy. The second expresses the aims and goal of national conservation. But is it possible for the government to enter into business relations with private capital and to regulate the use of its lands by the terms of leases or contracts in such a way as not only to preserve the property

itself in the best possible condition, and insure the greatest benefit to the public, but at the same time induce capital to venture on large and prolonged investments which are entirely dependent on the guarantees given in such contracts, and on the interpretation placed upon their enforcement by public officials. Under the old order of political appointees, incompetent and often unscrupulous, the answer would be an emphatic negative. The new wine of public responsibility and efficiency would crack the old bottles and the effort would come to naught.

The solution of this problem was the creation of a new national service, for the direct purpose of coping with these new responsibilities and proving to the country that as a nation we were not incapable of rising to our opportunities. The best example of this is the Forest Service, in the Department of Agriculture, which was gradually built up partly by rigid competitive examinations in technical forestry, which required for passage the equivalent of five years of college training, and partly by appointment of local men as forest rangers on the basis of merit and examinations. A widespread system of forest schools sprang up, located in Washington, California, Idaho, Montana, Colorado and in eastern states, the graduates of which sought employment in this branch of the government service. The Yale Forest School alone has graduated over three hundred men, a large majority of whom are or have been employed in this national work. The writer desires to add that of this entire number, with most of whom he is personally acquainted, he has yet to hear of a single instance of dishonesty or favoritism in their administration of the national possessions.

Many of these men have now had ten to fifteen years of continuous experience with the problems of public business, complex and diversified, which have presented themselves for solution during the development of the system of co-operative use of timber and other resources. In the ten years since 1905 the service has effected a complete change in the attitude toward the national forest administration of that portion of the public in the western states who have had occasion to use these resources, and who would be the first to criticize an unjust and unefficient system. They have established a reputation for honesty, impartiality and efficiency which goes far towards the final solution of even the most complicated questions of procedure. The result is that while the champions of private ownership have waged continuous warfare upon public reservations and have tried in

every possible way to break down the system and to demonstrate its failure, the spirit of efficiency and emulation developed in the Forest Service has triumphantly solved the big problems of public administration in the face of and even aided by this opposition.

This is best illustrated by the timber sales policy of the Service. Lumbermen were at first bitterly hostile to the withdrawal of the timberlands, for timber was the raw material of their business, and its ownership in large quantities was the guarantee upon which rested the security for its continuance. The idea of being forced to purchase stumpage from the government, and to com-



HAUSER LAKE PLANT OF THE MONTANA POWER COMPANY

This plant, on the upper Missouri River near Helena, Mont., is one of six developments operated by this company on the Madison and Missouri rivers, of which one is operating under a Forest Service permit and two under permits from the Interior Department. The power developed at the plants of the Montana Power Company and associated companies supplies the general market throughout central and western Montana and is used principally in mining operations. It will be used to operate the trains of the Chicago, Milwaukee & St. Paul R. R. as soon as installation of the necessary equipment along the line of the railway is completed.

ply with new, costly and untried regulations, which compelled them to burn slash, leave part of the stand, and protect this residue from damage during logging, was offensive and aroused much indignation. But the operators have found that they could do all these things. The period of experimentation is past. Mistakes, due to inexperience, have been remedied. Today contracts are in force for billions of feet of timber, in which the operators are entirely dependent on the government for stumpage. The annual revenue from timber sales totals over \$1,300,000, and the lumbermen of the west are practically united in support of the principle of national retention of the residue of publicly owned timber lands. The principle of co-operative use of national timber has stood the acid test of actual application.

In the use of the grazing lands included within national forests, an even more satisfactory development of business customs and regulations has occurred. Based on the principle of allotting the government range to those most entitled to it, and to the homesteader and resident in preference to the owner of large migratory flocks, the

Forest Service has built up both the condition of the range and the number of stock grazed, and at the same time has completely won over both sheep and cattle men to a whole-hearted support of the principle of national retention of these grazing rights. Throughout the length and breadth of the west there remains hardly a vestige of opposition to the grazing policy save on the part of a few who are not getting what they think they might secure under a return to the old policy of the right of the strongest, backed by the rifle, which formerly characterized the struggle for the public range.

These are facts which cannot be denied. So powerful has public opinion become in support of these national policies that big interests working through state and national politics to restore the good old days of free land grabs have again and again been driven to cover. The disruption of the national forests, desired as the surest method of exterminating the all too successful propaganda for retention of national resources has been widely advocated. Recently efforts have been made to show that the western states were staggering under unjust burdens of taxation as a result of the "retention" by the government of percentages of their area varying from 40 to 92 per cent of the total. (AMERICAN FORESTRY, page 820.) The author of these figures neglects to state what portion of these lands are *purposely retained*, and what percentage are now open for occupancy, thus permitting the public to believe that all such lands are forcibly held by the U. S. It must be made clear that not one acre of national forest lands more valuable for agriculture than for timber will be retained under present policies any longer than it takes to have it examined and thrown out, barring only the ranger stations and lands for similar public uses, and that the examination and elimination of all agricultural lands is being rapidly completed. National forests contain the *only large* bodies of land, exclusive of national parks, which the government intends to keep forever.* Indian reservations will probably in time be broken up, and allotted individually, pursuant to the declared policy of the Indian Office. The area of national forests amounts, not to 92 per cent, but to an average of not over 15 per cent of the total area of western States, the largest percentage being 33 per cent—practically all of which is worthless except for the timber it contains or for its capacity for timber production, grazing, or watershed protection. Mineral lands may be taken up and title obtained under the mining laws.* To those who would plead the necessity for local taxation as a reason for the breaking down of this national ownership of timber lands, the answer is clear. The only method of taxation which is considered perfectly just in the long run is a tax on income. Timber should in the future pay such a tax in lieu of annual taxes. But a tax of 20 per cent on net income is considered a fairly reasonable sum. The national government under existing laws pays to the counties within which national forests are located a *tax of 35 per cent of the gross income*, whether or not there is any net

income whatever from the management of said forests. No private owner could afford such a tax, and annual taxes placed on such timber which would yield equal revenue would be confiscatory. Furthermore, this income will be perpetual, since the forests will be retained as productive areas, while under private management in many instances their productivity would be greatly impaired.

Had the principle of national retention of public resources in the west been wrong and the results detrimental, the entire system would long ago have been demolished by its enemies. It has stood and grown on its own merits until it is so firmly entrenched in public favor that the opponents of the national forest policy have been forced to fall back on state sovereignty as their last argument. And here they have no grounds to stand on, for the *western states as such have received as much, if not more, land from the nation than those located elsewhere*, and the U. S. Supreme Court as early as 1839 in Illinois, announced the absolute right of the national government to retain title and to lease such lands and resources as it chose, within the confines of a sovereign state.

The fight on the waterpower question is merely another phase of the struggle of the new and successful principle of national retention and leases as a means of developing public resources against the older and questionable plan of relinquishment of these properties to private ownership. There is but one answer to this question; the nation must retain the ownership of the waterpowers on public lands, and lease them on terms which will secure the greatest degree of utilization and benefit both to the investor and to the consumer.

MARYLAND'S WOOD-USING INDUSTRIES

THE State of Maryland probably has a total of 500 industries which rely to a large extent upon wood for the manufacture of their products. Thirty-five per cent of these are centered in the city of Baltimore, the rest distributed over the State, but particularly numerous in the middle western part, and certain sections of the Eastern Shore.

The study of those in Western Maryland is completed, and in Baltimore it is well under way. The investigation has disclosed some interesting facts, and upon the basis of the data secured it is the intention of the State Forester to establish a State Wood Waste Exchange. It is of course not difficult to find manufacturers who have waste to sell; it is not as simple a matter to locate advantageous markets for them. However, it is believed that this part of the work will meet with reasonable success, and the manufacturers themselves are evidencing much interest in the present investigation. There exists among most of them a decided willingness to add to the efficiency of their plants through a better and a closer utilization of raw materials, and if hearty cooperation makes for the success of such work, that in Maryland should be productive of results.

*An exception must be made to these statements in the case of extensive areas of coal lands, the future policy for which has not yet been determined.

Children's Department

Devoted to importing information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.

BY BRISTOW ADAMS

HOW TREES TRAVEL

OF COURSE a great tree does not move itself from where it has long stood. That is the best thing about it; it stands steadfast, its leafy crown reared aloft, in sun and rain. It may be beaten by the winds, or weighted down with snows, but still it holds its own, an example of courage and sturdiness. Indeed, it has been said that a full-grown tree is practically the only thing that man cannot put up where and when he wants it.

But the trees, as groups, must travel, or they could not live and spread out to occupy new places.

It is a well-known fact, and one that all foresters learn at the very first, that trees cannot thrive in dense shade. Foresters have a word for this quality of trees in respect to the demand for a place in the sun. They call it "tolerance," and say a tree will "tolerate," or stand, shade, or will not, in which case it is "intolerant." Some foresters claim that the reason smaller trees cannot grow under the limbs of others is not wholly because the light is kept off, but also because the larger and more numerous roots of the bigger tree rob the little one of all its moisture. No matter what the cause, the result is the same, and certain trees are not able to get a start unless they have a good open space to grow in. Others, the "tolerant" ones, can stand a lot of crowding and overshadowing; then, if light and freedom come they begin to grow thriftily even after they have been cramped and dwarfed for many years. The hickories, the sugar maple, and hemlock are examples of trees of this type. Yet even they do better if they can get their full share of light and moisture.

Thus it can be seen that if the trees dropped their seeds immediately to the ground beneath, the little seedlings, even if they were able to get a start, would have to struggle against the shade and the dryness caused by the parent tree, even though the greatest effort of the parent tree is spent in making possible the lives of new trees. So it seems as if some of the trees had thought out ways to scatter their seeds to a distance and had invented all sorts of devices, such as aeroplanes, parachutes, and even shotguns, like the witch-hazel's. Through the constant but very slow changes that have come about as a result of the success in life of those forms which have met the needs of the life struggle and have won out in this struggle—by means of the process known as evolution—the various devices have been made more and more perfect, until they seem to be the result of special plan and effort.



PRACTICALLY all of the pine seeds have wings. Those which do not have these filmy planes which bear them some distance from the tree on which they are borne, are valued as food by squirrels, and even by people, so their distribution is taken care of. The white pine cone opens at just the right time, and the little seeds from the bases of the cone scales go whirling away in spirals through the air. If you have even seen a single pine tree standing alone, with a whole brood of little trees, generally to one side, you may be very sure that these tree-children have come from the one parent, and that they are on the side away from the prevailing fall winds. Some pine trees release many of their seeds after the snow falls, and these seeds go scampering away with the winds, gliding and sliding over the crusted snow. Then when the warm spring sun comes, each black spot of seed, absorbing the heat, melts itself down into a hole and reaches the ground before the surrounding snow is all gone, and thus gets the benefit of the moisture from the melting, for the spring-time is near to start life.

One pine, the lodgepole pine of the Rocky Mountains, has been known to hold its seeds clutched fast in the tight little cones for a quarter of a century. Some cones have even been grown over by the limbs on which they grew and could never release their seed unless the branch or tree were destroyed. These seeds keep their life during all the years. Heat will open the cones, and a forest fire in this region is almost sure to be followed by a forest of lodgepole, because the fire not only opens the cones, but also destroys the litter on the ground so the seeds which are released can sprout at once on the soil left exposed. It is said that all the lodgepole pine forests represent areas that have been burned over, and they have been able to take possession because the other trees couldn't stand the fires, while the lodgepole was adapted to profit by them.

THE maple keys help the seed to float away from the parent tree. The aeroplane of the elm seed not only bears it on the wind but helps it float on the water. When the heavy spring rains come, the elm seeds which appear before the leaves in spring, and must soon sprout or die, are floated in quantities by the rain into pools or down streams, to find lodgement where some soil gives them a chance to grow.

Another device is used by the sycamore, or button-ball. Its seeds are ripened in the fall; yet the old tree does not let go of them, but holds them through all the winds of winter, where they hang on in spite of gales, even when the cord-like stems of the button-balls are whipped to shreds. But when the spring winds and rains come, the button-ball softens, and divides into downy segments; each seed, with its parachute, is whirled away in the gales of March.

The paddles of the ash tree serve their purpose, the little birds formed by the gray birch scales—all these are part of the same plan. Hemlock seeds are borne far out on the tips of the smallest twigs and each seed is

provided with a scale that keeps it from falling directly to the ground. The linden seed has a plane or parachute, other seeds have hooks that catch to moving objects, and thus they travel. Some have special boats for floating, like the Chinese water nuts.

The coconut has traveled all the tropic seas, for its husk has an outer layer that is smooth and shiny and will not let water in, while just inside is a porous and fibrous mass, full of air spaces so that the heavier kernel is readily floated. Because of the so-called "milk" in the coconut the kernel keeps its life for a long time, until cast up on a beach by the tide, and half imbedded in sand from the beat of the waves, it sprouts in groves that fringe the southern oceans and even helps to establish soil on newly formed coral islands.

The common red cedar or juniper bears a seed covered by a pulp which is relished by birds. The birds digest this pulp, not the seed, which, passing through the bird's body, is carried from place to place. The fence-row lines of cedar trees have all been started in this way and mark where birds have stopped to rest on the fence rails or wires. Foresters have found that the only successful way to get red cedar seeds to sprout is to practically boil them first and remove the pulp, or in other words, to imitate the conditions within the birds' hot little bodies.

CHESTNUTS, hickory nuts, walnuts, and other edible seeds relished by squirrels and mice are buried by these animals. Naturally they forgot some of these storage places, or do not need to use all that they have hoarded. Here again another wise provision of nature comes in. The shells protect the germ until after the winter has frozen and cracked the outer protective covering, admitting the moisture when the spring thaws come and cause the germ to swell and grow.

Most remarkable, in many ways, is the witch-hazel, which grows in dense thickets and must spread its growth outside these thicket boundaries. It has a regular artillery. The nuts seem to need a sharp frost to open the closely joined parts. Frosty nights will do the trick, and a dry, sunny day completes the process. Warmth causes the edges of the seed cups to curve inward with such force that the seeds will be shot for a considerable distance, usually from ten to twenty feet, though an actual measurement of forty-five feet is recorded. The special provision in the case of the witch-hazel seed is that the seed is very smooth, and polished, and the way the seeds are discharged is like that by which orange or watermelon seeds are shot by the pressure of thumb and forefinger.

These examples of the way trees travel by means of their seeds are only a few of many. Can you think of others?

DIRECTORS MEET IN NEW ENGLAND

DIRECTORS of the American Forestry Association met at Boston on August 31 and at the Profile House, N. H., on September 1, in order to present at the Forestry Conference at the latter place

the views of the Association on the extension of the appropriation for carrying on the program of acquiring forest reserves under the provisions of the Weeks Law, and to decide where to hold the next annual meeting.

Boston, backed by the Massachusetts Forestry Association, made an earnest appeal for the meeting and it was decided to hold it there early in January, the date to be announced later. There has long been a demand from the many members of the Association in New England for a meeting there and as all throughout that section there is a desire to continue the purchase of Federal forest reserves, and as the Association is so active in keeping before the public the necessity of completing the original program of acquiring 5,000,000 acres in the Southern Appalachians and 600,000 acres in the White Mountains, the meeting in January will be particularly appropriate occasion for discussing the situation as it will be at that time.

It is planned to hold a two-day session, with a public banquet on the evening of the first day and to have programs of addresses and discussions at the morning and afternoon sessions each day.

During the stay in Boston the directors were the guests of the Massachusetts Forestry Association on a visit to the Arnold Arboretum, through which the party was conducted by Prof. John Jack whose lucid descriptions of what has been accomplished there and what work is planned for the future were much enjoyed. The party was escorted about the city by Secretary Harris A. Reynolds of the Massachusetts Forestry Association.

At the Profile House, President Henry S. Drinker, in behalf of the American Forestry Association, presented its plans in relation to advocating an additional appropriation of \$10,000,000 to be expended during the next five years in acquiring Federal forest reserves, and invited the organizations represented at the meeting to cooperate. This invitation was accepted with enthusiasm. Senator Weeks, father of the Weeks Law, told, in an interesting reminiscence, of the long-continued efforts and final success in securing the passage of the law, and of the efficient manner in which the law has been administered, during the past five years. He also gave some valuable advice regarding efforts to secure a continuation of its operation.

The Forestry Conference consisted of several sessions during which there were addresses and discussions on various phases of forestry, including addresses by W. R. Brown, president of the State Forestry Commission, on forest progress in New Hampshire; by Prof. H. H. Chapman, of Yale Forest School, on the woodlot from the foresters' point of view; by Dr. Kenyon L. Butterfield, president of the Massachusetts Agricultural College, on the place of forestry in a rural policy; and the discussion on this topic was taken up by Commissioners of Agriculture from various New England States; by John C. Orcutt, secretary of the Agricultural Committee of the Boston Chamber of Commerce, on the cooperative marketing of woodlot products; by Herbert Welsh, of Philadelphia, on cooperation at Sunapee; by Hon. E. E.

Woodbury on progress at Lost River; by Prof. J. W. Toumey, director of the Yale Forest School, on the woodlot at home and abroad; by William L. Hall, assistant United States Forester, on the national forest in the east, and by Miss Eloise Gerry, of the U. S. Forest Laboratory at Madison, on some suggestions in wood technology.

An excursion by automobile through the national forest on Lafayette Mountain and a tramp on foot over the skyline of the Appalachian Mountain Club and an excursion to Lost River marked the outings of the party.

A FORESTER'S CHIEF TASK

BY ALFRED GASKILL

Director of the American Forestry Association

THE chief task of a forester is to localize and to specialize his efforts—always looking toward the future. Above all he must educate his public in economics and through that, not apart from it, lead to the practice of silviculture. The store of virgin timber is



ALFRED GASKILL

State Forester of New Jersey and Director of the American Forestry Association.

the dominant factor in the lumber market. As that is reduced lumber prices will approach the cost of production. The sections which use most wood and have the least reserve offer the best opportunities for practical forestry.

It is important to realize that timber is accidentally, not essentially, a product of the wilderness. The most profitable forests are always close to populous centers for the same reason that low grade lumber is more salable in New York than high grade is in San Francisco or New Orleans.

True forest conservation will give serious thought to the degraded woodland areas in the eastern States. They can be made to yield a double harvest—one of wood, another of human uplift.

TWO NOTABLE OAKS

By J. R. SIMMONS

IN FRONT of the Wayside Inn, on the State Road, in Sudbury, Mass., about 20 miles west from Boston, stand these two mighty white oaks, measuring 18 feet 2½ inches and 17 feet 7 inches in circumference, respectively, and spreading their powerful branches over a space of about 225 feet.



THESE OAKS SAW WASHINGTON PASS

Under their branches the father of his country passed on his way to Cambridge to take command of the Continental Army

Here they stood in June, 1775, when Washington passed on his way to Cambridge to take command of the Patriot army; and again, nearly a century later, their silent grandeur attracted the eye and appealed to the heart of Longfellow, who made them famous in his "Tales of a Wayside Inn."

"Through the ancient oaks o'erhead,
Mysterious voices moaned and fled."

They stand as witnesses of a long series of historical events reaching back over a period of years previous to the coming of the first European settlers. The oldest citizens in their vicinity claim for them an age of upwards of 1,000 years. Certainly in appearance they would seem to bear out the tradition.

The tree on the left of the picture has not succeeded in preserving its history by means of radial rings. Its trunk is hollow, and, by entering through an opening on the side furthest from the road, three persons might stand upright within. The other oak is comparatively sound, and when death comes a cross section will undoubtedly record a very long and interesting life.

The measurements given were made in the early spring of 1915

STATES GET \$850,000 FROM NATIONAL FORESTS

THE portion of the National Forest receipts for the fiscal year 1915 to go to the benefit of the various States in which the forests lie, according to the computation of the Forest Service just approved by the Secretary of the Treasury, amounts all told to more than \$850,000. The gross receipts for the year ending June 30 were \$2,481,469.35, of which under the law 25 per cent is paid over to the States for county school and road purposes and an additional 10 per cent is made available for expenditure by the Secretary of Agriculture in building roads and trails for the benefit of local communities.

Montana gets the largest share, having contributed the largest amount of receipts for the sale of timber, grazing, and other uses of the forests, or more than \$318,000. Of this amount, Montana is to receive \$79,589.78 for county school and road purposes, while the Forest Service will expend \$31,835.91 for improvements of special benefit to local communities and not included in the regular administrative and protective improvements. Idaho comes second with a 25 per cent allowance of \$75,651.15 and a 10 per cent fund of \$30,260.46. California is third, receiving a 25 per cent allowance of \$67,611.37 and a 10 per cent fund of \$27,044.74. The other National Forest States follow in the order of the size of their respective shares.

Arizona, \$59,801.89, under the 25 per cent provision and \$23,923.16 under the 10 per cent; Colorado, \$59,218.60 and \$23,687.44; Oregon, \$49,675.83 and \$19,870.33; Utah, \$48,675.96 and \$19,470.38; Wyoming, \$43,086.86 and \$17,234.75; Washington, \$37,445.56 and \$14,978.23; New Mexico, \$31,786.46 and \$12,714.58; Nevada, \$16,244.53 and \$6,497.81; South Dakota, \$12,988.11 and \$5,195.25; Alaska, \$11,165.75 and \$4,466.30; Arkansas, \$8,738.93 and \$3,495.57; Florida, \$2,336.77 and \$934.71; Minnesota, \$1,971.60 and \$788.64; Nebraska, \$1,401.15 and \$560.46; Kansas, \$1,357.33 and \$512.93; Oklahoma, 759.77 and \$303.91; Michigan, \$198.37 and \$79.35; North Dakota, \$81.83 and \$32.73; Porto Rico, \$9.25 and \$3.70.

The States of Arizona and New Mexico receive additional shares for their school funds on account of school lands included within the National Forests, yielding them \$28,966.46 and \$9,311.87 respectively.

On the National Forest Purchase Areas in the East, a total of \$3,977.60 was collected in Georgia, New Hampshire, North Carolina, Tennessee, Virginia, and West Virginia, these States thereby sharing \$994.40 under the 25 per cent provision and \$397.76 under the 10 per cent.

The total amount to be expended under this system of sharing the Forest receipts with the States to make up for the loss of local taxes due to public ownership of the land is about \$16,000 greater than for the previous fiscal year, as the receipts for the fiscal year 1915 exceeded those of the previous fiscal year by about \$14,000. The provision of law under which a portion of the receipts is turned over to the States dates from 1906, and the total payments reach, with this year's allotment, nearly \$4,500,000. The 10 per cent provision for government-built public roads has been in force only since 1912, and has now made available for this purpose an aggregate of \$926,000.

CALIFORNIA'S TREE COLLECTION

ONE of the largest collections of rare trees, representing countries in all parts of the globe, is that maintained by the State of California in the large and beautiful park surrounding the capitol building in Sacramento. Here one will find not only scores of varieties of coast trees but visitors from afar like the white mulberry from Asia, the variegated euonymus from Japan, the Rose of Sharon from Syria and the silver wattle from Australia.

Chili has a representative in the monkey puzzle tree, other wise the *Araucaria imbricata*, that peculiar member of the pine family which takes its name from the fact that its crowded and twisted branches are said to puzzle the monkey which would seek to climb it. From Brazil was brought the lemon verbena, while from distant Persia there came the walnut.

Europe has a number of trees in the State's collection, including the Aleppo pine, the sweet bay and the hawthorn. The graceful Irish yew lines one of the walks leading to the capitol, with century plants alternating.

To the visitor from the north and eastern States the butternut tree and the sugar maple have a familiar look, and there are other varieties that make southerners feel at home as they stand beneath their branches. In all,



THE MONKEY PUZZLE TREE

This is a peculiar member of the pine family from Chili, aptly named because it is said the crooked and twisted branches make it a puzzle for monkeys to climb.

Capitol Park contains some 500 kinds of trees and shrubs, and many students of arboriculture visit it to see the various species in leaf and blossom.

40,000 GET FREE TIMBER

OF THE 688,922,000 board feet of timber cut on the National Forests during the fiscal year ended June 30, 1915, according to statistics just compiled by the United States Forest Service, 123,168,000 feet were taken under free-use permits given to settlers and others living in or near National Forests. There were 40,000 free-use permittees, and the value of the timber they cut was \$206,464.13.

Montana leads the National Forest States in the amount of timber cut under sales, with more than 101,000,000 feet, but takes second place in the free-use cut, with 18,000,000 feet. Idaho leads the free-use list, with a cut of nearly 25,000,000 feet, and is a close second in the amount of timber cut under sales contracts, with over 100,000,000 feet. Oregon, Colorado, Washington, Arizona, California, Wyoming, Utah, New Mexico, and South Dakota, in the order named, contributed from 60,000,000 to 24,000,000 feet under both free use and sales. The middle western and eastern National Forest States furnished relatively insignificant quantities.



IRISH YEWE

These graceful trees line one of the walks leading to the capitol of California at Sacramento

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

EDITED BY J. J. LEVISON, B. A., M. F.

Arboriculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School

How to Plant a Shade Tree and How to Care for It the First Few Years

THERE has been considerable good literature published in recent years on the planting of shade trees. It is timely to quote some of this from the following tree sources which will cover the most important points of the question.

The office of the Commissioner of Forestry of the

ing it in a new place is a surgical operation requiring a knowledge of plant physiology. To grub out trees and plant them in small dry holes invites wholesale failure. Of a lot of vigorous trees suitably planted, nearly every one should live and thrive.

"In digging trees care is required to preserve a large number of the tender root-tips and fine rootlets which supply the water and mineral food. A small tree—an inch or two in diameter—growing near the place of transplanting, may be lifted with a ball of earth in which the root system is imbedded, wrapped in burlap, and carried to the pit prepared for it. To secure shade without loss of time, trees six or more inches in diameter are sometimes transplanted with full ball of earth—an expensive operation requiring special appliances. Trees sent out by nurseries are usually lifted without balls of earth and skilfully packed for long-distance shipment. Upon arrival from the nursery, unpack the trees and set them in small trenches in a shady place, covering the roots with moist earth. Trees dry and hot when received are not likely to live, but some species will stand more maltreatment than others. Wild seedlings from the field and woods may be used, but nursery stock is preferred. When ready to begin work, remove the trees from the trenches, cover the roots with moist straw or burlap and carry them to the tree-pits and plant. At no time must the roots be much exposed to the sun and wind.

"The cost of planting varies with the size of tree, soil and site. The Beacon Street planting in Boston recently done successfully under the direction of a landscape architect, cost \$50 a tree. This work involved the planting of 150 European lindens, 2½ inches in diameter, a system of sub-irrigation by means of Akron pipes laid with open joints among the roots, the digging of tree-pits 12 feet long, 4½ feet wide and 3 feet deep, the removal of the excavated material, the filling of each pit with 4 cubic yards of rich loam, relaying the sidewalk, tree guards, and maintenance for two years. In country and suburban districts and in favorable city locations, the cost would be much less than the above named figure.

"Street trees are usually spaced 30 to 50 feet, according to species; 10 feet is a good distance; large trees like oak, elm, sycamore, and black walnut require wide spacing—

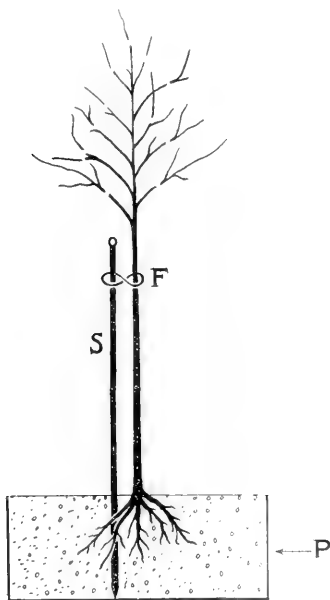


Diagram of Tree

P=Tree Pit 6'x5'x2½' deep

S=Stake; F=Fastening

=Pruning for Transplanting

State of Rhode Island publishes the following on "How to Plant Shade Trees":

"Many trees are destined before planting to an early death through lack of precautions in their digging and transit. Removing a tree from its original site and plant-

50 to 70 feet. Where trees and shrubs of varying foliage and tolerance of shade are mixed in groups for landscape effects, the spacing is closer—often 5 to 20 feet.

"The hole should be dug wider and deeper than seems necessary—perhaps 2 or 3 feet deep with an area of about 30 square feet for 2-inch trees, in order that the growing roots may have a sufficient amount of loose rich soil. If the soil from the pit is not good, it should be replaced with rich loam or forest humus free from sticks and stones. The tree should be planted to the same depth at which it stood in its original site, or perhaps an inch or two deeper if set in light porous soil; the root collar indicates the right depth. Fill in the center of the hole with earth to the height at which the tree is to stand; then place the tree on this slight elevation and spread out the roots in a natural manner. While an assistant is covering the roots with the first thin layer of soil, the tree may be moved up and down within the space of an inch, in order to firm it in place and to bring the soil into close contact with the roots; then as the hole is gradually filled, the soil is pressed down carefully but firmly to prevent drying out, the last shovel full being thrown loosely over the surface. A heavy man with large feet makes a good planter. Water is useless excepting in dry loose ground.

"Before planting, any broken and bruised roots should be removed with a sharp knife, the face of the cut being made on the under side of the root. The loss of roots must be balanced by pruning of the top in which crooked branches are removed and spindling twigs shortened. A straight and vigorous leader uncut gives the tree a long conical crown; if cut, a short compact crown. The bean-pole style of planting without any top is not advisable excepting in special cases where the root structure has sustained much injury; since rapidity of growth depends on leaf surface, topping is a serious set-back, but good sprouters like willows and poplars will survive such mutilation, and these short-lived trees are recommended for planting where rapidity of growth and shade is the chief consideration.

"A thin mulch of leaves, or litter mixed with fertilizer will keep the ground cool and free from weeds which would transpire the moisture needed by the young tree. A stake driven into the ground and fastened to the tree by a twine inclosed in a piece of rubber tubing prevents wind-throw. The market affords various kinds of tree-guards against injury by animals. Young beeches, maples, horse-chestnuts and others subject to sun-scald are protected by neighboring shade or by lattice south of the trees. Planting may be done at any time, but from April 1 to May 10 is the most favorable season in Rhode Island.

"The choice of species is a large topic outside the scope of this essay, but it may be said that adaptability is essential. Sidewalks require clean, hardy, symmetrical, long-lived species of moderate size like Red Maple, Norway Maple, Hackberry, and Ironwood. Wide avenues admit the more majestic trees, like the Oaks, Basswood, Tulip, Chestnut, Rock Maple and Liquidambar. Uniformity of spacing and species is effective in a street.

On lawns, variety of species lends accent to diversity of topography, and charm through the countless tints of bud, leaf, and flower in springtime, and the fine array of brilliant foliage in autumn. For dense shade, use Beech and Maple; for thin shade, Ash."

SPECIFICATIONS FOR SHADE TREE PLANTING

The Brooklyn Park Department, in permitting citizens to plant a shade tree, sets up the following specifications:

"1. The tree to be at least 2½ inches in diameter, one foot from ground.

2. To be straight, to have a compact fibrous root system and a well-balanced head.

3. The trunk of the tree to be free from branches to a height of at least 7 feet from the ground and the first branch to be not over 9 feet from the ground.

4. The tree to be free from disease and injurious insect pests.

5. The tree hole to be not less than 3 feet square and 3 feet deep.

6. One to three cubic yards of good mould to be placed in each tree hole, according to the conditions governing the location.

7. The tree to be planted at the same depth that it stood before transplanting.

8. Wherever possible, trees should be planted not less than 25 feet apart. Thirty feet is preferable.

9. The tree to be watered and surface soil raked or cultivated at least once a week in dry weather, and otherwise to be properly cared for by the owner of the premises, at his own expense and to the satisfaction of the Department of Parks.

10. The work of planting to be done under the direction and to the satisfaction of the Department of Parks, or its proper representatives, and subject to the rules, regulations and ordinances of the Department of Parks.

11. A tree guard of approved pattern, or wire guard of small mesh, to be placed around the tree by the owner of the premises.

12. The most desirable trees for general street planting are the Norway Maple (*Acer platanoides*) and Oriental Sycamore (*Platanus orientalis*). For suburban sections there are other equally suitable trees, and for information on these consult this Department. The Poplars, Silver Maple (*Acer sacharinum*, Linn.) and Sycamore Maple (*Acer Pseudo-platanus*) are not desirable for street planting."

THE CARE OF SHADE TREES

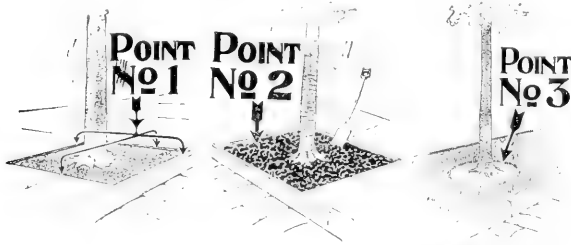
Mr. Carl Bannwart, of the Newark Shade Tree Commission, admirably presents the main points in the "Care of Trees" in the following way:

"Every boy and girl has his or her good points. So has a horse. So has a tree. The good points of a horse and those of a boy are much the same. The horse must have vim, be bright, be well-proportioned, clean-limbed. The boy must have vim, must be bright, must have a good set of muscles. The good horse has a pleasing color and a glossy coat and must hold his head high.

So with the boy; he must be well-groomed, must stand erect; and moreover, must see things when he looks at them. The good horse must walk, gallop, trot, or stand as the master directs. So the boy must learn to walk, run, caper or be still as the case requires.

"And the tree has as many good points, although they are different. Examine your tree for points every month and see what percentage it will have out of a possible one hundred. Here are some of the signs which show whether the tree has a college diploma, is cultivated, is familiar with the higher branches. Each question, if answered unequivocally, 'Yes,' gives your tree $8\frac{1}{3}$ per cent toward the one hundred. These questions are put in the order of their importance; and are numbered to correspond with the pictured 'Points.'

1. Is the opening around your tree of standard size?*



(What is the actual size?)

2. Is the ground in this opening well-loosened to admit air and water?

3. If the tree is surrounded by grass, is the sod open around the trunk?

4. Does the tree get a good proportion of the rain which falls on the sidewalk, or does it run over the curb into the gutter?

5. Is the tree protected with a tree-guard? Guard must be six feet high and not too tight. Tree must be protected from chafing by guard.

6. Is the tree free from borers? Borers can be detected by sawdust coming out of holes in the trunk. Watch for the borers from April to November.

7. Are the trunk and the branches cleared of all cocoons, egg-masses, larvae, caterpillars, beetles, scale?

*Standard size is: 4 feet square for a tree of 6 inches (or less) diameter; for every 1 inch increase of such (6-inch) diameter, an increase of 1 square foot in area of opening.

8. (a) Is the head free from all deadwood, has it been pruned by an expert, and how do you know he is an expert? Find out how a tree should be pruned. Are all the cuts painted? (b) Does the tree stand perpendicular and is its present place intended to be its permanent home?

9. Have the scars from horse bites or other injuries been cleaned out and painted to prevent harboring insects and to stop decay? If there are large cavities these should be filled with cement.

10. Does the tree remain green and in full leaf to the middle of October?

11. Have you put as much nourishment into the soil as the tree needs for the year? Give it a treat; dig in wood ashes, ground bone or well-rotted manure.

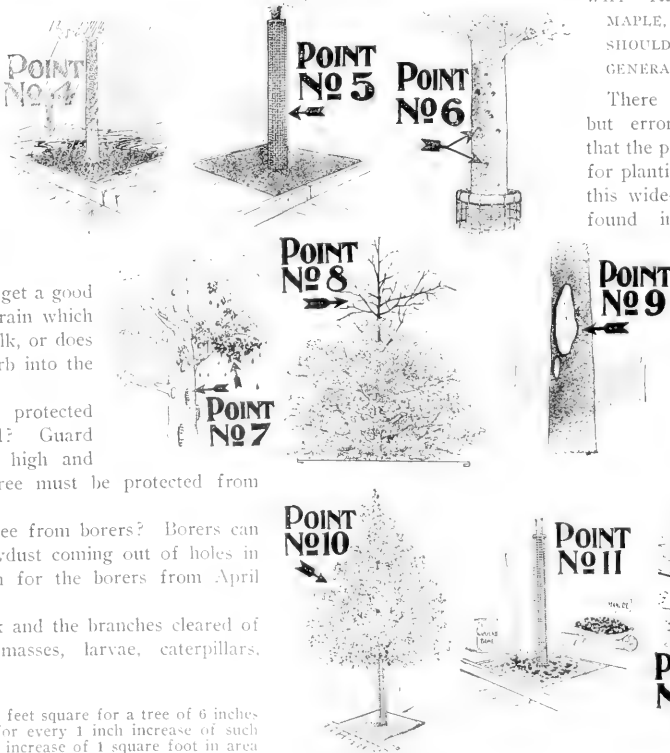
12. Are any wires interfering with your tree either by swaying or by electric current? Are there any gas leaks?

"Here are the twelve points of a good street tree. The total percentage if below par reflects on the man, not on the tree. The tree always does its best. Man forgets that he has taken it out of the God-made forest where it could and did care for itself, and has placed it in a man-made city where it is dependent on man's care for thrifty growth."

WHY THE POPLAR, SILVER MAPLE, AND ALNANTHUS SHOULD NOT BE USED FOR GENERAL PLANTING.

There is a very popular but erroneous idea current that the poplar is the best tree for planting. The reason for this wide-spread idea can be found in the quality of

quick growth which the poplar possesses, and which the average citizen evidently considers of supermost importance in choosing his tree. The



fact, however, is that even this fast growth itself soon becomes a most serious objection against the poplar, because the tree grows so rapidly that it soon becomes top-heavy, and the wood being soft and brash, breaks of its own weight. The main roots of the poplar grow very large and upset the pavement of the sidewalk, while the finer rootlets in their search for water extend themselves to the nearest water or sewer pipes, penetrating the cemented joints of these, and in course of time develop sufficiently to clog up the passages.

The conventional outline of its form and its system of branching as well as the stiffness of its foliage does not

to some special authority, the poplar is not tolerated. The species which is most commonly planted and to which these remarks apply more directly is known as the Carolina poplar. But there are three other kinds frequently used—the Silver, Lombardy and Balsam poplars, and most of the defects enumerated above are equally applicable to all.

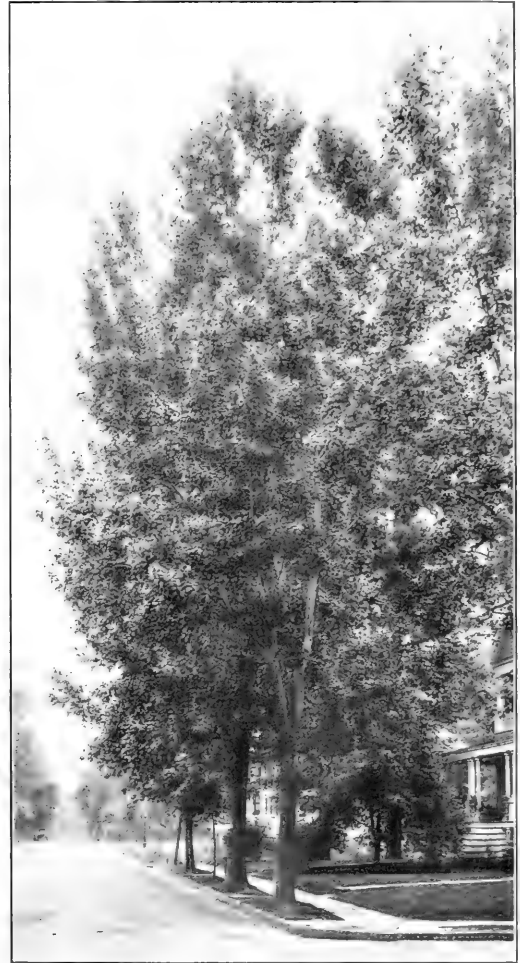


LOMBARDY POPLAR

This tree has a special landscape value which no other tree possesses and under special conditions it can be used to better advantage than other trees.

even recommend the poplar as a beautiful tree. Its leaves begin to drop earlier than those of most of our other shade trees and the flowers of the male trees during their period of falling cause much discomfort to pedestrians. It is a tree that requires constant trimming, possesses a very short life and is frequently destroyed by scale insects and borers. The city government in Albany, N. Y., in 1871, not only forbade the planting of the poplar, but also compelled its removal from the streets at the time this ordinance was passed.

In Washington, D. C., in Brooklyn, N. Y., and in most other cities where the care of the city trees is charged



A CAROLINA POPLAR

Many believe that because of its quick growth the poplar is desirable for street planting. It is not, however, as its roots, which grow large, are likely to do much damage to the pavements, while the finer roots, in their search for water, extend themselves to the nearest water or sewer pipes, penetrating the cemented joints of these and sometimes clogging up the pipes.

There are occasions, however, under special conditions, where the poplar may be used to better advantage than any other tree. The Lombardy poplar, for instance, has a special landscape value that no other tree can produce. The Silver poplar is very desirable for seaside planting and the Carolina poplar is so well adapted to

factory districts and poor atmospheric and soil conditions that it is often better to have that tree than none at all.

The Silver maple is very pretty in its mode of branching and grows rapidly, but in most respects is as undesirable as the poplar and more subject to dead wood and injurious insects.

The alanthus like the poplar has the advantage of being able to grow where few other trees will grow. Moreover it is well formed and straight. The serious objection, however, is the brittle character of its wood which causes frequent accidents, especially in wind storm. It is short-lived and has a tendency to become hollow when it reaches a diameter of about 2 feet or over.

For special use under special growing conditions all these trees may prove of great value but for general planting in large numbers on city streets their disadvantages should be considered with the utmost regard.

ADVICE FOR OCTOBER

1. Prune all dead branches before the leaves fall.
2. Mark for removal, all trees hopelessly infested with insect pests that are liable to become serious enemies in a locality. Such pests as the hickory bark beetle in the hickories, and the bronze birch borer in the birches are examples.
3. Collect and burn the egg masses of the Tussock moth and destroy the eggs and cocoons of other insect infestations.
4. Spray for scale insects; but before doing this, determine the character of the insect and receive specific instructions from your local State entomologist or from the United States Department of Agriculture. Do not spray sugar maples with oils.
5. Treat cavities before freezing weather sets in.

QUESTIONS AND ANSWERS

Q. Should Lombardy poplar trees be trimmed around the lower part of the tree or should the growth which starts from the ground, that is the branches, be allowed to grow, for, seemingly, by doing so they withhold from the upper part of the tree the strength needed.

C. F. Q., *Center Harbor, N. H.*

A. Lombardy poplars are only *beautiful* and *natural* when the branches are allowed to grow thickly from the very bottom to the very top. The little branches should *never* be trimmed around the lower part so as to bare the stem. When a Lombardy poplar begins to thin out or grow old, the best thing to do is to cut off a great portion of the top, varying with the size of the tree, and cutting back all the little branchlets along the whole surface of the tree. I do not mean to cut any of these off entirely, but just to remove a part of them, half or more, according to the condition of the tree. After cutting the

form of the tree should be uniform. The harder and the oftener the Lombardy poplar is cut, the faster and the thicker it will grow. You can cut the tree at any time from now on until the buds begin to open in the spring. September or October, however, are the best months for doing this work.

Q. Have you, or do you know of a successful transplanting of large oaks? What are the chances of success in moving oaks 2 inches in diameter as compared with elms, maples and like fibrous rooted species? I have a problem with a virgin live oak (*Quercus agrifolia*) and shall appreciate any information you may give me.

N. C. T., *Oakland, Cal.*

A. Oaks from 2 inches to 4 can be readily transplanted with little difficulty and with fair chances of success. Trees of larger diameter, up to 14 inches, have been transplanted with more or less degree of success; but in each case the work has been done with special lifting apparatus and by men who more or less specialize in this sort of work. I would suggest your writing to Messrs. Isaac Hicks and Sons, Westbury, L. I., who are about the largest tree movers in this section of the country and who will undoubtedly send you their catalogue and other information along these lines.

Q. When will it be advisable to plant the following trees, in a situation in the southern part of Cayuga County, N. Y.: English Thorn, American holly, hawthorn, Swiss Mountain pine, Rhododendron, Fringe tree, Korean pine, Giant Arbor Vitae, Linden, and one each of the following: White pine, pitch pine, table mountain pine, Austrian pine, Scotch pine, nut pine, fox-tail pine, lace-back pine and needle pine.

M. C. C., *Venice Center, N. Y.*

A. Plant in the spring of 1916. About the beginning of April. You can plant in September, but spring is preferable on general principles.

Q. I am sending you specimen from a Dogwood that I have in my yard. This blight seems to be affecting the whole tree. Can you advise a remedy?

A. The premature turning of the dogwood leaf and its dry condition shows that the tree is suffering from too much exposure or too little water. Dogwood naturally grows best in deep woods where the moisture from their leaves does not evaporate as readily as in exposed places, and where their roots can find plenty of moisture. There is no evidence of disease. Would suggest cutting back the tree lightly this fall not cutting out any branches entirely but just cutting back from the ends. Dogwoods respond to this treatment well. Also cover the tree with a mulch of leaf mold late in the fall.

The Philippine Forestry Exhibit

By ARTHUR T. FISCHER.

THE Philippine Forestry Exhibit at the Panama-Pacific Exposition in San Francisco is the largest exhibit of its kind there, occupying 10,000 square feet of space and displaying some 450 different species of wood in panels and samples.

The main features are 10-foot panels of varying widths, covering 260 feet of wall space and representing 131 species of woods; and manufactures of different woods, such as furnitures, floors and interior finish for which there is an export market and which can be furnished in commercial quantities. All the materials inside of the allotted space used in the installation of the exhibits and booth construction are of Philippine woods or forest products and have created much favorable comment.

About one-third of the area of the Philippine Islands, that is, 40,000 square miles, is covered with virgin forest, with a stand conservatively estimated at 200 billion board feet, of which 142 billion belong to the Dipterocarp family of which the lauans are in the majority. Ninety-nine per cent of all this timber belongs to the Government and is under the administrative control of the Bureau of Forestry.

The entire administrative and investigative work of the Bureau of Forestry is shown. It is very interesting to note the progress along investigative lines made during the American occupation; in 1900 only about 100 species were known and the botanical and wood collections made by the Bureau employes number about 26,000 up to 1915, out of which the number now identified is 4,200 woody plants and 2,200 tree species, of which about 1,000 are timber trees. On an area of 120,000

square miles the Philippines have four or five times as many species as the entire United States.

A woodman from temperate regions is usually very much bewildered and often discouraged when he first realizes the very great number of forms with which he has to deal in the Philippine forest. He cannot work long in the forests before he discovers that the bulk of

the stand is made up of comparatively few species.

With the great number of forms occurring in the Philippines it is very natural that the problems of silviculture and management are correspondingly increased over the problems in the temperate regions, and it is just this fact that makes a forester's work in the tropics so much more interesting. In 1911, the investigative work of the Bureau of Forestry was centered at the Forest School at Los Baños. Laguna, on the lower slopes of Mt. Ma-

quilung, about 25,000 acres of which are forested and included in the Government reserve. This makes not only a splendid laboratory for the students of the Forest School but also a splendid area for research and investigation. Extensive studies of growth and reproduction were started, measurement of the rate of growth of hundreds of trees in the forest and of many more in the nurseries and plantations were taken. To date 317 species have been handled in the nurseries and 83 species set out in permanent plantations. A number of these species offer promise as successful plantation crops.

As a result of the scientific work done by the Bureau and those who have cooperated with it the following things have been accomplished.

1. Mapping showing the location of the principal forest areas of the Islands.



THE MINOR FOREST PRODUCTS SECTION

In this section there are on exhibit in many forms gum copal, resins, gutta percha and rattan, all products of the Philippine forests which are well worth careful inspection.

2. Recognition of the fact that the principal forest wealth of the Islands is in the woods that occur in quantity and not in a few rare cabinet woods.

3. Detailed study and classification of the important timber trees.

areas varying in extent up to 20,000 acres are not uncommon. Its leaves have great use locally for thatching but the sap is of importance to the commercial world, it having the distinction of being the cheapest raw material known in the world for the production of sugar, alcohol and vinegar.



FURNITURE AND KIOSK AT PHILIPPINE EXHIBIT

The floor is of Philippine hardwood and the entire exhibit is made of the forest products of the islands, with the exception of the shell frieze work, which is made of capiz shell.

4. Classification of the commercial woods.

5. Determination of the durability of a number of woods by systematic tests extending over a period of years.

6. Determination of the strength of the generally used woods by mechanical tests.

7. Discovery of a successful crop for firewood and reforestation purposes.

8. Scientific study of the Dipterocarp forests.

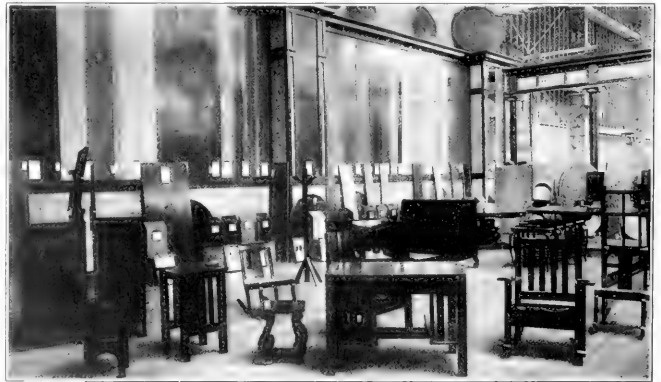
One of the exhibits along the administrative lines is the system of communal forests which the Bureau of Forestry has put into effect. Each municipality having Government forest land in its vicinity can upon application have an area set aside for a communal forest, the size of the tract depending on the number of inhabitants and the stand of timber.

The Philippine Forestry Exhibit does not confine its display to woods alone but many products are shown which are classified as minor forest products in the Philippine Islands; they cover a wide range of products not cultivated but growing wild, the principal ones being Nipa, Rattan, Gum Copal, or Manila Gum, Mangrove barks for tanning, Gutta Percha, Dye-woods, Wood and Vegetable Oils, Bamboo for paper pulp, etc.

Nipa is a palm on the tidal flats along the seacoast;

Rattan is a product of many species of climbing palms found in the tropical regions of the old world. The large range of sizes makes the product adaptable for many uses. The Islands produce about 15 or more species and there is no finer rattan in the world than in the Philippine Islands. Its uses in furniture, baskets, car seats, etc., are too well known for further comment. One complete section is given to the display of this product showing the various kinds, and its varied uses are shown by artisans at work. This is the largest exhibit of its kind on the grounds.

Gum Copal, or Manila Gum, is shown in commercial packages as exported to Singapore and Europe and classified as to grades and kinds. It is the most complete as well as the largest exhibit of varnish gums and resins in the entire exposition. Other gums and resins are



THE TEN-FOOT PANELS ON THE WALLS

There are 280 lineal feet of these panels, each 10 feet long, and they represent the various commercial timbers cut from the magnificent forests of the Philippines

also shown, including the famous Manila Elemi, a source of certain drugs and perfumes which is only produced in the Philippine Islands and exported to Europe. Lumbang Oil, which is on display, is practically identical with the Tung Oil of China and could be developed to a big scale in the Philippines. The United States imported more than \$2,000,000 worth of this oil from China last year.

Gutta Percha and Rubber, while not as large a display as the Gum Copal, are nevertheless comprehensive enough

to give the visiting public and the American manufacturer in particular a good idea of the grades and qualities of these products as produced in the Islands. Mangrove bark, from which the tanning extract, known in the commercial world as cutch, is produced, can also be seen; 800 square miles of mangrove swamps are available for tan bark extraction and make an attractive source of supply for tanning extracts.

A small, rather inconspicuous exhibit of Boho Bamboo is shown, the source of one of the finest and best paper pulps in the world. Thousands of acres of this bamboo are available for use. This bamboo, after being cut, sprouts and is ready for cutting every three years. The fiber and quality of this material can be seen and examined in the wall covering known as "Sauale" which is woven with splints of Boho Bamboo.

Many more products can be seen which will interest the American business men.

These facts about the Philippines may be of interest:

Number of islands, over 3,000.

Total area, 120,000 square miles, about the size of the State of New Mexico.

Population, between 8,000,000 and 10,000,000 people. Area now cultivated estimated at 6,000,000 acres.

Area suitable for cultivation estimated at 30 to 35 million acres.

Virgin Forest area estimated at 25 to 30 million acres.

Second growth area estimated at 15 to 20 million acres.

EXHIBIT TAKES GRAND PRIZE

Just as this number goes to press a report from San Francisco to AMERICAN FORESTRY says: "The Philippine Bureau of Forestry exhibit at the Panama-Pacific exposition has captured the grand prize for the best forestry exhibit in the entire exposition. This is the highest honor within the power of the exposition officials to award. Moreover, the exposition officials consider the exhibit of such unusual excellence that in addition they have awarded to the Bureau of Forestry two other grand prizes, three medals of honor, four gold medals, six silver medals, seven bronze medals, and one honorable mention. It is expected that the exhibit will get still a few more awards."

Wood Preserving Department

By E. A. STERLING

The Modern Application of Wood Preserving Methods—Various Treatments and the Use of Treated Woods

CHESTNUT, which is the wood featured in this month's issue of AMERICAN FORESTRY, does not figure to any extent in wood preserving practice. It is a timber which is naturally durable, and has long been used for fence posts and other purposes where resistance to decay is an essential quality. Strangely enough, chestnut is one of the most difficult woods to treat by any known preservative method, so it is fortunate that it possesses the inherent power to resist decay. Although the wood is of open nature and the pores in the spring wood are distinct to the naked eye, it is almost impossible to force preservative liquids of any kind for any distance into the wood. This is for the reason that there are cross walls in the pores which are not easily broken down, and which effectively prevent the movement of introduced liquids even under high pressure. While a few chestnut cross-ties are treated at some of the Eastern plants, this species constitutes only a small percentage of even the miscellaneous timbers which are given preservative treatment.

THESE general statements in regard to the preservative treatment of chestnut apply mainly to the large plants which use a pressure process. In the very extensive use of chestnut for telegraph and telephone poles there has been some use made of creosote and carbolineum oils for brush treatment at the ground line. In a few cases an open tank treatment of the base of the pole for about 6 feet has also been given.

Although chestnut is naturally durable, the thin sapwood decays quite rapidly in contact with the ground. It is with the aim of checking or preventing this superficial decay that the brush treatment of chestnut poles at the ground line has been practiced. If properly done with a high boiling creosote or coal tar derivative, which will not show too great loss by evaporation, the brush treating of chestnut poles at the ground line is fully justified. By preventing the decay in the sapwood the development of fungus growth, which would ultimately extend into the heartwood, is eliminated.

AN INTERESTING order was received recently by a Chicago firm for shipment to South Africa. It consisted of a cargo of creosoted oak ties for use in building a new railroad. For many years it has been necessary to use metal ties in parts of South Africa on account of the ravages of the white ants. It now seems to be conclusively demonstrated that creosote treatment is an effective protection against these insects. Even with this fact established an order for creosoted ties would hardly be expected in America, and the explanation is that the war has closed the Baltic ports and Europe is now unable to supply creosoted timbers in the African market. Within the past year several cargoes of creosoted Douglas fir ties have been shipped from Pacific Coast points for use in India, and since the average life of a well-creosoted tie properly protected from mechanical wear is about 30 years, it is a natural expect-

tation that a further export market for creosoted American timbers will be found.

THE Santa Fe Railroad is conducting extensive experiments to determine the best methods of eliminating the loosening of spikes in cross ties, and the mechanical wear under the rail or tie plate. Since methods have been perfected which prevent the decay of ties, the next problem is to keep them from wearing out. This is usually done by using large tie plates, and in the more advanced practice holding the tie plate to the tie with lag screws, and using a screw spike as a rail fastener, which is independent of the tie plate. Even with this equipment, ties which are soft in character, as loblolly pine, wear out long before they decay, or fail to give the necessary holding power to the spikes. To overcome this, if possible, the Santa Fe, through the activities of George E. Rex, Manager of Treating Plants, is experimenting with what is known as hardwood "dowels."

These dowels are extensively used in Europe, but are entirely new in the maintenance of way departments of American railroads. They are simply a large wooden plug, bored through the center for the rail spike, and with a wood thread cut on the outside. In the case of old ties from in the spike is loosened the old spike hole is bored out to the proper size, and the hardwood dowel inserted. The rail or plate is then laid on top of the dowels and fastened down, preferably with screw spikes. The result is that a softwood tie becomes essentially a hardwood in respect to wearing qualities. In fact, the result is even better than with hardwood ties, such as oak, because the vertical ends of the grain on the hardwood dowels carry the load, and as is well known through the principle applied in putting creosoted paving blocks on end, the grain of wood in this position is very resistant to wear on breakage. As carried out by the Santa Fe, this can be applied both to old creosoted ties which are taken out and dowels inserted in the old spike holes, and to newly treated ties which are prepared with

dowels at the time of treatment. This is an extremely important matter, not only from the standpoint of economy in cross tie maintenance, but also in the conservation of timber resources, because it permits the use under heavy traffic of softwood ties, which otherwise could not be used except under very light traffic. By this practice the forest resources of the south can be more generally utilized.

IN THE promotion of creosoted wood block for city pavements and factory flooring, the question of cost is an important consideration. Although it is generally recognized that wood block is superior to any other form of pavement other materials are frequently used because of their lower first cost. In the effort to correct this condition a new idea in wood block treating practice has been developed independently by two well-known engineers, G. B. Shipley of Pittsburgh, and J. B. Card of Chicago. The essential feature of the new plan is that the blocks are treated in vertical instead of horizontal cylinders. The vertical cylinders are open at the top, and are filled direct with blocks which are carried by conveyor from the wood block machines. By simply dumping in the blocks without the use of cages, as in the case of horizontal cylinders, a greater volume of wood per cubic unit of cylinder displacement can be treated, with the further great advantage that mechanical handling figures entirely throughout the whole process. After treatment the blocks are either dropped direct by gravity to cars through a door in the bottom of the cylinder or pushed out through the top by a piston which operates from the bottom of the cylinder. These vertical plants are very cheap compared with the usual horizontal type, and can be easily erected in connection with saw mill plants or wherever facilities for block treatment are necessary. It is estimated that the saving in the cost of treatment will run from 20 to 25 per cent, which largely removed the handicap of higher cost, which the wood block people have been trying to overcome.

The Fool and Our Forest Dollars

By E. T. ALLEN

Good-by to the fool with the empty gun;

Forgotten his bid for fame,

Though he kills his friend, it only counts one,

And that, nowadays, is tame.

The fool who playfully rocks the boat

Is on the front page no more,

He may rank high with the fools afloat

But his glory is gone ashore.

There's the fool with women, the fool with wine,

And the fool who games with strangers,

And the joy-ride fool (he does well in his line

By combining these ancient dangers).

But they're all still down in the primer class,

Mere novices taking a flyer,

Compared with the prize-taking criminal ass,

The fool in the woods with fire.

A few hearts break for the deeds they've done

In their pitiful amateur way,

But fire slays dozens where they slay one

And scourges a state in a day.

For the ruined home and the smokeless stack

And the worker unemployed

Know a hundred years shall never bring back

The things that his match destroyed.

A NEW FACTOR IN FOREST FINANCE

By W. T. CHRISTINE.

NEVER before in the history of the lumber industry of America has the question of finance commanded so great a share of the attention of operators.

Conditions have called for continuing increases in plant and timber investments. The unit of value of timber, the price per thousand feet, is steadily advancing. Logging equipment and logging railroads cost more today than formerly. The outcome has created an imperative demand for more working capital.

When this need first became manifest it was met by the issuance of bonds secured by a mortgage on the timber and mill property of the operator.

In many cases the results of the bond issues have not been satisfactory, due to restrictions in operations arising from the conditions imposed by the bond house. This fault may be attributed to the fact that the banker did not understand the necessities of the lumber business, nor its opportunities for profit.

Forest finance is a much deeper and broader question than the people of America have realized. Forestry is practical under present conditions when it is profitable; and then only.

Present day forest finance is extremely practical in character. Money is loaned to owners of timber and mill properties who are worthy of financial aid. Some of these loans are straight mortgages; others are evidenced by bond issues, which likewise are mortgages.

One of the largest transactions of this character placed upon the market this year was the bond issue created and sold by the recently organized James D. Lacey Timber Company, of Chicago. This was a loan of \$3,000,000 secured by the property of the Brown Corporation, of Portland, Maine. The Brown Corporation constitutes one of the component companies of the Berlin Mills Com-

pany and the Burgess Sulphite Fibre Company, of Berlin, New Hampshire. These companies represent an organization founded in 1852 and purchased by William W. Brown in 1868, since which date they have been in continuous and profitable operation. The three companies today represent an investment of about \$30,000,000, with annual sales averaging \$12,500,000.

They use their timber economically. If true conservation is the wise and close use of timber, then these companies stand well in the fore rank of the conservationists, with a record of 90 per cent of tree utilization, against the ordinary sawmill record of 35 per cent to 40 per cent.

This bond issue was put on the market and sold at a time when the banking houses of America were disinclined to consider new securities of any kind. The accomplishment was due to the standing of the company offering the bonds and to the further fact that the interests of both maker and buyer were fully protected. It is the ability of the James D. Lacey Timber Company to protect both the bond maker and the buyer that places it in the van of lumber financiers.

James D. Lacey Timber Company is a development of James D. Lacey & Co., a firm which for thirty-five years has been an active force in the purchase, sale, cruising, valuing and development of the timber of North America. The members of this firm also have been active in establishing and operating sawmill and logging enterprises. They understand the needs of the operator, can approximate the credit to which he is entitled and appreciate the latitude that should be given him to make his business profitable. The new organization will have at its command all the wealth of data assembled by James D. Lacey & Co. It would be virtually impossible to duplicate this information as the firm's records cover every timber producing locality in the United States, eastern and western Canada, Mexico, and portions of South America.

When work of this important character is undertaken



OFFICERS OF JAMES D. LACEY AND COMPANY

James D. Lacey,
*President*Wood Beal,
*Vice-President and Treasurer.*Victor Thrane
Vice-President

by men of experience and proven business acumen a distinctly progressive step is taken. The personal knowledge and influence of the members of the new company, their understanding of the timber and lumber industries, the very high regard in which "Lacey" reports and recommendations are held, renders it possible for the company to perform a genuine service for their clients.

The officers of the company are: President, James D. Lacey; vice-president and treasurer, Wood Beal; vice-president, Victor Thrane; secretary, J. W. McCurdy. The directors include the officers named and Frank D. Stout and Lamont Rowlands, of Chicago, and Charles S. Keith, of Kansas City, Mo. Other stockholders of equal prominence are available for service on the board. The knowledge, experience and ability of the officers and directors of the company, fortified and supported by the reliable and detailed information in their possession, has made possible the success already obtained. The advent of this company should serve to place lumber and timber finance on a much more secure basis.

The facts briefly recited here will make a strong appeal to every forester and to all interested in the subject, for practical forestry means profitable forestry and entails satisfactory methods of finance.

BEAVER DAMS LAST 150 YEARS

HOW long will a beaver dam last? At least a hundred and fifty years is the conclusion of the New York Conservation Commission, as the result of an examination of trees growing upon a very old dam in the vicinity of Eighth Lake in the Fulton Chain.

Scrub white cedars on this dam were cut down, in order to count their annual growth rings, by W. C. Talmage, of Camp Waubun, Seventh Lake, whose study of beavers during the last thirty years has taken him over many of the wild portions of the United States and Canada. A section of one, just received by the Commission, is nine inches in diameter and shows 125 annual rings. Others as large as sixteen inches have rotted in the center until they are mere shells, whose age can only be guessed at.

On the supposition that the trees could not have taken root upon the dam until it had become covered with humus from dead leaves, or silt washed on by the stream, it is believed by the Commission that the dam dates back certainly until 1765, before the power of the Iroquois Confederacy was broken, and when the Adirondaeks were still their beaver hunting country of apparently inexhaustible supply. Then every stream held evidence of their skill, and the pelts that they supplied even passed for currency at Fort Orange and New York.

In their old haunts along the Fulton Chain they are coming into their own again, until they have become one of the prime attractions of the region.

WEST VIRGINIA'S STATE FORESTER

BY RECENT action of the legislature of West Virginia the position of State Forester was created, under the Department of the Forest, Game and Fish Warden, and H. J. Kaestner, 1327 Lancaster Ave., West Philadelphia, was appointed.

Mr. Kaestner received his early education in the public schools of Philadelphia, graduating from the Central High School, Course of Commerce, in 1910. His For-



H. J. KAESTNER

The young Philadelphian, a graduate of the Pennsylvania State College Forestry Department, who has been appointed State Forester of West Virginia

estry work was pursued at the Pennsylvania State College, from which institution he received his degree in 1914.

Mr. Kaestner, both as a student and since graduating, has traveled extensively through the forested regions of the United States. He has seen active service on the Cascade National Forest in Oregon, while extensive trips through New England, the Lake States and the Southern States were made by him in pursuance of his studies while at college.

Headquarters of the Forestry Department are maintained at Belington, W. Va. This department has been conducted under the direction of J. A. Viquesney, State Forest, Game and Fish Warden and it is now assuming the important position in the growth of that State which it so justly deserves. West Virginia, ranking eleventh in lumber production, realizes the importance of its natural resources and the field open to Mr. Kaestner is a large one.

Editorial

NATIONAL FORESTS IN THE EAST

WITH the exhaustion of the remainder of the present appropriation under the Weeks Law, the work of acquiring forest lands by the National Government in the East will be halted until such time as Congress provides means for its continuance. Up to the present time, some 1,250,000 acres have been acquired in the Appalachians and White Mountains. Since the fundamental purpose of these reservations is to protect the headwaters of navigable streams, prevent erosion and regulate flow for navigation and power, it is obvious that these objects will never be satisfactorily obtained until a substantial per cent of the mountainous non-agricultural lands within which these streams have their source are brought under proper management.

The nation has put its shoulder to the wheel at the request and with the sanction of the states concerned, and has selected by thorough examination the areas, seventeen in number, within which it has concentrated its purchases. But in most of these forests the amount of land actually acquired is merely a nucleus for the final goal—a few thousand acres scattered throughout a much larger area, practically all of which must be eventually held in Government ownership if fires are to be controlled and forest cover restored.

Perfect title is demanded before these lands will be accepted by the Government. Many times this condition cannot be fulfilled and friendly condemnation is the only possible solution. The process of appraisal, survey to establish boundaries, examination of title and acceptance of final purchase price by the Purchasing Board and the owner involves delays which greatly hamper the work of acquisition. This work requires expert services and during its progress a force of capable land examiners,

surveyors and others has been secured and trained. Active measures of administration and fire protection have been inaugurated on the chosen areas, in some instances with the sanction of the owners, while purchases were pending and before the Government owned a foot of land. The personality of the local supervisors is already making itself felt among the mountaineers and backwoods farmers in an educational campaign against forest fires.

To sum up the situation, everyone, settler, lumberman, town dweller, in the regions affected knows that the work of the Government has only just begun and that to be effective it must be pushed to completion. Those who have suffered inconvenience at the normal delay in purchasing lands have become skeptical of the possibility of doing business with the Government at all. Fire protection on areas not yet owned is being tolerated for the time, but this condition cannot last. There must be a show-down.

If Congress repudiates this great undertaking now, by neglecting to make the necessary appropriations for its continuance, the effect will be much the same as if appropriations for the Panama Canal had been discontinued when the enterprise was half completed. The scaffolding has been erected and the foundations laid. We must proceed with the superstructure.

The nation which is forced to economize by suspending operations on important public works midway of completion is exhibiting financial folly unworthy of a great and prosperous people. Let us proceed without such interruptions along the lines so thoroughly and carefully thought out, to a rehabilitation of our Eastern mountain forests and our Atlantic Coast waterways.

GETTING CLOSER TO FOREST PROBLEMS

FOR the first time since its inception the American Forestry Association will, on October 20, hold a meeting on the Pacific Coast, and the day will be known at the Panama-Pacific Exposition as American Forestry Association Day. This meeting is designed to bring the officials in closer touch with the western conservationists, foresters and lumbermen and to make them better acquainted with the work which the Association is doing all over the country. The members on the Pacific Coast are awaiting the event with keen anticipation and hundreds are expected to attend.

It is the desire of the officials of the association to keep in close touch with the forest problems in every

section of the United States. The annual meeting in New York City last January gave a clear insight into the conditions in New York State. The meeting at Boston in January next will be appropriate because it is expected that the question of providing a further appropriation for the operation of the Weeks Law will then be pending. The meeting in San Francisco will be at a time when the fire season in the great Pacific slope forests is practically over and when the reports on the progress of fire protective work will be available. As fire protection is the greatest forest problem on the Pacific Coast it will be possible at the coming meetings in San Francisco for the officials and members of the

association to listen to the reports and participate in the discussions regarding the work of the various fire protective organizations during the season as well as the efforts in the same direction so well made by the United State Forest Service and the State organizations.

During the next year it is the purpose of the Association to get in closer touch with the lumbermen's problems, the greatest of which, as affecting conservation of the forests, is the present need of leaving in the woods to rot, or to burn, some 30 per cent of the annual cut of timber. This 30 per cent, if it was possible to sell it at the price of the lowest grade lumber, would be worth some two hundred million dollars annually. If some

market can be found for this great quantity of wood now wasted, if some means of utilization can be developed which would convert it into a merchantable product, then there would be accomplished a saving of practically one third of the annual cut of timber, a saving which would add one third to the present life of our forests.

There are other problems commercial, national, state, municipal and individual which also may be solved in time, and the best means of studying these is to discuss them with people who are trying to solve them, to cooperate with them, and to give them the aid of the big national association, and that is what the officials of the American Forestry Association expect to do.

The Weeks Law Conference

ON THURSDAY, September 23, the American Forestry Association and several co-operating organizations held a conference with Secretary of Agriculture Houston at his office in Washington to present to him reasons why a further appropriation should be secured to carry on the work started five years ago under the provisions of the Weeks Law, and suggested that he urge the importance of such an appropriation upon the President and Congress and recommend it in his annual report to Congress.

Secretary Houston discussed the operation of the law and the proposals to continue the appropriation for the work with members of the delegation from various sections and assured them of his interest in the matter and his very careful consideration of their suggestions.

The presentation to the Secretary of the arguments in favor of the proposition was made by Dr. Henry Sturgis Drinker, president of Lehigh University and president of the American Forestry Association, and was as follows:

September 23, 1915.

TO THE HON. DAVID F. HOUSTON,
*Secretary of Agriculture,
Washington, D. C.*

Sir: The movement for an Appalachian National Forest Reserve originated in the South in 1899 on account of the damage done to the mountain slopes by unwise timber cutting and tillage and by forest fires. Congress was memorialized in the matter in 1900 and many bills have been introduced. (For a summary of the bills and reports between 1900 and 1907 see Senate Report 459, 60th Congress, 1st Session.) The White Mountain project was taken up in 1901 and the two movements combined in 1903. Twice bills passed the Senate only to fail of consideration in the House. In 1907 an appropriation of \$25,000 was made for an investigation and report by the Secretary of Agriculture. The Secretary's report, submitted in December, 1907 (Senate Document 91, 1st Session, 60th Congress), recommended the purchase of large areas of lands in the Southern Appalachians and in the White Mountains. Finally in 1911 (see circular on the purchase of land under the Weeks Law), the necessary legislation was secured and an

appropriation of eleven million dollars was made for the purchase of land, of which only approximately only \$8,000,000 actually became available.

This legislation was secured only after the most earnest efforts of the American Forestry Association and of other organizations represented at this conference. Many hearings were held by congressional committees which were attended by large numbers of representative citizens from the North and the South. The published reports of the hearings and reports of congressional committees show how broadly and thoroughly the question was considered. Many phases of the problem were discussed in publications of the Forest Service and Geological Survey. Action was taken by Congress only after all the bearings of the proposed legislation had been fully considered, and with the full knowledge that if the plan succeeded further appropriations would have to be made to carry the work to completion.

It is now reported by the United States Forester that of the \$8,000,000 that actually became available under the Weeks Law, all except some \$500,000 has been spent. There have been acquired or approved for purchase 1,285,000 acres at an average price of \$5.25 per acre. Including cost of appraisals, surveys and title investigation work, the cost has been \$5.83 per acre. Purchases have been limited at first, as we believe wisely, to the Southern Appalachian and the White Mountain regions. Considering only these regions, the program first proposed by the Secretary of Agriculture in 1907 (Senate Document 91, 1st Session, 61st Congress, and laid down by the National Forest Reservation Commission in its last annual report (Senate Document 661, 3rd Session, 61st Congress), is now far from complete in these regions. In some areas (already designated for purchase) no acquisitions have so far been made, and some localities ought to be included in purchase areas that are not now included. The Weeks Law is not limited to particular states or regions. It is, as it should be, a broadly national bill. Lands ought to be acquired to some extent outside the Appalachian region, as, for instance, in Arkansas and other western states to round out and complete the present National Forests for the purpose of protecting the watersheds of navigable streams.

An excellent beginning has been made on a great construction program that the Federal Government must carry to completion if the interests of the nation are not to suffer. The organizations represented here have long

been fully convinced of the wisdom and necessity of this program. Some of them labored for years for its inauguration. They have watched with deep interest and gratification the results secured under the Weeks Law, and their representatives are here now to assure the Secretary of Agriculture of their continued interest and to urge that the program be carried forward without interruption and on a scale commensurate with its importance. A further object of the conference is to consider ways and means of working effectively towards that end.

As the officer of the Government most largely responsible under the law for carrying forward this program, we desire to suggest to the Secretary of Agriculture that if it meets with his approval he urge upon the President and Congress the importance of this program and a continuation of the appropriation of funds necessary to carry it on. Our hope is that the Secretary may discuss the matter in his annual report and recommend a continuation of appropriations, as recommended by the National Forest Reservation Commission in its annual report, at the rate of \$2,000,000 a year for an additional period of five years and also that he will include in his estimates to Congress for the fiscal year 1917 an item of \$2,000,000 as a first installment of this appropriation.

The program of purchases should go on without interruption for the following principal reasons:

1. Congress has begun the policy. It did so only after long consideration and discussion and after obtaining convincing proof of its necessity. Under the authority obtained, and the appropriations, a good start has been made. An effective procedure has been worked out. A force of experts has been trained. The machine which has been created for the work and which under the law is somewhat complicated is in motion.

2. It would be a great loss to have the program interrupted. The force which it took two or three years at the start to get together and train would be lost so that when the work is taken up again a new force would have to be gotten together and trained. Touch would be lost with the land owners, and with it that intimate information as to titles, surveys and values which is now making the work go forward effectively.

3. The wisdom of the Secretary of Agriculture has been shown in limiting at the start purchases to certain specific areas of great importance. But the purchases are not complete in any of these areas and undoubtedly cannot be made so with the appropriation already made. If the purchases should stop now the Government would be put to too high a cost for protecting and administering its lands on account of intervening private lands. Furthermore, the work would not have gone far enough to accomplish the purpose which the legislation was intended to accomplish.

4. This program is of too great importance to be carried on intermittently. It is of the utmost national importance that the mountain watersheds be protected so that the streams may be capable of the highest development; so that the soils shall not be washed from the mountain sides nor the property of persons or communities ruined or damaged by floods which could in part be restrained; so that the river valley soils may not be destroyed as a result of the floods and debris from the mountains.

5. Finally, the continuation of this program is urged as a matter of economy. It is believed that it will cost

less to carry it on than not to do so. Carried on it will mean an expenditure of \$2,000,000 per year, with some three or four hundred thousand acres of mountain timber lands passing each year into the hands of the Government to be developed for timber production and to be utilized in many useful ways by the public. In this case at any time in the future the property will be worth more than the cost. If the program is not carried on the result will be the certain deterioration of these lands by fire and by unwise timber-cutting and tillage, the loss of at least a portion of the soils and likewise a loss in the navigability, power possibilities, and purity of the streams, increasing damage by floods to cities, communities, and persons along the rivers, and also to river valley soils. And after all this loss has been sustained (and it will certainly amount to more than the cost of these lands), the necessity will still exist for the Federal Government to handle the situation, and the cost of doing so then will be greater than it is now.

Members of the delegation at a meeting after the conference appointed as a committee to direct the activities of the co-operating organizations toward securing the desired appropriation the following: Dr. Henry Sturgis S. Drinker, president of the American Forestry Association; Percival Sheldon Ridsdale, secretary of the American Forestry Association, and Philip W. Ayres, forester of the Society for the Protection of New Hampshire Forests, and gave the committee power to appoint others to assist in the work.

The organizations represented and the delegates attending were:

The American Forestry Association, Washington, D. C., Dr. Henry S. Drinker, president, and president of Lehigh University, South Bethlehem, Pennsylvania, and P. S. Ridsdale, executive secretary, of Washington. Massachusetts Forestry Association, Boston, Mass., Harris A. Reynolds, secretary, and Allen Chamberlain, of Boston.

Society for the Protection of New Hampshire Forests, Boston, Mass., Philip W. Ayres, forester.

North Carolina Forestry Association, Chapel Hill, N. C., Hugh MacRae, Wilmington, N. C.

Appalachian Mountain Club, Boston, Mass., Hon. Harvey N. Shepard, of Boston.

Appalachian Park Association, Asheville, N. C., George S. Powell, secretary.

Knoxville Board of Commerce, Knoxville, Tenn., W. M. Goodman, Knoxville.

New Hampshire State Board of Trade, Concord, N. H., Geo. B. Leighton, Dublin, of the State Forestry Commission.

Western New England Chamber of Commerce, Springfield, Mass., Frank M. West, of Springfield, Mass.

Pennsylvania Forestry Association, Philadelphia, Pa., Herbert Welsh, Philadelphia.

Connecticut Valley Waterways Association, Springfield, Mass., Ashton E. Hemphill, Holyoke, Mass.

Southern Commercial Congress, Washington, D. C., Dr. Clarence J. Owens, managing director, Washington, D. C.

New Haven Chamber of Commerce, by Charles E. Jolin, New Haven, Conn.

Bouquets for the New Magazine

The change in style and size of AMERICAN FORESTRY has been welcomed by words of hearty commendation by members of the American Forestry Association. They have expressed their admiration of the colored cover, the better illustrations and the whole very marked improvement in words which leave us no doubt as to the wisdom of making the change.

Some of the comments follow:

"Let me heartily congratulate you on the continued and steady advance of our magazine in beauty and interest."

DR. H. S. DRINKER,
President of Lehigh University,
South Bethlehem, Pa.

"I have just received and looked over the August issue of AMERICAN FORESTRY, and I am really surprised at and very favorably impressed by the change. I think it will attract much attention and increase the prestige of the magazine and of the Association. I am gratified to see the large amount of advertising and hope it will be sustained."

CHESTER W. LYMAN,
International Paper Company,
New York City.

"I congratulate you upon the new form of the magazine. The interesting part is to look back about three years and trace the evolution and improvement. You have unquestionably done wonders in creating an attractive magazine, and I am convinced that if more people saw it and more readers knew about it they would take it for its own sake alone, regardless of any sentiment, propaganda or charitable feeling towards the Association."

E. A. STERLING,
Manager, Trade Extension Dept., National Lumber Manufacturers' Association, Chicago, Ill.

"Congratulations on the good taste of the new clothes worn by AMERICAN FORESTRY. 'Clothes bespeak the man,' and the quality, character, as well as the appearance of the magazine have never before spoken so well as now. I now feel that constructive American forestry is ably represented and well dressed."

CHARLES LATHROP PACK,
Lakewood, N. J.

"I wish to compliment you on the August number of AMERICAN FORESTRY—the magazine is surely greatly improved."

PROF. R. B. MILLER,
Dept. of Forestry, University of New Brunswick, Fredericton, N. B.

"I congratulate you on the favorable impression which the magazine in its new form has made. I continue to think that the preservation of forests is one of the chief features of wise national conservation."

DR. CHARLES W. ELIOT,
Cambridge, Mass.

"Congratulations on the new form and increased size of your valuable publication. May it be a means of carrying on more and more effectively the good work you are doing."

GEORGE H. RHODES,
Secretary, California Forest Protective Assn., San Francisco, California.

"While I have this opportunity, allow me to congratulate you on the attractive appearance of the August number. It seems to me that this new size should allow of even better illustrating than ever before, and should contribute to the popularity of the magazine."

J. GORDON DORRANCE,
Baltimore, Md.

"It is with pleasure that I compliment you upon the new size of the magazine, which permits of greater picture space directly by the reading matter, thus holding the reader's attention more closely. The article on Yellow Poplar is splendid."

H. J. KAESTNER,
State Forester, Beltington, W. Va.

"I liked the appearance of the last issue of AMERICAN FORESTRY very much. The new shape strikes me much more favorably than I had anticipated."

S. T. DANA,
Washington, D. C.

"I think the August number of AMERICAN FORESTRY is a remarkable improvement, even upon the greatly improved issues that have gone before. The colored cover makes a striking impression and I predict for the Association a rapid increase in membership as a result."

M. B. BURBAGE,
Germantown, Pa.

"Allow me to congratulate you on the large size and attractive appearance of your August edition. As we are all more or less picture lovers, that feature brought more intimately to one's notice I think will be a continued advantage."

W. R. BROWN,
Berlin, N. H.

"Allow me to present my sincere compliments upon the August issue of AMERICAN FORESTRY—upon its very artistic appearance and its very solid, fine substance—a combination rarely met."

MARGARET L. STREETER,
Washington, D. C.

"AMERICAN FORESTRY, the magazine of the American Forestry Association, comes out in a brand new dress. The design of the front cover is attractive, being a photograph in colors of the tulip or yellow poplar tree, whose characteristics and commercial uses receive special attention in this number."

LUMBER WORLD REVIEW,
Chicago, Illinois.

"AMERICAN FORESTRY has made its appearance in a new, enlarged form, beginning with the issue for August. The cover is in colors and is ornamented with a photograph of a magnificent tulip tree, otherwise known as the yellow poplar, with beautiful reproductions of the flowers as panels, the latter being evidently engraved from an artist's sketch. The magazine has been increased in dimensions, the page now measuring 9x12 inches, as compared with the former size of 63/4x10 inches. AMERICAN FORESTRY is the organ of the American Forestry Association and is a most creditable publication."

"PAPER,"
New York City.

"My congratulations on the enlarged magazine. I dare to believe that it will fill the place long hoped for in this new form."

PHILIP W. AYRES,
Forester, Society for the Protection of N. H. Forests, Boston, Mass.

"The appearance of the August issue of AMERICAN FORESTRY certainly entitles you to the congratulation of your friends and of its friends. When it reached me I opened it in surprise. It was almost stunning. Keep on this way, everlastingly, and especially along that educational trail at which you hint, for nothing more helpful or hopeful for forestry can be thought of."

DR. J. T. ROTHROCK,
West Chester, Pa.

"Please permit me to remark that the magazine is much more attractive and that in my humble opinion its new form should do a great deal toward increasing its popularity, more especially among people who are not directly or intimately concerned with the science of forestry."

T. H. SIMPSON,
Washington, D. C.

"The AMERICAN FORESTRY for August, in my opinion, is the most beautiful magazine that has yet graced a newsstand, while the leading article about Yellow Poplar, is exceptionally complete, interesting and valuable, ranging as it does from botanical characteristics to the details of timber utilization. A magazine of this character, if it can be given general distribution, will unquestionably be of great value to the lumber industry, and of much interest to the general public."

R. S. KELLOGG,
Secretary, National Lumber Manufacturers' Assn., Chicago, Illinois.

"Your August issue of AMERICAN FORESTRY just received. We think that you have made a wise move in enlarging the size of your publication and want to congratulate you on its general appearance."

C. D. ANDERSON,
Chicago, Ill.

"I like the August issue in every way and think it is bound to fill a much larger field of usefulness. The new form gives it better opportunities for display and makes the pictures an extremely attractive feature. It ought to result in much more interest in, and success for, the organization. . . . All in all, I think it is a corker and you are to be congratulated."

BRISTOW ADAMS,
Cornell University, Ithaca, N. Y.

"The appearance of the August number of AMERICAN FORESTRY is certainly very attractive and shows a marked improvement."

AUSTIN F. HAWES,
State Forester, Burlington, Vt.

"I congratulate you on the fine appearance of the August number. It surely is a beauty, and I think that you are doing marvelous work in spreading real interest in trees, and we are all the more pleased with this because we recognize that this work is an important part of nature study."

EDWARD F. BIGELOW,
Editor, The Guide to Nature, Sound Beach, Connecticut.

"The new magazine is much more attractive, and I believe is a great improvement over the old one in every way. It ought to impress people and to aid in securing new members. I congratulate you on it."

PROF. H. H. CHAPMAN,
Yale Forest School, New Haven, Connecticut.

A Valuable Study

During the months of July and August the New York State College of Forestry at Syracuse University studied the forest growth and local wood market conditions in Broome County, New York. This work was done in the towns of Maine, Union and Vestal by Harold M. Day, a graduate student in the College of Forestry. Mr. Day estimated the amount of cordwood in each woodlot and mapped all areas down to 10 acres in extent on carefully prepared maps. At the same time Mr. Day made a comprehensive study of the portable milling industry in this section. This data will be written up in form of a report and with this information at hand in bulletin form the marketing of forest products will be a much simpler matter than it is today.

A 750,000 Acre Elimination

The President, on recommendation of Secretary Lane, recently eliminated about 750,000 acres of land from the Cleveland National Forest, California. The unwritten lands will be subject to settlement only under the homestead laws beginning 9 a. m., November 2, until and including November 29, 1915, after which they will be subject to be taken up under the laws applicable thereto. The lands, which are rolling in character and covered mainly with chaparral, lie along the boundaries of the National Forest in Riverside and San Diego Counties in southern California, within the Los Angeles land district, and about 333,000 acres thereof are public lands and subject to entry.

The Longleaf Pine Picture

Acknowledgment is made to *The Southern Lumberman*, of Nashville, Tenn., for the privilege of using the photograph of the longleaf yellow pine stand from which the handsome colored picture on the cover of the September AMERICAN FORESTRY was made. This photograph was selected for coloring from a large number, being considered one of the finest photographs of a yellow pine stand in existence.

Wins a Diploma

The New York State College of Forestry at Syracuse prepared last year a small exhibit showing forest conditions and forest work in the State of New York for the Panama-Pacific Exposition at San Francisco. The college has just received word that it has been awarded a diploma for the educational value of its exhibits. The diploma will come to the college through the Bureau of Education at Washington as its exhibits were judged as a part of the general educational exhibits at the Exposition.

Canadian Department

BY ELLWOOD WILSON

Secretary, Canadian Society of Forest Engineers

Probably the most important move along forestry lines in Canada during the past month has been the decision of the Government of the Province of New Brunswick to appoint a Provincial Forester and to commence a forest survey and estimate of the resources of that Province. This Province has hitherto been behind the times in this most important particular and the change in policy will be warmly welcomed by all friends of conservation. There are about eight million acres of forest lands held by the Government and lumbering is one of the most important industries of the Province. Although immense quantities of timber have been destroyed by fire, there is still enough, if properly cared for, to give the lumber industry a firm foundation for all time.

There is practically no accurate knowledge of areas burnt, of barren land or of merchantable timber, and the last Legislature voted the sum of \$50,000 to be spent this year in getting at the facts. Lately the Premier, the Hon. Mr. Clarke, and the Provincial Treasurer, Dr. Landry, have made a trip to Quebec and Ontario, collecting information which would be valuable in inaugurating the new policy and in looking around for the right man for Forester.

Classification of its lands will enable the Government to open up lands for settlement intelligently and will prevent many of the disastrous mistakes made in this matter by other Provinces. Later some scheme of reforestation will be considered. The only work now being done along that line in New Brunswick is that of the Pejepscot Paper Co. at Salmon River.

The Chief Forester of Quebec has prepared a very comprehensive scheme for the exploration of lands and their classification, and forms for reports have been elaborated with much detail.

Several of the Canadian railways have equipped tank cars for fighting forest fires along their rights-of-way. The Canadian Pacific has two such cars at Brownsville, Me., the Grand Trunk has one in the Algonquin National Park and the National Transcontinental one between Edmundston, N. B., and Quebec. This latter road is considering equipping two more of these cars for use between Quebec City and the Ontario boundary, and it is hoped will be decided on. These have a capacity of about ten thousand gallons and will throw a stream of water five hundred feet from the track.

During the past month, Messrs. Clyde Leavitt, G. C. Piche, Robson Black, Henry Sergius, and Ellwood Wilson made two very interesting trips. The first of these

was to the Quebec Government plantation at Lachute, on the sand dunes, and its nursery and experimental station at Berthierville. About fifty years ago the careless handling of sandy lands by farmers allowed the sands to begin to drift and in a few years such a large area was covered and rendered unfit for cultivation. Spasmodic efforts were made by the farmers to prevent the spread of the sands by planting trees and sowing different kinds of grass, but as there was no co-operation and no comprehensive scheme the effort was abortive. A few years ago the Quebec Government recognized the danger and bought up about 350 acres of these lands at one dollar per acre, giving the vendors the right to buy back the lands at the end of fifteen years at \$10 per acre, but with no right to cut the timber. The neighborhood is exceptionally favorable for tree growth of all kinds, as, although the soil is pure sand, the water table is high and there seems to be abundant moisture. Four years ago the plantations were commenced, several sorts of trees being used, white and Norway spruce, larch, white and Scotch pine, and green ash. About 1,500 trees per acre were planted, the work being done by the students from the Government Forest School. Sixty per cent of these trees have survived and some show surprising growth; one spruce showed a leader thirty-one inches long. After this first planting it was decided to establish beach grass before planting trees, and this was done by plowing furrows and laying in them heads of this grass. The grass is taking a good hold and trees will be planted between the rows and will in time kill out the grass. These lands will soon be covered with a very valuable crop of timber and will encourage the planting of other areas of a similar character which exist in the Province.

At the Experiment Station at Berthierville a mixed stand of white pine and maple was examined. This stand has been carefully thinned and the reproduction of white pine is really remarkable, the young trees springing up almost like a carpet. The seed and transplant beds of all the different sorts of trees which can be grown in this region are doing very well and the demand for trees is rapidly growing.

The other trip was made into the woods to look over some experiments in brush disposal made by the Laurentide Company some two years ago. Tops of trees left after logging were lopped and left in as close contact as possible with the ground, and it was found that such brush was moister and had more progress toward decay than where the tops had not been lopped. This advantage was, however,

overbalanced by the fact that the brush covered more ground and so hindered reproduction. It is doubtful if top-logging pays either from the standpoint of fire protection or that of reproduction, and it seems as if piling and burning was the only solution of the problem.

On the 24th of August, Mr. F. Laliberté, manager of the firm of Laliberté & Marquis, died in Quebec after an operation for appendicitis. Mr. Laliberté was a graduate of the Laval Forest School and worked from 1912 to 1913 with the Quebec Forest Service, which he left to organize the above firm, which carried on the business of forest engineering and also handled timber, recently shipping poplar to South Africa. He was only 28 years of age and showed much promise.

Mr. Henri Roy, graduate of the Laval Forest School and for some years in charge of the Quebec Government Nursery at Berthierville and now Forest Agent, has been elected an active member of the Canadian Society of Forest Engineers. Mr. E. S. Holloway, Acting Chief Engineer of the Canada and Gulf Terminal Railway and Member of the Canadian Society of Civil Engineers, has been elected an associate member.

Mr. R. L. Campbell has resigned the editorship of the *Pulp and Paper Magazine of Canada* to become the Secretary of the Canadian Pulp and Paper Association.

A farmer at Lac Ignace, Quebec, was arrested for setting fire to his clearing without a permit and fined ten dollars and costs, amounting to \$100.00 in all. This is the second conviction for such an offense before a magistrate and shows that the justices of the peace have awakened to the necessity of enforcing the forest fire laws. Eight or ten other arrests have been made, and it will not be long before the farmers realize the necessity of care. Agents of the Government and of the Forest Protective Associations are traveling through the country trying to educate the people and enlighten them as to their responsibilities, and arrests are only made of flagrant cases.

According to the annual report of the Dominion Forestry Director, the herd of fifty reindeer purchased by the Government from Dr. Grenfell has now been reduced to four animals, all females, and it is proposed to try and cross these with the native caribou. The great difficulty has been with the bulldog flies in the summer. These attack the deer and irritate them to such an extent that they break out of their corral and scatter into the bush. The herds of wood bison, on the other hand, seem to be increasing and now number probably five hundred head. They are well protected and should increase rapidly.

In the Forest Reserves in Saskatchewan the Government has required brush piling and burning on all timber sales, and while there was a little opposition at first, this was soon overcome and now it is a regular procedure. Mr. Gatches, lately in charge of this work, gives the following figures of costs: With wages at 25 cents per hour the average cost per acre was \$1.00, average cost per cord five cents, average cost per thousand feet board measure ten cents. On another operation, where 16,178 ties were made but the lopping was not done till after all the ties had been removed, the cost for lopping and burning was one cent per tie or 31 cents per thousand feet. This cost would have been much less had the lopping and burning been done at the time of cutting. Brush burning should certainly be made a routine part of every logging operation.

The first number of the first forestry journal published in Spain has just appeared, under the title of *Espana Forestal*. It is edited by Sr. Don R. Cordoniu and published monthly at fifteen pesetas the year. Sr. Cordoniu is a member of the Spanish Forestry Association, The Royal Spanish Society of the Friends of the Tree, and has been for many years in charge of the control of torrents and reforestation of the mountains and planting to control sand dunes. He is also a noted Esperantist.

British Columbia Notes

Maps showing the range of each commercial timber species in the Province have been completed. Necessary information for these maps was obtained from reconnaissance parties, cruisers and other members of the field force. While minor corrections will undoubtedly have to be made from time to time as a result of future and more detailed observations, it is thought that the general range of the various species has been fixed with a fair degree of accuracy.

The Hon. W. R. Ross, Minister of Lands, in a recent interview expressed great satisfaction at the result of three months' work in connection with the markets campaign, in the course of which seven cargoes, representing over twenty million feet of lumber, have been sold to the British Government. This will have been the means of circulating a sum in the neighborhood of a quarter of a million dollars, the bulk of which is made up of wages, supplies and transportation and has caused much activity in the lumber industry.

The pulp mills at Powell River have recently increased their output to the maximum capacity, and two hundred extra men have been taken on in consequence. With the prospect of an early resumption of work at Ocean Falls, the pulp output will be further increased, and as soon as addi-

tional tonnage can be secured activity in the pulp industry should be still more pronounced.

A chart has been prepared in the Victoria office for use at headquarters, showing the daily maximum and minimum temperatures reported by each weather recording station, by means of horizontal curves, and the rainfall by perpendicular proportional lines. The Dominion Meteorological Service furnishes daily reports for this purpose in addition to giving special forecasts whenever the fire hazard becomes serious. Such a chart is of the utmost value in enabling close touch to be kept with the fire situation throughout the Province and is a useful addition to the weekly telegraphic advices sent in by the District foresters.

Rangers M. V. Allen and F. B. Edwards, of the Canadian Mounted Rifles, are at Shorncliffe.

The end of the first week in August found the fire situation very hopeful. There had been no losses to speak of in green timber and the fire-fighting expenditure compared favorably with last year. The rainfall throughout the season has been above the normal and some rain may be looked for during August, which is the critical month of the year. In some districts the absence of hazards enabled much improvement work to be undertaken by the forest wardens. Storms and slash fires caused serious damage to the 65-mile telephone line connecting the logging camps on the islands between the mainland and Vancouver Island and necessitated heavy repairs. The submarine cables on this line have given entirely satisfactory service and the line fulfils a most useful purpose. Numerous outbreaks of fire during the second week in August gave considerable trouble in the Vancouver district, which takes in much of the coast, and much damage was caused to property. The fires were due to lighting in many cases and many were ascribed to campers. One life was lost and much property destroyed.

V. K. Wood, clerk, who left Victoria with the 48th Batt., is at Shorncliffe.

Forest Assistant O. J. Sangar, of the Lillooet Division, has volunteered for active service and hopes to leave for England with his battalion.

Forest Assistant E. G. MacDougall has left for England with one of the Eastern Canadian regiments, preferring to go in the ranks rather than wait for a commission.

H. R. MacMillan, Special Trade Commissioner, after visiting the United Kingdom, France and Italy, is on his way to South Africa.

Interesting accounts of trench fighting in Belgium came from Ranger Turnbull, of the Princess Patricia's Light Infantry. No word has been received from Ranger Brewer, Forest Assistant Pickup, Draughtsman Stone, Scaler Milroy and other of the B. C. Forest Service now at the front.

James Eddie, clerk, has been wounded and is in the hospital, with the prospect of remaining there for several weeks, suffering from a compound fracture.

Assistant Forester H. K. Robinson, who holds a commission in the 5th Regiment, Royal Canadian Artillery, is leaving for the front in charge of a detachment provided by that regiment for active service.

Forest Assistant F. McVickar, of the Royal Canadian Dragoons, who has been in the trenches for several months, is now in England recovering from sickness.

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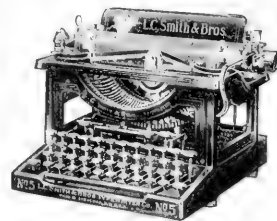
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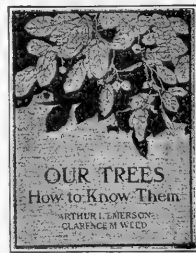
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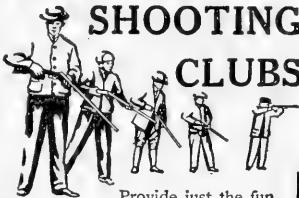
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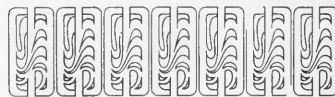
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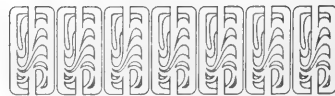


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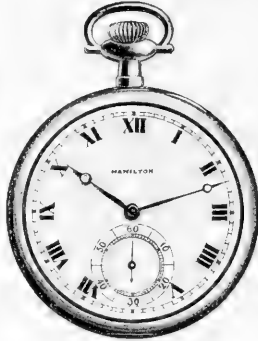


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American Forestry

Vol. 21

NOVEMBER, 1915

No. 26



THE SUGAR MAPLE

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Washington, D. C.

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Declaration of Principles and Policy of *The American Forestry Association*

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

Federal Administration and Management of national forests; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners; non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid to lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

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AMERICAN FORESTRY

The Magazine of the American Forestry Association

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November, 1915. Vol. 21

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American Forestry

VOL. XXI

NOVEMBER, 1915

No. 263

The Sugar Maple

Identification and Characteristics

By S. B. DETWILER

IF TREES had human characteristics, the sugar maple would be the banker of the forest community because of its store of wealth. It is a conservative, dignified, well-dressed tree, conscientious, hard-working and dependable. It loves the quiet life of the country, and has the air of belonging to "one of our best families," but it inspires affection as well as admiration.

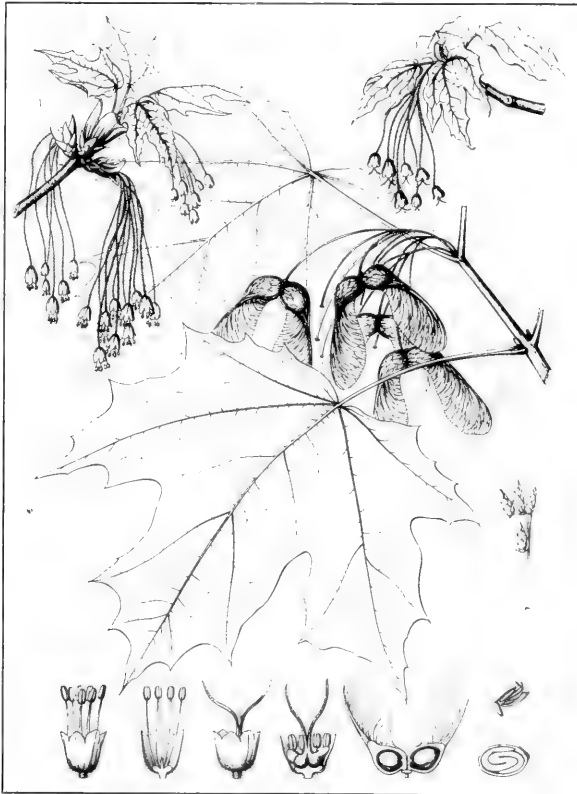
The maple family has about seventy members in the world, but sugar maple is by far the most valuable. It is widely distributed through eastern North America, from Newfoundland to Manitoba, and south to Florida and Texas. While sugar maple is the most familiar name, it is also well known as rock maple, hard maple and sugar tree. The black maple is an important variety found throughout the greater portion of its range. This form is not easily distinguished from the true sugar maple. In the south there are two other varieties known as white-bark maple and Florida maple. In the Rocky Mountain region, a near relative, the large-tooth maple, is found.

The finest and most abundant growth of the sugar maple is

found in the New England States, New York northern and western Pennsylvania and westward throughout the region of the Great Lakes to Minnesota. In the southern Appalachians it grows well where climatic conditions are similar to those further north.

Sugar maples growing in the open have a short trunk and a compact, well-shaped oval or oblong head. In the forest, its maximum size is about 5 feet in diameter and 120 feet in height. The usual forest maple is 2 to 3 feet in diameter, 70 to 90 feet high, clear of limbs to within 20 or 30 feet of the top, where it forms a small, rounded crown. The bark is usually ash gray, but may be a dark brown. On young trees the bark is smooth but in older trees it has deep furrows and is divided into broad plates or large, shaggy flakes. The bark has a peculiar hard, flinty appearance.

The leaves and buds stand opposite each other on the twigs. The leaves are shaped somewhat like the human hand, the edges being divided into five points or lobes. The deep notches between the points are broadly rounded and serve as an easy means of tell-



From "The Silva of North America," by Sargent; Houghton Mifflin Co., Publishers.

THE LEAVES, SEEDS AND FLOWERS OF THE SUGAR MAPLE

1. A branch with male flowers, natural size.
2. A branch with female flowers, natural size.
3. A male flower, enlarged.
4. Vertical section of a male flower, enlarged.
5. A female flower, enlarged.
6. Vertical section of a female flower, enlarged.
7. A fruiting branch, natural size.
8. Vertical section of a fruit, natural size.
9. Vertical section of a seed, enlarged, showing undeveloped embryo.
10. An embryo, greatly magnified.
11. A winter branchlet, natural size.



BARK OF THE SUGAR MAPLE

The bark is usually ashen gray, but may be a dark brown. On young trees it is smooth, but on older ones it has deep furrows and is divided into broad plates or large, shaggy flakes.

ing the sugar maple from the red and silver maples, in which the leaf notches are sharply cut and angular. The leaves are 3 to 5 inches long and of a slightly greater breadth; they are thin in texture, colored deep green on the upper surface and paler green underneath. The entire leaf margin is coarsely toothed.

The tree is as beautiful in winter as in summer. The branches trace a pleasing pattern against the sky. The twigs are slender, smooth and of a beautiful light brown color. The buds are sharp-pointed, conical, and about one-quarter inch long. The scales are small, dark brown or purplish in color, and overlap on the bud to form an attractive design. Unlike red and silver maples, which bloom early in the spring before the leaves come out, the sugar maple flowers appear with the leaves in April or May. The flowers that produce the pollen are in separate clusters from those which produce the fruit. Sometimes a tree bears only one kind of flower, but usually both appear on the same tree. They are small, greenish-yellow and are borne in clusters on thread-like stems about $2\frac{1}{4}$ inches long.

The fruit of the sugar maple is winged, two being joined together to form the familiar maple key. Usually only one fruit of the key is perfect and will grow; if this is carefully opened, the baby tree may be plainly seen. The clusters of keys are usually found at the tips of the twigs and often remain on the tree over winter. In this respect, sugar maple differs from the red and silver maples, whose fruits usually appear on the sides

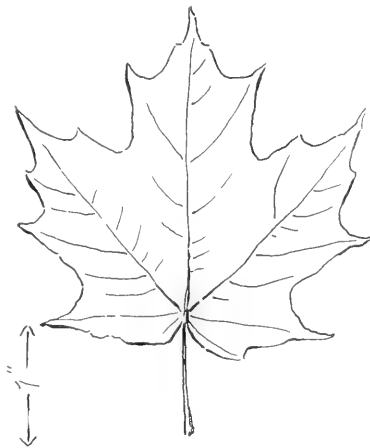
of the branches, ripen early in the summer and fall quickly. The wings on the fruit serve as an aeroplane to carry the seeds to a considerable distance from the parent tree. The heavy end falls first, and, if the keys split apart, the shape of the wing causes the fruit to revolve rapidly and work its way through the grass and debris to the moist ground where it can germinate.

The wood of the sugar maple is hard, heavy, fine-grained and strong. It has a satiny surface which takes a high polish. The sap wood is white or cream color and the heart is various shades of light brown. The sugar maple is one of our most valuable broad-leaved timber trees. The wood is easily split and is one of our best fuel woods, it is also one of the principal woods distilled for producing wood alcohol and acetic acid.

The wood is not naturally durable in contact with soil, but when it is creosoted, it makes excellent railroad ties and fence posts. When burned, its ashes yield large quantities of potash which are leached for soap making and other uses. The ashes are also valued highly for fertilizing purposes, especially for lawns and orchards.

Curly maple is caused by a twisted grain which gives a beautiful pattern to the wood. Bird's-eye maple is due to the growth of great numbers of buds in the thick bark, or, in some cases, it may be caused by the holes drilled by woodpeckers in quest of the sweet sap. At any rate, the wood has unusual markings, and, like curly maple, it is much in demand for furniture and cabinet making, logs bringing about \$90 per thousand feet, board measure.

Acer, the scientific name of the maple family, means hard or sharp. It was applied because the wood of some kinds of maples is extremely hard and was greatly esteemed by the ancients for making pikes and lances. The Romans prized maple wood very highly, and tables inlaid with curious portions of it in some instances brought their weight in gold. Virgil celebrates the maple as the throne on which Evander seated Aeneas.



LEAF OF THE SUGAR MAPLE

Shaped somewhat like a human hand, the leaf is readily identified. The edges are divided into five points or lobes. The leaves are three to five inches long, thin in texture and colored deep green on the upper surface and pale green beneath.



FOREST FORM OF SUGAR MAPLE

The maximum size of the forest trees is about five feet in diameter and one hundred and twenty feet high. The usual forest maple is from two to three feet in diameter and seventy to ninety feet high, being clear of limbs to within twenty or thirty feet of the top, where it forms a small rounded crown.

"On sods of turf he sat the soldiers round;
A maple throne, raised high above the ground,
Received the Trojan chief; and, o'er the bed,
A lion's shaggy hide for ornament they spread."

The sugar maple flourishes on moderately deep, well-drained, fertile loam soils. It will grow on stiff clay soils if not too wet, and on stony hillsides if not too dry; it shows strong preference for limestone soils. It thrives in cool, moist situations; in fact, sugar maple requires a cool climate and an abundant rainfall for its best development. It has a shallow root system. Under the best conditions it grows only moderately fast. In the forest it grows slowly, but at a fairly even rate; an inch in diameter in 12 to 16 years is probably average growth under forest conditions. In the Lake region, beech and yellow birch are commonly found associated with the sugar maple. Among other trees that often grow with it are red spruce, paper birch, red maple, white pine and hemlock.

The exceptionally dense foliage of the sugar maple enables it to endure heavy shading by other trees. Some seed is borne every year, but every three to five years large quantities of seed are produced. For this reason young growth is abundant, and the ability of the seed-

lings to grow vigorously in considerable shade insures plenty of young maples ready to take advantage of any opening in the forest. Sometimes trees develop from the sprouts that come up from maple stumps on cut-over lands.

If it is desired to grow sugar maple trees, the seed should be planted in the fall in well-prepared seed beds. The seeds may also be sown in spots cleared of grass and shrubbery where the trees are desired to stand permanently.

Sugar maple is an excellent shade tree for planting along country roads and village streets. In large towns, it is affected by smoke, dust, illuminating gas and other troubles. It is sometimes defoliated by the forest tent caterpillar, and the maple borer occasionally makes great holes in its trunk. Under favorable conditions the tree may live to reach an age of three or four hundred years.

The sugar maple casts a very dense shade, and the mosaic formed by the artistic arrangement of leaves on the branches is a joy to the observant student of nature. Its broad dome forms a pleasing picture in summer or winter, but the lover of the woods finds one of his greatest pleasures in its brilliant autumn foliage. At first the change of color is gradual; later the tints become more and more



SUGAR MAPLES AS STREET TREES

This variety of maple is popular as a shade tree. It thrives best in villages or along country roads, as in large towns it is affected by smoke, dust and gas. It is subject to attack by the forest tent caterpillar and the maple borer occasionally makes great holes in its trunk.

gorgeous. The glowing shades of yellow, orange, scarlet and green turn the forest landscape into a wondrous sea of color.

The "sugar tree" is an appropriate name, for in a cool climate this tree stores great quantities of sugar in its sap. The colder the season the larger the amount of sugar it yields. In March, when the sap is ascending, the trees are tapped and the sap is collected and evaporated into maple syrup and sugar. Unless excessive tapping does not injure the tree and can be continued indefinitely. Sugar "bushes" or orchards are profitable when well cared for. Three or four gallons of sap are usually required to make one pound of sugar. Two or three pounds of sugar per tree is an average yield. Large, solitary trees often yield much more than this.

Commercial Uses of Sugar Maple

By HU MAXWELL

COMPARATIVELY little maple lumber is used in rough form. It is essentially a factory wood, and as such it has a place in nearly every industry of this country which employs wood as raw material. The reported sawmill production of maple lumber for the United States in 1912 was 1,020,861,000 feet, and the factory use for one year is reported at 922,337,274 feet, which is 90 per cent of the cut of the mills.

Maple appears in fifty of the fifty-five industries into which the uses of wood in the United States are generally divided. No other wood has a record so nearly approaching universal use. Oak, red gum, basswood and birch approach maple, but fall a little short. It appears in a few industries where they are not found. As might be expected, Michigan, which produces more maple lumber than any other state, is likewise the largest user of this wood in its factories.

MANUFACTURING

Maple is pre-eminently a manufacturer's wood. Little rough lumber reaches the final user, but it passes through machines or is shaped by tools until it has been fitted for the most exacting service required of wood. Nearly every industry that has a place for any sort of wood, draws supplies from maple. It fills positions where the highest order of material is required, and it meets de-

mand if low-class and cheap stock suffices. It is an associate of aristocrats and a companion of plebians. Forty-nine wood-using industries report it as raw material for further manufacture in various parts of the United States. The largest consumes more than 300,000,000 feet a year; the smallest less than 25,000. The ten industries which lead in the use of maple are: planing mill products, furniture, boxes and crates, boat and shoe findings, agricultural implements, musical instruments, handles, woodenware, vehicles, fixtures. These use a total of about 833,000,000 feet yearly, while the use of maple by thirty-nine other industries aggregates 89,124,587 feet a year, and forty states report it. This is in addition to what is consumed for cooperage, wood distillation and fuel, and in the aggregate these amounts are very large.

PLANING MILL PRODUCTS

The largest demand for maple comes from the industry which turns out planing mill products. These cover a considerable range of articles, among which are flooring, ceiling, wainscoting, stairwork, molding, doors, and many other articles of interior house finish. The largest single item is flooring, so far as the use of maple is concerned. No wood surpasses it for that purpose.

in point of long service and the ease with which it can be kept in repair. Though its natural color is very light, it readily receives stains and almost every shade desired can be developed, but most users prefer the natural color, which may be given an oil finish.

The excessive hardness of maple adds greatly to its value as flooring. Tests conducted under exactly similar conditions have shown that a maple floor may outlast one of marble, under very heavy wear. After the wood has been well seasoned, it shrinks and swells but little under atmospheric changes and this increases its value as floor material. A maple floor remains smooth and its joints are tight and sanitary. The absence of alternate hard and soft streaks causes uniform wear, and as long as such a floor remains, it is attractive. Maple flooring has a market which not only reaches every part of the United States, but extends to many foreign countries. It is bought by the builders of small cottages and is specified by architects for hotels, apartments and large business blocks.

Stair builders find this wood one of the best to be had, and the demand for it is extensive. It serves not only as stair treads where the wearing is most severe, but it is frequently worked into every part of stair work, and is specially suited for rails and balusters.

Maple shows to excellent advantage in wainscoting where panels are employed. The bird's-eye and curly stocks are seen at their best in work of that kind. It is not unusual to employ rotary-cut veneer in building such panels. This veneer differs from that which is sliced or sawed by being peeled round and round the log as a broad, thin ribbon. By this method the bird's-eye effect is brought out in the best possible manner, and many sheets of veneer almost exactly the same in figure are obtained. Such are bundled and a purchaser may buy enough of certain figure to finish an entire room, or even several rooms. The sheets of veneer are little thicker than writing paper, and a single figured log may produce two or three thousand square feet of bird's-eye

stock so nearly the same in appearance that the closest scrutiny is required to discover the slightest difference.

Veneers of high class are used only as surface finish where they are exposed to view. They are glued upon cores or backing of other and cheaper woods. A beautiful wainscot panel in which bird's-eye stock only is visible, may really have the thinnest covering of maple, while the hidden parts consist of pine, chestnut or some other wood which possesses the requisite glue-holding qualities.

The manufacture of maple doors has become a large business, and they consume some of the choicest output of sawmills and veneer factories. The workman here finds his opportunity to display his best skill. Maple doors are often real works of art, though they may contain no figured wood. The very plainness of maple is sometimes accentuated as its principal recommendation. Doors are usually veneered; at least, those of highest grade are. The process does not differ from that employed in making wainscot panels. The best doors are

built up of many parts which are held together by glue and dowels. The latter are small wooden pins, varying in size according to the use intended. They take the place of nails and screws, and are so skillfully inserted that they are wholly invisible in the finished door. Several dozen may be concealed within the joinings of a single door. Dowels are often maple, but other woods are used.

FURNITURE

The second largest demand for maple lumber comes from furniture factories. The making of chairs is often classed as an industry distinct from other kinds of furniture, because the two commodities are frequently the product of separate factories and of different methods; but no useful purpose is served in the present instance by separating them.

No wood is more popular than maple where light-colored furniture is wanted. Not only is the wood's natural color very light, but when enameling is desired, maple ranks among the highest woods procur-



SUGAR MAPLE TREES IN WINTER

The formation of the branches may best be studied in winter, and the student should be able to identify it as readily then as in the summer

able. Its surface takes the smoothest, finest polish, and enamel adheres to it perfectly. This is true also when goldleaf finish is designed, in work of very high grade. Most maple furniture, however, is finished in the wood's natural color. Curly, wavy, smoked, cloudy and bird's-eye effects are brought out to fine advantage. Maple darkens and the tones grow richer with age, though the actual outlines of the figures may lose something of their distinctness.

Those who consider chair making separate from furniture manufacture, accord maple a high place. The majority of chairs made in separate factories or mills are of common patterns and medium prices. They are primarily for use, while the high-priced chairs that come from furniture factories are often designed primarily for ornament.

One of the first requisites of a common chair is that it shall be strong. Only handles and vehicles call for stronger woods than chairs, and the difference is only slight. Maple ranks among the very strongest of American woods, and for that reason it occupies a commanding position among chair stock materials. This stock is usually worked out by small, portable mills, equipped with special machinery. They move from site to site, frequently cleaning up the slashings left by hardwood

is shipped to central factories to be finished and assembled, and to be turned out as completed chairs.

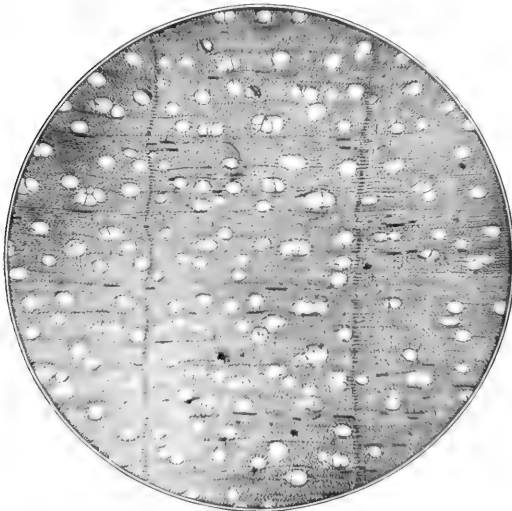
BOXES AND CRATES

The making of shipping boxes and crates constitutes the third largest demand by manufacturers upon the maple supply. The wood possesses two qualities which are not considered favorably by box makers—hardness and weight—but in spite of these, it is consumed in enor-



Courtesy the Manual Arts Press.

AREA OF SUGAR MAPLE GROWTH



Courtesy the Manual Arts Press.

MAGNIFIED CROSS-SECTION OF SUGAR MAPLE

Showing one complete annual ring, included between the two dark lines, and parts of two other annual rings. The small openings are pores or vessels. Faint lines running at right angles to annual rings are pith vessels.

sawmills; because chair mills utilize logs and bolts, crooked and short lengths, which the sawmill is obliged to leave in the woods. In the northern hardwoods, and wherever maple grows, the chair mill finds it a valuable pick-up after the sawmill has cut the large, smooth logs, and moved on. The dimension stock, for rounds, spindles and braces, which the chair mill roughs out,

is shipped to central factories to be finished and assembled, and to be turned out as completed chairs. Hardness is a disadvantage from the nailers' viewpoint, while the purchaser of commodities shipped in boxes has reason to object to excessive weight on which freight must be paid at the same rate as on the merchandise within. But these drawbacks are more than compensated for by the good points of maple box lumber. It is so strong and stiff that the lumber may be cut thin, thereby making a given quantity go farther. It is a clean wood, which is a point insisted on by many purchasers of boxes that carry articles of food. The wood contains no stains or odors to contaminate the contents. Though it is heavy, yet by cutting it thin, a smaller amount of material is needed for a box of given size than might be required if a lighter, weaker wood were chosen, consequently, the cost may be less.

The bulk of maple box lumber comes from the culls and low grades of maple sawmills; and the largest use is found in regions near where the maple output of lumber is largest. More than one-half of all the maple box lumber used in the United States is reported by box makers in Michigan and Illinois, and the latter State draws the principal supply of that wood from Michigan. It is probable that fully one-half of all the maple box lumber consumed in the United States grows in Michigan. The industry affords a market for much low-grade maple lumber which might not otherwise find buyers. It holds true of this wood, as of all others, that high grades sell readily, while the low grades are often hard to dispose of. A reason commonly assigned for that condition is that the low grades cannot pay freight charges necessary to reach distant markets.

BOOT AND SHOE FINDINGS

Maple leads all other woods of the United States in the industry which produces boot and shoe findings. Lasts are the most important article of this industry, so far as such are supplied by wood; but some maple is consumed in the production of shoe pegs and shanks, though paper birch is ahead of maple in all except lasts. In the manufacture of these, maple has no rival worthy of mention. It is so much superior to them all that it stands alone. A very hard, close-grained wood is demanded, and the most exacting processes of seasoning are necessary to fit it for the place it must fill.

Last blocks, which are the rough billets, are partly shaped without the use of the lathe. Choice, straight-grained trunks are first cross-cut into bolts which are usually long enough for three lasts. The bolts are split into billets of proper size, and these are carefully air-seasoned from one to three years. Because of the slowness of the drying, few checks or cracks open in the wood. If such do open, the rigid inspection rejects them, for the smallest crack degrades or spoils a last. After air-seasoning has been sufficient, the billets are subjected to kiln heat for a considerable time. They are then cut into lengths proper for one last each, and are passed through a lathe which produces the rough form only.

The actual turning of the last is a careful and delicate operation. An automatic lathe does it. The keen knives, each revolving at very high speed, dig into and chip away the wood, scooping out depressions here, and leaving elevations there, until a last, which must be the exact shape of the inside of a shoe, is produced. The knives are guided by cams which slowly feel out the precise form of a pattern affixed to the lathe as a guide. Every change in style of shoes calls for new lasts and the old, though they may still be perfectly serviceable from a mechanical standpoint, go to the scrap pile, victims of changing fashions in footwear. For that reason, shoe last factories must always keep ample supplies of rough last blocks on hand; but they must not manufacture much ahead of the orders on file.

AGRICULTURAL IMPLEMENTS

The manufacturers of agricultural implements require the enormous quantity of 321,000,000 feet of various woods annually. Some other species are in more demand than maple, but it is near the head of the list and furnishes 15 per cent of the total. In almost every case it is selected on account of its strength, hardness and stiffness. It is pre-eminently a frame material when machines are of considerable size; but it has a place also as pitmans, guides, levers, braces and axles. Its largest use is found in threshers, reapers, fertilizer spreaders, grain drills, wind-stackers, land rollers, fanning mills and similar machines. When maple is employed as slides in apparatus with rapid oscillating motions, the wood wears to the smoothness of polished steel and friction is reduced to a minimum.

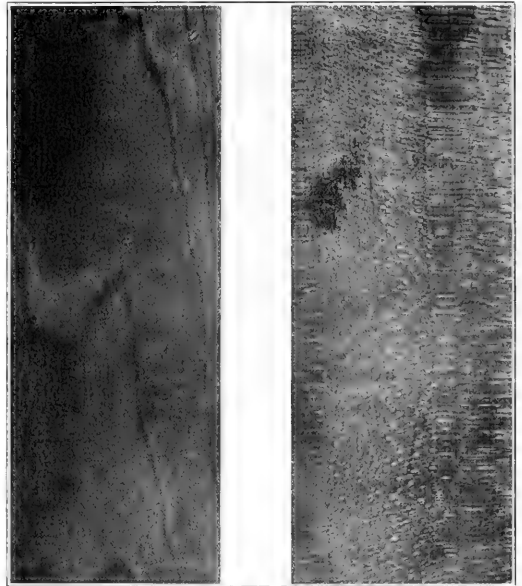
Maple is much used for hoppers, chutes, drawers and boxes which are essential parts of certain classes of agricultural implements; but when so used it possesses

no advantage over yellow poplar and cottonwood, since great strength is not demanded.

MUSICAL INSTRUMENTS

Few persons who have not looked into statistics of the uses of woods in the country's industries would place maple as the leading one in the manufacture of musical instruments in the United States, yet such it is. A large number of woods, both foreign and domestic, have places in that industry. It calls for materials of the highest class. The annual demand exceeds 260,000,000 feet, and 18 per cent of it is maple.

It may be used for practically every part of a piano that can be made of wood, except the sounding board, which is always spruce; but maple's most important place in piano making is in the actions. It is so peculiarly fitted for the requirements of that mechanism that it monop-



Courtesy the Manual Arts Press.

SUGAR MAPLE BOARDS

Tangential or bastard cut, the most common method of sawing.

Radial or quartersawed section, showing pith rays, which appear in cut as light flecks or streaks.

lizes it in many factories. Again it is maple's hardness, stiffness and strength that lead to the preference shown it; but its fitness for piano actions is due likewise to what is known as "standing qualities." That term means, when applied to a wood, that it will hold its form in climatic changes, neither warping, shrinking nor swelling. Maple is not surpassed in that quality, at least not among commercial American woods.

Some of the choicest figured maple finds its use as piano cases, and as the boxes or cases of phonographs and the bodies of costly harps; while the very finest of all, though in small quantities, is found in the sides of violins. The artist who exercises his skill in the making



SUGAR MAPLE MUCH USED FOR WHEEL RIMS

Bicycle and sulky wheel rims made of sugar maple. Ninety per cent of the wood used for this purpose is of this species.

of this instrument considers the stick of curly or smoky maple, which reaches his hands as raw material, the fittest medium for the display of his genius and for the interpretation of his ideas.

WOODENWARE

The term woodenware is very broad, and its boundaries are vaguely defined. It includes most everything made of wood which does not specifically belong somewhere else. It is commonly understood to include wooden supplies and apparatus used by beekeepers, poultry raisers and dairymen, and also nearly all sorts of wooden novelties. More than 38,000,000 feet of maple reaches its final use yearly as woodenware in the United States. It is impracticable to name even by classes, the articles which owe their existence to this remarkable wood; but one of the smallest, and at the same time the most ephemeral, is doubtless the most important.

This is the picnic platter. It is a thin, wooden plate with which nearly every one is familiar. Its uses are many, but all are temporary. It is expected to serve only once, and for that once the grocer may sell butter in it, the butcher may wrap sausage in it, the baker's pie is carried in it to the customer, the picnicker may serve his forest-cooked dinner on it by some mountain stream. It is then thrown aside, and a new one takes its place next day.

There are no statistics showing the number of such plates manufactured, but they are numbered by millions, and maple furnishes a large part of the material.

Beech and birch supply nearly all the rest. Maple logs of the finest quality pass through machines and come out ready for the user. The first step in the process is to peel the log in long, broad ribbons of veneer, by the same method as the veneer is cut that goes to the furniture maker. The veneer is steamed, cut in discs and pressed in shape; and the work is done.

Maple contributes largely to kitchen and pantry ware, like vegetable cutters, stompers, pastry boards, rolling pins and carved trays and dishes. It is a choice wood for such wares because of its sanitary qualities. It is easily kept clean. The surface remains smooth because it is so hard that it will not readily dent or bruise.

MISCELLANEOUS

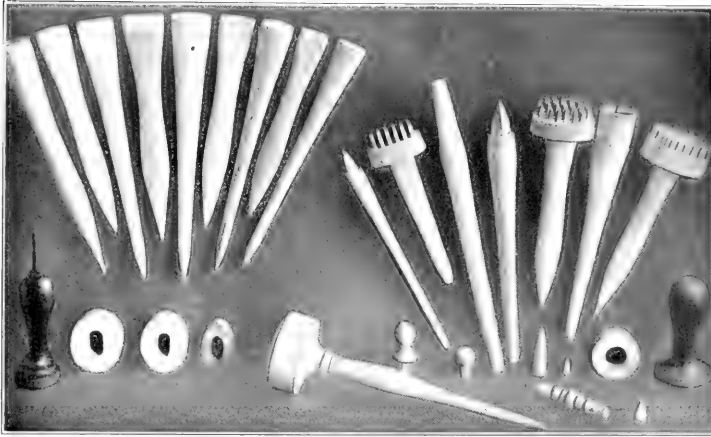
The principal places filled by maple in vehicle making are as axles for heavy wagons, runners and frames for sleds and sleighs and frames for bodies of buggies, carriages and automobiles. As an axle wood it is stronger than oak and compares favorably with hickory; but if subjected to pressure beyond its ability to sustain, or if caught by a sudden jolt or jar, it is liable to snap much more suddenly than oak or hickory. It is more brittle than they, and if it breaks, it breaks suddenly and without warning in the way of preliminary bending. Forty-nine woods are reported in the vehicle industry, and only four in larger amounts than maple. They are hickory, oak, yellow poplar and ash.

The employment of maple in making fixtures for

stores and of
fices follows
the same gen-
eral lines as in
furniture and
interior house
finish; that is,
either as
frames or as
surface finish,
usually as veneer.
Figured stock is in de-
mand. The
class of fix-
tures in which
most maple is
employed in-
cludes coun-
ters for banks,
stores and
libraries; cab-
inets for stores and ticket offices and standing desks,
stationary seats and partitions for offices and banks.
Rostrums for schools, halls and lodge rooms are often
built largely of this wood.

Laundry appliances constitute an important demand.
The drying rack for clothes is an important article, and
the frame in which curtains are stretched is another.
Maple's strength is responsible for the employment of
the wood in laundry machinery, and mangles, by which
clothes are smoothed, are made of it because of its hard-
ness and its smooth finish. Most clothespins are of beech,
yet large numbers are maple.

Textile mills where three-piece spools are in use depend
to a considerable extent on maple for these articles. The
ends are often maple, but the central barrel is more often
basswood or yellow poplar. The small, one-piece spool



SOME OTHER USES OF SUGAR MAPLE

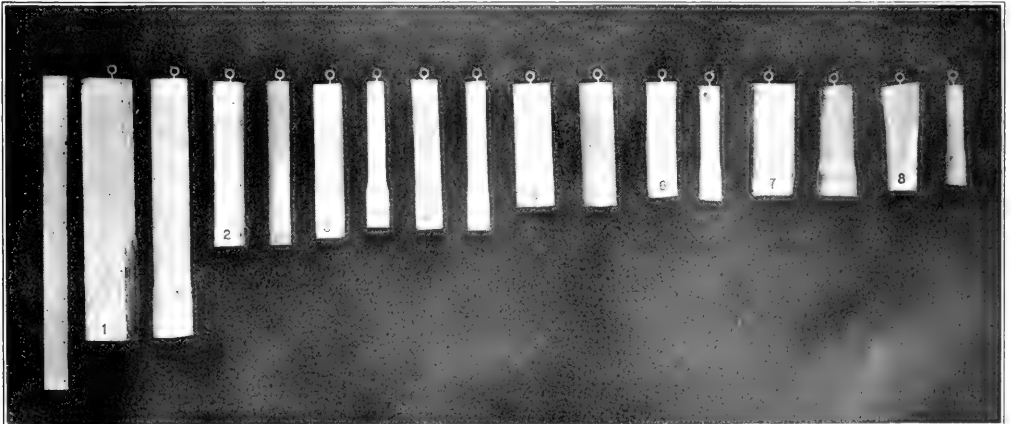
Products cut from beech and maple for paint brushes and cheap shaving brushes. Photo from the Fred B. Pierce Company, Keene, Cheshire County, New Hampshire.

is paper birch.
Manufactur-
ers of refrig-
erators and
kitchen cabi-
nets in which
ice or other
cooling appli-
ances are em-
ployed, con-
sume more
than 6,000,000
feet of maple
yearly for
frames, inside
lining, doors,
shelves and ex-
terior finish.

Nearly an
equal amount
goes annually
into the con-

struction of cars where it serves in numerous capacities.
Stock with fine figure, generally veneer, appears as exterior
finish for coaches, but most of the maple that goes
to car shops is utilized as frames and other hidden parts.

It would scarcely be supposed that 5,000,000 feet of
maple are consumed yearly by makers of trunks, yet
statistics show that such is the case. Some of it appears
as slats placed on the outside of the trunk to strengthen
it; some forms trays and compartments within; and
rotary-cut veneer is made into three-ply sheets and bent
in the necessary shape to form the body or box of the
trunk, which is then covered with canvas, leather or
metal. Maple is only one of several woods so used, and
in quantity is exceeded by basswood, yellow pine, white
pine, hemlock and elm, while eighteen woods are reported
in smaller amounts by trunk makers.

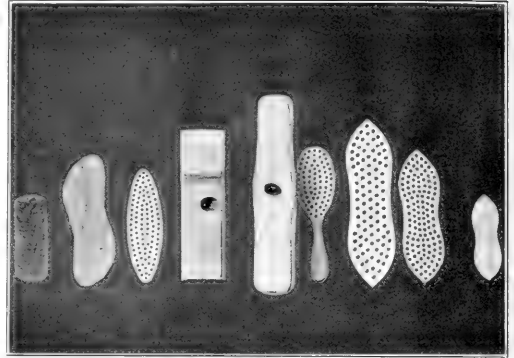


READY TO BE TURNED INTO BOBBINS

In the manufacture of bobbins for use in textile mills woods which turn readily are desired. Sugar maple contributes about equally with beech and birch the raw material required for this purpose.

Factories which produce sporting and athletic goods consume nearly 5,000,000 feet of maple annually in articles of many classes. Bowling alleys and the accompanying apparatus account for most of it. The bowling pins made of maple are considered superior to those of any other American wood. Its hardness and elasticity cause it to be preferred to any other. The pins withstand excessive battering. The same qualities lead to its use as croquet balls and mallets.

Two woods only, hickory and ash, are in more demand than maple by handle makers. The chief call for hickory comes from the manufacturers of slender handles where excessive toughness and resiliency are wanted; ash leads other woods for farm tool handles, as rakes, hoes and pitchforks; and maple supplies many of the remaining handles, among the numerous kinds being handles for brooms, brushes, mops, small hand tools and what are called grips, or the small turned pieces of wood serving as hand holds on pails, tubs, boxes and packages. Many



USED FOR BRUSHES

Sugar maple supplies a large part of the raw material required in the manufacture of high-grade brushes of various kinds.

The chopping blocks on which butchers cut meat were once made of sycamore almost exclusively, but maple has now taken first place. The chopping blocks are built up of sections bolted together, but the old-time sycamore was in a single piece. Maple is a leading wood also for skewers, which are the small pins or pegs with which the butcher trusses up a roast. The skewer maker selects a wood that is not inclined to splinter or splinter, and maple meets that requirement.

A number of industries consume maple in relatively small amounts, that is, less than 2,000,000 feet a year. Among such are the following:

Brush backs require a wood firm enough to retain the bristles, corn or fiber, and the yearly use of maple totals 1,912,000 feet. Of the thirty-four woods contributing to this industry, beech and birch alone exceed maple in quantity.

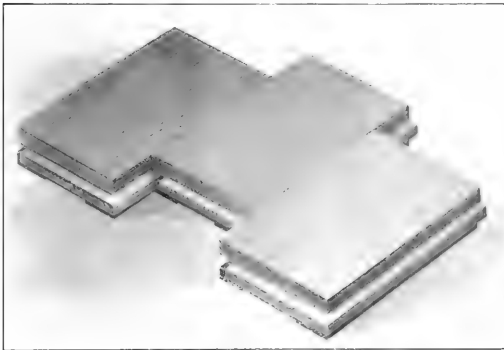


Photo by Maple Flooring Manufacturers' Assn.

SUGAR MAPLE FOR FLOORING

It is particularly serviceable for this purpose, the wood being tough, heavy, strong and hard, taking a high polish and wearing evenly.

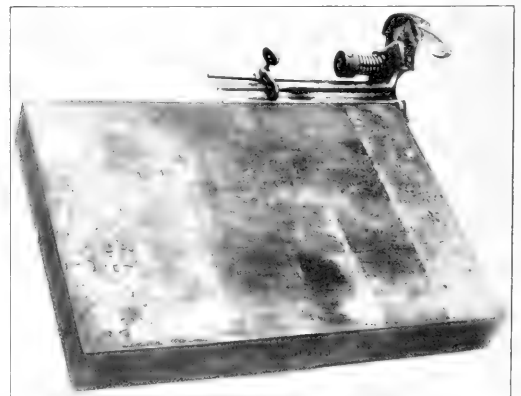
pail handles are enameled to give them the appearance of black ebony, and maple is one of the best woods for that treatment.

This wood has been found well suited for various parts of professional and scientific instruments, and nearly four and a half million feet are so used yearly. With the exception of southern red cedar, maple leads all other species in that industry, though thirty-four are reported.

Nearly four million feet of maple go yearly to toy factories in this country. The separate articles are very numerous, but most of the maple is worked into wagons and sleds for children, and into toy tools for the playground.

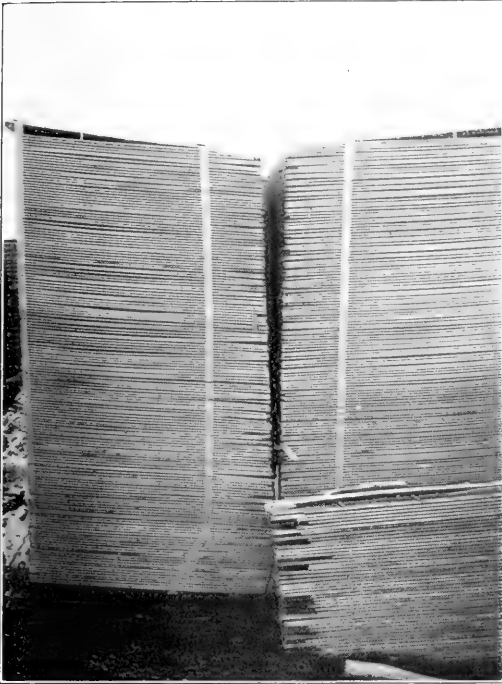
Excelsior mills convert 3,000,000 feet of maple yearly into the finely-cut ribbons of wood, and the finished article is of great value as packing material for merchandise. It takes the place of straw for that purpose, and is better because it has a firmer body and is more elastic. Excelsior is employed in considerable quantities in uphol-

but is not equal to cotton, hair and Spanish moss.



SUGAR MAPLE FOR CUTTING BLOCKS

For cutting blocks, including those used in cigar factories, butcher shops, etc., sugar maple is employed in equal quantities with sycamore. Formerly a solid block of wood was used for small cutting blocks, like those shown in the picture, while a two-foot section of a tree answered the same purpose in the butcher shop. At the present time both kinds of blocks are built up of a number of smaller pieces, glued and bolted together.



WELL PILED MICHIGAN MAPLE LUMBER

Much of the mill man's success depends on the way his lumber is stacked in the yard. It should season flat and straight. It will then pass through the machines with the minimum of waste.

The makers of pumps and wooden pipe for conducting water or other liquids require 1,706,000 feet of maple annually.

Elevator makers report 1,652,000 feet. It is worked into guides and floors.

Nearly one and a half million feet go into saddles and harness, chiefly as hames and as trees or frames for saddles.

The pins or dowels which serve to fasten together the different parts of doors, furniture, interior finish and fixtures call for 1,351,000 feet of maple a year.

Toothpicks account for 1,200,000 feet, but paper birch greatly exceeds maple as toothpick material. The log is first reduced to veneer of proper thickness and is then sliced into picks.

The consumption of more than a million feet of maple a year is reported by manufacturers of electrical machinery and apparatus.

Whip handles, canes and umbrella handles call for more than a million feet.

A like quantity finds its way to boat yards as material for construction of vessels of all sizes. Most of it is used as trim.

The making of mine machinery and other appliances and equipment draws liberally upon maple.

Approximately 870,000 feet a year go to factories which make shade and map rollers, and most of it is

converted into the small plugs to which are fastened the springs that by uncoiling raise the shades. Most of the rollers are white pine.

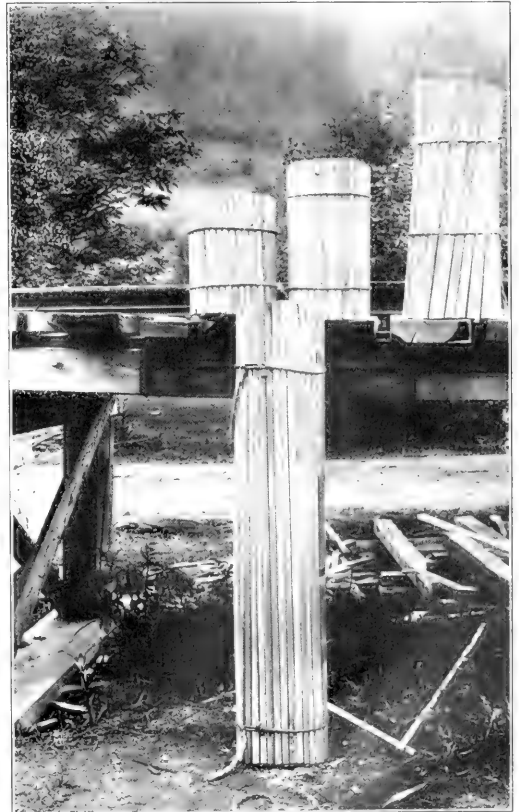
Considerably more than three-quarters of a million feet of maple a year is manufactured into faucets and bungs for barrels and kegs.

Nearly an equal quantity is consumed in making the numerous articles and apparatus classed as playground equipment. Other uses are for printing material, brooms and carpet sweepers, weighing apparatus, plumbers' woodwork, sewing machines, picture frames, silos and tanks, artificial limbs (crutches), gates and fencing, patterns and foundry flasks, caskets and coffins, advertising signs, clocks, cigar boxes.

In the State of New York 130 separate uses of maple are reported by factories, 164 in Illinois, 168 in Michigan and 336 in Pennsylvania.

SLACK COOPERAGE

Cooperage or stave ware is divided in two classes, called slack and tight. The latter term is applied to barrels intended to hold liquids, while stave containers



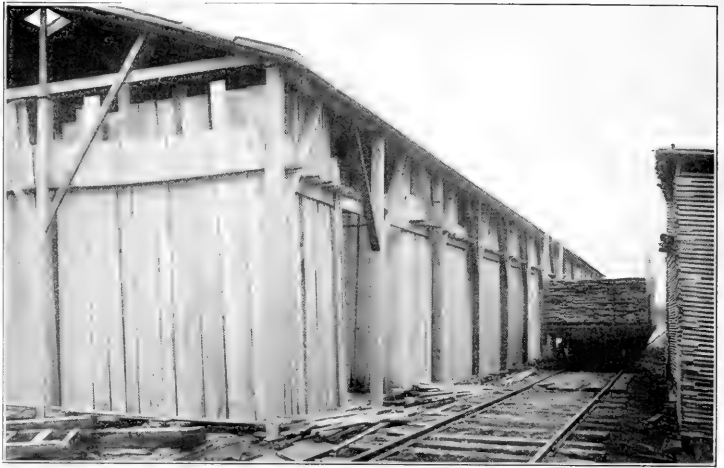
HANDLES OF SUGAR MAPLE

Mop and broom handles are made usually from three varieties of wood, and one of these is sugar maple.

for fruit, flour, cement, lime and almost innumerable other dry or partly dry commodities are known as slack cooerage. Maple is not used in tight cooerage, but in the other kind it ranks fifth in quantity among American woods. Those demanded in larger amounts are red gum, pine, beech and elm. The output of maple staves per year, according to latest obtainable figures, exceeds 133,000,000.

The average value of maple staves per thousand is \$5.42. Staves of all sizes and qualities are included in the average.

Heading and hoops constitute part of the stave industry. Maple supplies 13,633,000 sets of heading a year, at an average value of \$41.50 per thousand sets. Two-thirds of all



DRYING MAPLE LUMBER BY END-STACKING

The virtue of this method of stacking lumber lies in the better air circulation which it affords. The popular notion that the water drains lengthwise out of boards so stacked is erroneous. Little, if any, passes out by drainage

maple heading comes from Michigan, and Pennsylvania follows. The yearly contribution by maple to the country's hoop supply amounts to 731,000 valued at \$3.76 per thousand. Most of the maple hoops are made in Maine. Elm is the leading hoop wood and the output of this species exceeds maple's forty fold.

VENEERS AND DISTILLATION

Maple ranks third as a producer of veneer, with a yearly output of 35,444,000 feet, log scale. The species above it are red gum, with 129,930,000 feet, and yellow pine, with 48,143,000 feet. Cottonwood and yellow poplar, respectively, are next below. The average cost at the mill of maple veneer is \$15.45 per thousand feet, log scale. The leading states in maple veneer production are Michigan, 15,350,000 feet a year; New York, 7,658,000; Indiana, 3,051,000; Vermont, 2,682,000; Wisconsin, 2,336,000, and Pennsylvania, 1,093,000. Practically all of the maple veneer made in the United States is consumed by the industries described in preceding paragraphs.

Maple is, without question, the leading wood in hardwood distillation in this country; but precise figures to show this cannot be quoted, because beech, birch and maple are listed without distinction. The three constitute 91 per cent of all hardwoods going to distillation plants. The wood is distilled by being passed through kilns or retorts, where sufficient heat is present to break down the structure of the wood. The chief commercial products are charcoal, wood alcohol and gray acetate. Michigan leads with a yearly consumption of 457,362 cords of wood, which costs on an average of \$3.03 a cord. Pennsylvania follows with 368,126 cords at an average cost of \$3.68, and New York ranks third with 139,011 cords, costing \$3.62. The value of the total product is placed at \$7,641,690 a year.



LOADING LOGS ON GONDOLAS

The "hoisting machine" is getting in its best work here. The maple lands among the heaviest woods, the logs are handled as light as broom handles.



Photo by the Field Museum, Chicago.

AN OLD-FASHIONED SUGAR CAMP

This rural scene lies near Pickens, Randolph County, W. Va., at an altitude of 2,700 feet. The stand of maple is pure. Buckets in place of the old-time sugar troughs are used to catch the sap which drips from the trees.

Maple Sugar Making

THE great importance of maple lumber and the other products manufactured from the wood should not throw too far into the background the industry which produces maple sugar and syrup. The northern states yield most, but such sugar is made in commercial quantities as far south as Georgia. In 1860 New York was the leading maple sugar state. Ten years later Vermont attained first place and held it for thirty years, and then lost it to Ohio. The general government and various state governments have concerned themselves in detecting and discouraging the adulteration of maple syrup and sugar. The temptation to doctor the product with impurities seems exceptionally strong. It is so easily done, and the fraud is so difficult for the ordinary consumer to detect that it has been found necessary that the strong arm of the law interpose its authority to protect the public.

All maples yield sugar, but the common hard maple and the variety known as black maple are usually considered best. The manufacture of maple sugar in this country has gone on since prehistoric times. The Indians understood the process very well, but their methods were crude. They caught the sap in bark buckets or in gourd shells; boiled it in bark troughs by dropping in hot stones, and they stored the sugar for future use in

bark boxes. Sugar carried in such retainers was an article of commerce on the frontiers a hundred years ago. Chicago was a maple sugar center before it had any business with grain and meat or with lumber. Early traders at Chicago reported as a common article the "barks of sugar" brought in by Indians to be traded for whiskey. Further to the northwest, where hard maple was scarce, the Indians made sugar from boxelder.

The sugar-making carried on by early white settlers was nearly as crude and unsanitary as that of the Indians, and in some rural communities there is still room for improvement; but where the industry is on a large scale, up-to-date methods prevail. The business pays. In Vermont the claim is made that a sugar grove brings larger returns than the same ground would bring if devoted to agriculture. In the past, most of the sugar has come from trees planted in nature's way, and at haphazard; but the tendency now is to plant trees, or at least to thin and properly space those which nature plants, so that they will not be unduly crowded, nor yet so far apart that they do not wholly occupy the ground.

The flow of the sap from which sugar is made takes place during the first warm days of spring. An erroneous idea prevails that the sap is rising from the ground to the tree's crown, and that the flow is due to that fact.

No foundation exists for that belief. There is more sap in the tree in winter than in summer. It accumulates during the summer and remains inactive, so far as movement is concerned, during the winter; but the sugar is being manufactured in the wood's pores and cells. When the warmth of spring appears, the air in the wood expands and causes a pressure which may amount to 20 pounds per square inch—more than the pressure created by a perfect vacuum. If an opening is then made through the bark and into the wood, the internal pressure, due to expanding air, forces the sap out. The cool of night lowers the temperature of the air in the wood cells, the pressure ceases, and the sap flow declines or stops; but the heat of the succeeding day restores the pressure and the flow again begins. That continues as long as the weather is alternately hot and cold. The earliest flow occurs in the spring while the tree's roots are still frozen, and it is not possible for sap to rise from that source. An artificial flow may be induced in midwinter by building a fire against the maple's trunk to warm the



A MODERN SUGAR CAMP

Our illustration is culminated from posts and is based in part on the work of the American Forestry Association. For more information on the subject of maple sugar, see the article in this issue, and also the article on the subject of maple sugar in the issue of the American Forestry Association, Washington, D. C., for 1917.

air within, thereby creating pressure by the expansion of the air sufficient to force the sap out. That process was formerly resorted to by settlers on the frontiers when sickness or some other cause demanded sugar in winter and none was available except that made from the maple trees with which the snowy forests abounded.

The New York State College of Forestry at Syracuse is maintaining in the State Forest Station at Syracuse an experimental nursery where over one million trees are produced annually. The College invites inspection of this forest nursery and of the experimental work being carried on in the Station. It will be glad to give information at any time regarding the kinds of trees that are best suited to different soils, methods of planting, care of trees after planting, etc. It is surprisingly easy to start a thousand evergreens and

until one has planted these they will not appreciate the pleasure of watching the development of a plantation of little trees.

Annual Meeting in Boston

THE annual meeting of the American Forestry Association will be held in Boston, Mass., on Monday and Tuesday, January 14 and 15. Headquarters will be at the Copley-Plaza Hotel, and the business and general meetings will be held there with sessions each day in the morning and afternoon. A program suited to the public and technical phases of forestry will be announced later and special attention will be given to the effort to extend the appropriation for continuing the purchase of Federal Forest Reserves under the provisions of the Weeks Law.

On Monday evening, January 17, there will be a Dinner and Banquet at the Copley-Plaza under the joint auspices of the Massachusetts Forestry Association and

the several other forestry and forest protective associations in New England and the American Forestry Association, the purpose being to get together all the New England organizations interested in forestry. The speakers will comprise some of the leading men of the country and it is expected that several hundred people will be present.

Reservations for the dinner may be made now. Tickets are \$3.00 each. Those desiring tables for a special number should arrange for same at once. Reservations should be requested from Harris A. Reynolds, secretary of the Massachusetts Forestry Association, 4 Joy Street, Boston, or P. S. Ridsdale, secretary of the American Forestry Association, Washington, D. C.

The Reforestation Movement in China

By W. F. SHERFESSE

Director of Forestry, Philippine Islands

CHINA has long been held up as the horrible example of forest neglect. Her treeless hillsides have proved the text for many a lecture, and her floods have served to illustrate many a warning. The casual traveler, by river boat or railroad, in describing his impressions, has seldom failed to refer to the treelessness of the areas through which his route lay; and the technical forester and the conservation propagandist have joined the tourist in deprecating the negligence in the past which has deprived the present-day Chinese of one of the most essential elements of industrial civilization.

In most cases such accounts have not been exaggerations, for although there are said still to be found large areas of forest in more or less good condition, particularly in Manchuria, it is undoubtedly true that throughout most portions of the country the treeless mountains rise naked from the treeless plains.

That such a situation as this has had and continues to have a disastrous effect upon the industrial productiveness of the country, as well as upon the comfort and well-being of its inhabitants cannot be doubted. Mr. Gifford Pinchot writes that—



NOTABLES AT TREE PLANTING ON PURPLE MOUNTAIN, NEAR NANKING, CHINA

A gathering to attend the ceremonial tree planting to mark the inauguration of the Forest School in the University of Nanking, March 15, 1915. The principal figures shown are (1) His Excellency, Chang Chien, Minister of Agriculture and Commerce, (2) United States Consul Williams of Nanking, (3) The Daodai, or Lieutenant Governor of the Province of Kiangsu, (4) Mr. Wang, the Mayor and Chief Magistrate of Nanking, (5) Mr. Chu Chi Heng, the President of the Nanking Branch of the Chinese Colonization Association, (6) President A. J. Bowen of the University of Nanking. In the midst of the crowd are Mr. Ngan Han, in charge of the Forest Office at Peking, and Mr. P. C. King, Forester of the Province of Anhwei.



PURPLE MOUNTAIN NEAR NANKING, CHINA

General view of the lower slopes of Purple Mountain showing the house erected for tools, seeds, etc., and to serve as living quarters for the superintendent in charge of the work. The tree plantations are shown by light dots in the middle distance towards the left. The river visible in the distance is the Yangtze-Kiang.

"Of the two basic materials of our civilization, wood and iron, the forest supplies one. The dominant place of the forest in our national economy is well illustrated by the fact that no article whatsoever, whether of use or ornament, whether it be for food, shelter, clothing, convenience, protection, or decoration, can be produced and delivered to the user, as industry is now organized, without the help of the forest in supplying wood. An examination of the history of any article, including the production of the raw material, and its manufacture, transportation and distribution, will at once make this point clear."

These remarks, while made with particular reference to America, apply with equal force to China. Most portions of the new republic lie well north in the temperate zone, where fuel for warmth is a vital necessity during a large part of the year. Existing industries require large quantities of fuel and of lumber and no one will hesitate freely to admit that with a cheap and abundant supply of these so essential commodities, the standard of living among all classes, their comfort, health and productiveness would all show a prompt and striking rise. But under existing conditions most of the needed forest products must be imported and the resulting drain on the financial resources of the country is among the least harmful effects of a most unfortunate situation. The chief harm comes from the handicap to industrial development, from the depressed standard of living, and from the low productiveness per capita. Even if means for

cheap and rapid transportation were available, importation of lumber from abroad could never form a satisfactory substitute for a domestic timber supply. The great mass of the population is poor and can ill-afford the added cost of transportation—even granting that it were low—and the profits of the many dealers through whom the imported wood must pass.

Since trees have vanished, brush and wild shrub growth of all kinds have eagerly been consumed, until the very roots of the plants are dug from the ground to serve as a scanty supply of fuel for cooking and for warmth. The dead grass and the stubble from the fields are raked clean to eke out the desperately needed but lamentably inadequate supply. And then comes fire during the late autumn to add its share to an already almost hopeless situation.

Naturally under such conditions floods are by no means rare, for the essential part played by forests in the protection of stream flow by conserving a large portion of the rainfall and giving it out later during the dry season is too well known and recognized to need exposition here.

In this connection, also, the fixation of wind-driven sands and loose earth is too important to be overlooked. To bring about such a result there is in most places no agency so effective and so profitable as the establishment of forest growth.

The magnitude of the task in China, the appalling amount of work which should be done, need not prevent a beginning being made, if only on a small scale, for while flood prevention and to a lesser extent the fixation of wind-blown earth require for best success that operations should be undertaken and carried through on a large scale, the most pressing need of all—that of raising a cheap and abundant supply of fuel and timber—can be taken up on any scale, large or small, according to the available means.

Through the energy, perseverance and skill of Prof. Joseph Bailie, cordially and actively supported by influential Chinese and by the University of Nanking, an admirable beginning has already been made on the slopes of Purple Mountain, just outside the walls of Nanking, and a School of Forestry has been opened at Nanking. There is every reason to expect that a high degree of success will continue to attend these efforts and that they will, as they should, serve as an object lesson and as an encouragement for the inauguration and wide extension of similar projects.

At the invitation of the University of Nanking, and through the courtesy of the Governor-General of the Philippines, the writer has recently been given an oppor-

tunity to visit the newly established Forest School in the University of Nanking and to study the reforestation work on Purple Mountain. Also, through the courtesy of Governor Han of Anhwei Province, facilities were afforded a party, of which the writer had the good fortune to be a member, to make careful studies of many of the hills and mountains in the provinces to determine the feasibility of forest planting, and if conditions should prove favorable, to recommend the general lines on which such work could be undertaken with best chances for full success.

To the writer at least the most astonishing fact revealed by these investigations is the great extent of excellent land lying waste on hill and mountain. In many places the population is overcrowded and desperately poor, yet in the immediate vicinity, rising perhaps from the very outskirts of the overcrowded towns and villages, are fertile but unused hills, excellently suited for forest growth. In fact, a considerable portion of these huge waste areas is covered with soil too good for forest growth—not that forest would not grow excellently in such situations, but that as the soil and configuration are suited for fruit growing or even for the intensive cultivation of agricultural crops, it should be put to these



PHOTOGRAPH TAKEN IN COMMEMORATION OF THE ESTABLISHMENT OF THE NANKING BRANCH OF THE CHINESE COLONIZATION ASSOCIATION

First Row (Seated) Reading from Left to Right—1. Su Si-tai, President of Nanking Chamber of Commerce. 2. Wu Chia-hsiu, President of Nitrate Mines. 3. Dr. Macklin, University of Nanking. 4. Hsu Ch'ien, Commissioner of Industry of Kiangsu. 5. Han Kuo-chun, Civil Governor of Kiangsu. 6. Ch'ui Lai-chih, formerly Vice-President of Kiangsu Provincial Assembly, President of Nanking Branch Colonization Association. 7. Wei Chia-hua, President of Charitable Associations of Kiangsu, Auditor of Accounts of Colonization Association. 8. Chin Ting, Associated Director of Hsia Kuan Chamber of Commerce.

Second Row (Standing)—1. Chang Kuan-ch'i, Acting President of Agricultural Association of Kiangsu. 2. Chang Han-ru, Vice-President of Chamber of Commerce of Nanking. 3. Tao Pao-sing, formerly Representative to National Assembly. 4. Ku Ch'i, Investigator at Civil Governor's Office. 5. Lou Yün-ch'ing, Secretary to Commissioner of Industry. 6. Joseph Bailie, University of Nanking. 7. Chung Hung-shen, formerly Judge in Chekiang Province. 8. Liu Wei-li, Secretary in Civil Governor's Office, formerly District Magistrate of Kiangning. 9. Mr. Magee, Foreign Treasurer of Colonization Association. 10. P'u Chi, Second Secretary in Civil Governor's Office.

Third Row (Standing)—1. Chen Tsh-shu, Secretary in Civil Governor's Office. 2. Tang Ch'ing-shen, Proctor of Law School. 3. Chung Fung-ching, President of Law School of Kiangsu. 4. Kan Hung, Vice-President of Chamber of Commerce. 5. Wang Hsi-shiang, Treasurer of office for Road Building, Treasurer of Colonization Association. 6. Chang Tsen-pi, Chief Auditor for Office of Road Building, Secretary of Colonization Association. 7. Huang Kuei, Director of Agricultural Station of Colonization Association. 8. Hsia Ren-hsiu, Secretary of Internal Affairs, Office of Civil Governor.



PLANTING THE FIRST TREE ON PURPLE MOUNTAIN

The figures in the foreground, from left to right, are His Excellency, Chang Chien, Minister of Agriculture and Commerce; United States Consul Williams, of Nanking (stooping), serving as the Representative of the United States Minister in Peking; and with spade poised in mid-air, Mr. Sheldonridge, of Shanghai, Editor of the *National Review*. Mr. Baile is seen standing in the center of the photograph.

more profitable uses. As is to be expected, however, by far the larger portions of these hills and mountains are suited to forestry alone—their poor, shallow soil, their slope, or their rock-strewn surface rendering them unfit for more intensive use. Some of these idle lands are held under private ownership, but title to the greater portion is held by the government. Every consideration urges that these waste lands be put to the various uses to which they are so well adapted—that they should be made to produce the forest or agricultural crops for which there is such pressing need. Land suitable for agriculture should be put under intensive cultivation. Of that which remains as much as possible should be devoted to fruit growing—and the remainder, the largest portion of all, to the production of fuel, timber and other products of the forest. Fruit trees found growing wild on hillsides prove that success will attend such operations if they are conducted with reasonable skill and care. Found growing naturally were species of wild pear, persimmon, peach and cherry and young bushes of the soft jujube. And if additional assurance of success should still be desired, it is to be found in the fruit orchard occasionally encountered—established and cared for by private owners of land on the lower slopes of the hills, and yielding most satisfactory returns.

Also throughout practically all of the areas we visited we found that in spite of the scarcity of seeds, in spite of the eager activity of fuel-gatherers, the rudiments of forest growth are still present; and when given a chance that they develop into forests of fair density and form. It is seldom or never that even small areas of such

natural forests are left undisturbed to show what could be expected if nothing more were done than to protect the natural growth from fire and cutting. But the presence of any forest growth whatever under such circumstances is a very strong proof that little or no risk is involved in undertaking artificial reforestation. Among the tree growth found naturally in Anhwei Province are pine, oak, chestnut, elm, maple, hackberry, willow, ailanthus, cypress, of which the Chinese name is Peh-Mu Shu; Cunninghamia lanceolata or Sha-shu; Liquidambar or Feng; pistache, or Lien Shu; the Wing Nut; Dalbergia hupeana or Tian Shu and many others.

That forest planting, on a large scale or small, on these idle lands found so abundantly throughout China, would be highly profitable cannot be doubted. The soil and climate are excellently suited to the purpose. Labor is abundant, very



A FEATURE OF THE REFORESTATION WORK

Transporting humus from a nearby lake-bottom to enrich the soil in the nurseries and in the plantations on Purple Mountain.

cheap and can be made highly efficient by proper instruction. As there is a greedy demand for forest products in the immediate neighborhood, market conditions and transportation present no difficulties. Nor is it necessary to postpone the returns until the trees have reached sufficient size to produce saw logs. A very much shorter rotation may be adopted, due to the heavy demand for fuel and for small round timber of all kinds and dimensions. All necessary conditions, so far as we were able to anticipate, are present, nor is there any difficulty which cannot be overcome by the exercise of ordinary skill and foresight. In comparison with most situations in which reforestation has been successfully carried out in the United States, the conditions in China are extremely favorable.

It is unlikely that the Chinese government, either now or at any time within the near future, will feel in a position itself to carry on extensive work in reforestation



CHINESE PUPILS FROM THE FORESTRY SCHOOL AT NANKING, CHINA

Pupils, with their teacher, ready for a practical lesson in transplanting seedlings of forest trees. The stone figure in the background is a large monolith (marking the grave of a general) borne on the back of an enormous stone turtle.

Even if funds were available, the personnel is lacking for such work to be undertaken and carried out on a large scale. It is to the private owner or planter, therefore, that we must look for the reforestation so badly needed throughout the country. Thus the first steps should be to encourage the owners of private land now lying waste to plant with profitable trees of fruit or forest species; to get the idle public land into private ownership or under private use; and by seed distributions, by the establishing of tree nurseries to supply the young stock, or by actual demonstrations made or instruction given on the ground, to assist the private individual to secure the greatest returns from his time and labor. Especially at first, experiments should play but small part. It is most important that the initial efforts should succeed and one of the surest ways to accomplish such a purpose is to use a tree species found growing naturally in the vicinity and under the actual conditions which the young, new forest will have to meet. Later on, when the practicability of the work has been abundantly demonstrated, exotic species can be included with probable profit and without much risk.

It is along these lines that Prof. Bailie has conducted his notable work on Purple Mountain. Undertaken originally as a means for giving needed

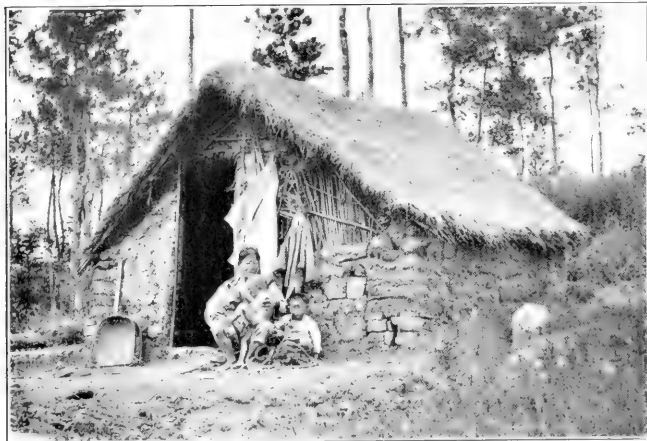
succor to sufferers from famine, it has now definitely justified its own existence, and it has proved the soundness

of his plans and the skill and common sense which underlay his energy and enthusiasm. It has put to profitable use large areas which had hitherto lain idle. It has given temporary employment to thousands, and many families now gain a comfortable and permanent livelihood on land which would otherwise have remained indefinitely unproductive. It has resulted in the establishment of a comprehensive course in forestry in the University of Nanking; and probably most important of all, it is serving and will serve as an inspiration and encouragement for the inauguration of other, and possibly larger, projects elsewhere throughout the new republic.

As stated above, the reforestation work on Purple Mountain had its beginnings in a recent famine which rendered countless Chinese homeless and destitute. Thousands flocked to the city of Nanking and naturally looked to the University and to the missionaries for assistance and relief. At first, money and food were supplied by direct distribution, but Prof. Bailie conceived the better idea of employing the destitute in some useful work which, while meeting their immediate necessities, would also provide at least some of them with a permanent and suitable



PROF. JOSEPH BAILIE



HOME OF A CHINESE COLONIST

This family has been established in the stand of pine, a few trees of which are to be seen in the picture. The house is built of stones, reeds and grass and is typical of the residences of this class of Chinese.

livelihood. They were, therefore, given the task of building roads to and around Purple Mountain and of putting the waste land on its slopes and foothills into a productive condition. The introduction of agricultural crops on the rich land at the base of the mountain was the first object, but it was soon found that as such areas were naturally limited, reforestation must be depended upon for the utilization of the great body of land on the upper slopes. It was also realized that in order to make the plans permanent and adequate, Chinese sympathy and cooperation must be obtained. The formation of the "Colonization Association of the Republic of China" was the first natural outgrowth.

Readers of *AMERICAN FORESTRY* will doubtless find much of interest in the following petition sent to Governor General Cheng of Kiangsu Province by His Excellency, Chang Chien (at that time Minister of Agriculture and Commerce and still chairman of the Colonization Association), and others:

"Your Excellency:

"We (Chang Chien, Ma Liang, Chiu Chiheng, Ku Chi, and Chang Tzu-lin), representing the Board of Trustees of the Colonization Association of the Republic of China, respectfully present this petition, requesting your examination and permission for registration.

"The Chinese nation was built up on farming. As early as the medieval times, the "well" system of land division had been organized on a sound basis conforming to the principles of modern socialism. Unfortunately, with the wars and the feudal states and the tyrannical rule of the Chin Dynasty, this system degenerated and finally

went out of existence. The fertile lands lying both in the north and in the west were then laid waste, to say nothing of the already barren regions where cultivation and improvement were never thought of. With natural resources thus undeveloped, our people have been led from idleness to poverty, which is mainly responsible for China's weakness—a condition truly deplorable!

"It is for this reason that we have started the Colonization Association with a view to relieve the poor through the cultivation of the waste plains and valleys. Under the guidance of Joseph Bailie, an English professor specializing in agriculture, the colonists shall be taught farming along modern lines. The details of our scheme are contained in our regulations. All the executive officers of our Association are elected from among the Chinese Committee. Four thousand *mu* (700 English acres) of land have been secured on Purple Mountain, outside of Nanking, for the pur-



CHINESE FORESTRY STUDENTS

The type of bright enthusiastic young men who are being trained to be the future foresters of China. They are making rapid progress in their studies.

pose of experimentation, which, if successful, will lead to further extension.

"We therefore enclose our Regulations for your examination, with the request that proper registration be permitted to us, that order be given to the local officials to issue proclamations, and that the Boards of Agriculture and Finance be notified to that effect, so that all provinces may know what we aim to accomplish.

"This is our Petition."

The Governor General replied as follows:

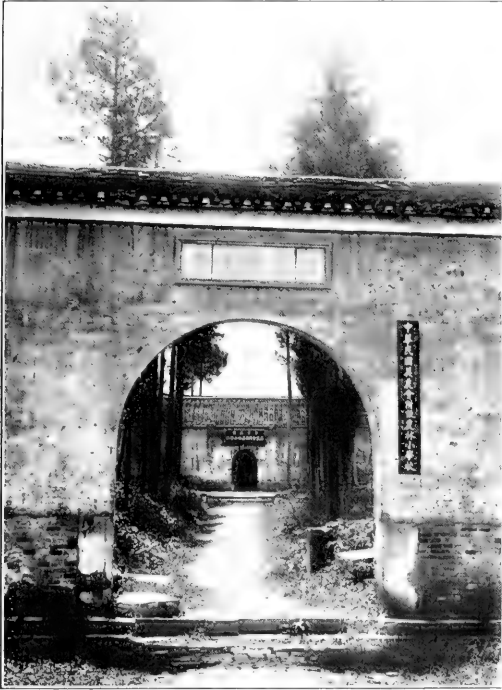
"To Chang Chien and other Trustees of the Colonization Association of the Republic of China:

"Your petition has had my attention. It is true that the Chinese nation was built up on farming. The "Well" System, so well organized during the Medieval Ages, found some traces in the two Hans when they made efforts to encourage agriculture. It was not until after

the Tsin and the Wei Dynasties that this ancient principle was entirely forgotten. Since then, things went from bad to worse; and today the economic tide of our people has almost reached its lowest ebb.

"To have such large tracts of land lying waste and barren in a country known to the world to be the richest in natural resources, is certainly deplorable! You gentlemen have done well by organizing the Colonization Association. You are laying the foundations for national development and paving the way for Chinese colonization. I can not peruse your petition without appreciating your good ideas and well-laid plans.

"It is also gratifying to note that Mr. Bailie, out of



TEMPLE USED AS A SCHOOL

A former Buddhist temple (in the interior) now devoted to school purposes by the Chinese Colonization Association. The large arch in the foreground is the formal gate with which all temples are customarily provided.

his love to humanity, has offered his valuable services for the relief of the poor. He will greatly profit our farmers by teaching them modern methods of agriculture.

"I hereby permit your Association to be registered; I order the local officials to issue proper proclamations; and, further, I send despatches to the Boards of Agriculture and Finance so that your purpose may be known to all the provinces.

"This is my reply."

The Forest School made its first beginnings in the Spring of 1915 with the enrollment of seventeen students, all of whom hold scholarships: three from the famine relief fund, five from the Governor of Anhwei, five from the Governor of Shantung and six who had formerly attended the German Forest School in Tsingtau.

which was discontinued at the outbreak of hostilities with Japan. For each student the University receives 130 Chinese dollars per year, for which it provides tuition, lodging and meals. Their clothing and incidental expenses are supplied by the students themselves. The scholarship also provides a yearly cash allowance to each student of \$30 for the purchase of books and other needed incidentals. This allowance is increased by \$10 a year during each year of the course. Thus \$700 dollars local currency will meet the student's needs during his four years' residence at the school.

The average age of the students is probably about 22. They are a strong, sturdy, intelligent set of students who would do credit to any institution. It has not yet been possible to start technical instruction in forestry, as the students are not sufficiently familiar with English to receive instruction in that language and there is a dearth of textbooks and reference books on forestry published in Chinese. Accordingly, for at least 18 months, that is, until the fall of 1916, most of their time and energy are being devoted to an intensive study of English which will enable them to take advantage of forest literature published abroad.

The most encouraging feature of the entire work is the eagerness with which the provinces, and even the central government, are planning to inaugurate similar



ROAD-MAKING ON PURPLE MOUNTAIN

Here coolies take the place of draft animals. Note men who are supervising the work carrying umbrellas.

projects elsewhere. Governor Han of Anhwei Province has easily shown himself the most progressive in this respect. In a speech which he recently made occurred the following statement:

"China has long been an agricultural nation. Nanking and its neighborhood were left barren and deserted by the recent wars. Such wrongs fill men's hearts with shame. It is very fortunate Mr. Bailie has taken every possible means to encourage agriculture and forestry. But the Purple Mountain is but a limited area, and unless this work be extended to other villages and magistracies, the plan lacks perfection. I have personally visited Mr. Bailie's Experiment Station, and my heart

was filled with veneration for his works. I hope that the people of Kiangsu will follow his example. I, being confined to my official duties, hope that, in the future, when released from my post, I may learn the method of agriculture and forestry under Mr. Bailie."

In the service of Anhwei Province under Governor Han is Forester P. C. King, a recent Chinese graduate of Cornell, whose efforts are now being directed towards the wide extension of forestry in his province. While the leaders of the reforestation movement in China will undoubtedly meet with many difficulties and discouragements which are inseparable from pioneer work of all kinds, there is every reason to believe that the work has made a sound and permanent beginning and that future decades will show a very different and much happier state of affairs from that which the present generation has inherited from its ancestors.

NOTE.—Much of the credit for founding the Nanking Forest School belongs to Major Geo. P. Ahern, former director of Forestry in the Philippine Islands. In 1910 Major Ahern visited China and was impressed by the vast areas of country entirely bare of any tree growth.

Land Speculators Block Settlement

DURING the last decade, the Forest Service has classified as agricultural and opened to public entry more than 15,500 individual scattered tracts of lands in the national forests, comprising more than 1,700,000 acres, says an article by the Chief Forester, published in the Year Book of the Department of Agriculture, just issued. Within the last two years, in addition, several large blocks have been eliminated aggregating more than 2,500,000 acres, while nearly 2,000,000 acres more are now under consideration for elimination. All the remaining agricultural land in the national forests is confined chiefly in isolated tracts scattered here and there; to restricted areas requiring irrigation, where water cannot be obtained; and to certain river bottoms and benches which are not covered with very heavy and valuable timber.

A constant pressure is being brought to bear on the Government by private individuals who want to acquire possession of these heavily timbered agricultural lands, single quarter-sections of which often have a value as high as \$20,000 for the timber alone. In spite of the fact that some of these lands have soil suitable for agriculture, to throw them open as homesteads would not result in farm development. This has been proven over and over again where lands of this kind, acquired under the Homestead Law, are today held not by homesteaders but by lumber companies, who promptly purchased them from the settlers as soon as title passed from the Government—a speculative process which effectively prevents men of small means from acquiring land and establishing homes.

The Government is withholding from agricultural entry all such heavily timbered land until after the timber is cut off. As soon as this is done, the land will be

A little later he wrote to Hon. Amos P. Wilder, American Consul General at Shanghai, as follows: "While in China last fall I was impressed with the need of a Forest Service of that country. It is one of the crying needs of China today. If Chinese students, trained in American methods, later on found a Chinese Forest Service it will mean that the development of their forests will be along modern lines. It will mean another link in the chain of friendship that now binds America and China."

By conferences and correspondence Major Ahern then arranged for the entrance and maintenance of Chinese students in the Philippine School of Forestry and a number of Chinese have since been under training there. Last Fall Major Ahern suggested to the authorities of the Nanking University a plan for establishing a school of forestry at Nanking, the plan was approved and he was asked to participate, but illness prevented his acceptance. The school was opened last March under promising auspices.—THE EDITOR.

opened to entry and settlers will be able to acquire it directly from the Government without cost, instead of having to pay from \$40 to \$60 an acre to land speculators. For example, on the Kaniksu National Forest in Idaho and Washington, the Government's timber sales have been made to include much of the remaining timbered agricultural land. Within eight years fully 10,000 acres will be made available for settlement. Permanent homes will be established by the settlers, and there will be available for the use of communities approximately \$225,000 for roads and schools, their legal share of the proceeds from the timber sales. Private ownership of heavily timbered agricultural land blocks farming development, says the article; Government ownership insures such development under conditions that give opportunities to the small settler whose only capital is his strength and courageous perseverance.

One of the most serious agricultural problems of the northwest today is the development of the logged-off lands in private ownership. In Oregon and Washington alone more than three million acres of such logged-off lands are lying idle, although much of this area has fine agricultural soil and a climate that insures abundant crops and the development of thriving communities. Yet in this same region hundreds of settlers are seeking to find places in the national forests, usually remote from transportation, high in the mountains, where the climate is harsh and the soil relatively poor, simply because the good lands at lower levels outside the forests are held by the speculators at prohibitive prices. The true solution of the problem of agriculture in such sections is to develop the rich logged-off private lands that lie outside the forests, and not to throw open the non-agricultural lands within the forests.



THE QUEER GROWTHS KNOWN AS "CYPRESS KNEES"

These growths are sent up by the roots of the cypress tree and they are generally hollow and vary from a few inches to several feet in height. It is generally believed that their function is to furnish air to the roots of the tree because they die when the water in which many of the trees grow is drained off.

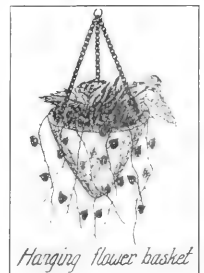
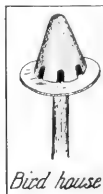
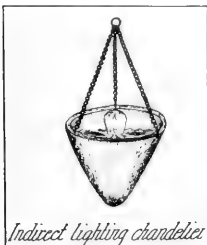
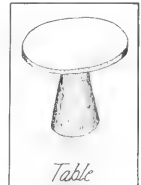
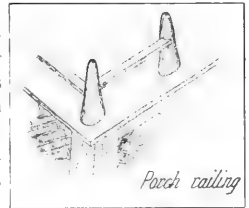
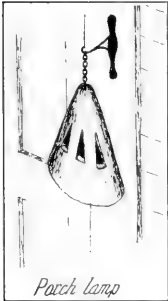
Suggestions for Using "Cypress Knees"

BY HOWARD F. WEISS

Director of Forest Service Laboratory at Madison, Wis.

THOSE familiar with cypress timber and the conditions under which it grows are also familiar with the queer growths known as "cypress knees." Cypress grows best in marshy ground or even in quite deep water in the southern portions of the United States. When the trees stand in soft ground which is covered with water a large part of the year, the roots send up peculiar growths known as "knees." They are sharp, cone-shaped and generally hollow. They vary from a few inches to several feet in height and under ordinary conditions extend above the water. It is generally believed that the function of these knees is to furnish air to the roots of the tree, because when the water is drained away they die. They also furnish a firmer anchorage for the roots in the soft earth.

The illustration at the top of the page shows a typical scene in one of the cypress stands. This indicates the large number of these knees which might be collected at a relatively small cost during lumbering operations if





CYPRESS KNEE USED AS A FLOWER JARDINIÈRE

they could be utilized. At present they are occasionally used locally for rustic furniture such as lawn tables and benches, but no extensive use has been made of them.

An accompanying photograph shows how cypress knees have been utilized for flower jardinières at the Forest Products Laboratory, Madison, Wisconsin. Many other similar uses might be made of them and a number of such uses are indicated in the other illustration.

The principal difficulty experienced in making such articles is in properly drying the knees. They generally check badly, but with a demand for them well established, some satisfactory method of treatment and seasoning might certainly be perfected.

THE FIRST TOWN FOREST

FITCHBURG, Mass., claims to be the first municipality in the country to have officially set aside under a State law an area which is not connected in any way with its parks or water supply system for the express purpose of growing trees for profit. The action of the city government was taken in accordance with the Town Forest Law—known as the Public Domain Act of 1913—by which cities and towns within the Commonwealth may own, control and operate forests. For this purpose, four tracts aggregating 105 acres in extent have been set apart to be known and used as a Town Forest. These tracts contain 50, 31, 16 and 8 acres, respectively. About one-fourth of this land is

now covered with white pine ranging in age from 20 to 60 years. The remainder is cut-over land, now partly covered with sprout growth so common in Massachusetts.

The city forester, Mr. Page S. Bunker, will prepare working plans for this area and the planting of the cut-over land to white pine will begin next spring. Mr. Bunker was connected for many years with the United States Forest Service and is ably fitted to develop an efficient forest for the city. He has been in his present position but a few months.

This action by the city government was inspired chiefly by the Park Commission, and the Fitchburg Branch of the Massachusetts Forestry Association. A petition was presented by the chairman of the Park Commission, Dr. D. S. Woodworth, asking that this land be utilized as a Town Forest. It was supported at the hearing by the president of the Branch Association, Hon. Frank O. Hardy, an ex-mayor. Fitchburg was the first municipality in the State to organize a local branch of the State Association and the sentiment for conservation is very strong.

While this is a very feeble beginning toward the establishment of an efficient Town Forest, it is tremendously significant in view of the fact that it is the beginning of one of the greatest movements for conservation ever started in this country. Town Forests are bound to increase in number and area very rapidly since the public is becoming alive to their wonderful possibilities and practical advantages. There are nine States that already have laws permitting towns and cities to create and manage their own forests.

A great many cities and towns throughout the country are practicing scientific forestry to a greater or less degree on lands owned by the municipality, but in every case so far as we know, this work has been done in connection with the public parks or for the purpose of protecting the water supply. In other words, the matter of timber production has always been a secondary consideration.

Through the interest which has been created in Town Forests in Massachusetts, by the Massachusetts Forestry Association, it is believed that many such forests will be started in Massachusetts. The Association has offered to plant fifty acres to white pine, in the Town Forest of the city or town which makes the best showing in the establishment of such a forest this year. This prize, which consists of 60,000 three-year-old white pine transplants, is well worth striving for and is creating a keen competition.

Ten entries must have been made before the prize will be awarded. To enter the contest, at least one hundred acres must be, officially, set aside as a town forest under the new town forest law and fifty acres of this area must either be planted to trees or already contain forest growth of commercial species. If the contest succeeds, there will be over 1,000 acres of Town Forest in the State, and a half or more of it will be covered with timber-producing trees. It is a small beginning of a very big and important movement.

Growing Pine at a Profit

By J. R. SIMMONS

Assistant State Forester of Massachusetts

A PINE seed, planted and grown under average conditions, will produce, in fifty years, a tree one foot or more in diameter. Waste land in the state of Massachusetts, if reforested this year with four-year-old pine transplants, would yield \$376,000,000 worth of lumber in 1965. Deducting from the cost of planting and care, the interest on the investment and the taxes for the fifty years, would leave a net profit of \$140,000,000. This calculation assumes that there are 1,000,000 acres of waste land, and that the cost of planting would be \$12 per acre, that the land is registered under the new forest taxation law—a law similar to those now in force in New York, Pennsylvania, Connecticut and Vermont—and that lumber will be worth as much fifty years hence as it is today.

Fifty years is a long time to wait for returns on an investment; especially so when the expected results of

the planter are based upon a theory or upon the experience of a state or national government. One of the greatest hindrances to the work of private forest building has been the lack of any record of individual success. It is not, however, necessary to wait so long. The fifty-year period was referred to merely because the maximum profit is gained in that time. Forest stands now in existence demonstrate that up to fifty years the trees grow faster than the interest on the investment. The turning point comes with the retarded growth of the pine.

Looking back a period of years it is found that there was as much interest in forest planting in the Eastern states between 1820 and 1880 as there is today, with the result that large plantations were made by private individuals and some few by corporations. Seedlings were usually dug up from fields surrounding old seed pines



FORTY-ONE-YEAR-OLD WHITE PINE PLANTATION

This picture was taken after the stand had been properly thinned according to the most approved forestry methods and is a striking illustration of what might be accomplished with much of the non-agricultural land in Massachusetts if it were planted with white pine and protected from fire, insects and disease. The stand is near South Lancaster, Mass., and is owned by Mr. Harold Parker.



FIFTY-YEAR-OLD WHITE PINE PLANTATION

The author estimates that waste land in Massachusetts planted this year with four-year-old pine seedlings would, in 1965, after deducting cost of planting and care, interest on investment and taxes, yield a net profit of \$140,000,000.

and planted, either at random or in rows, and spaced at distances varying from four to fifteen feet. At the end of that period there were in Massachusetts alone forest plantations to the extent of 10,000 acres.

Interest then began to decline, owing to the immense supply of lumber brought in from the region of the Great Lakes at a low rate of transportation, and also to the inadequate methods of combating forest fires. These conditions tended to gradually dampen the enthusiasm of the forest planter.

Some of the plantations still remain. Despite the fact that they have received little or no treatment and, with one or two exceptions, have not been thinned, they have reached maturity, and stand as a record for the present generation of what the results of reforestation will be.

During the winter of 1914 the writer made an investigation of these old stands in connection with his work in the State Department of Forestry. Something as to the history of the plantations was learned from the owners, and then they were measured, either as entire



WHITE PINE PLANTATION AT RHOBOTH, MASSACHUSETTS EXTERIOR VIEW

This plantation is fifty-five years old. Pasture trees were used, being planted about eight to ten feet. Careful measurement showed that there is a tract about 40,000 board feet to the acre. The regularity of the growth is due to the great care originally exercised in liming

tracts, or by the selection of sample plots, and the results in each case were reduced to terms of board measure.

Among the plantations measured is one fifty-five years old at Rehoboth, Mass., owned by Mrs. Clara I. Hubbard. It was planted by a Mr. Christopher Carpenter, and pasture trees were used, and spaced about eight to ten feet. So regular was the growth found to be, and so much care was originally exercised in lining up the rows, that a slightly different method than that of sample plots was employed in measuring. Two rows of trees through the tract were taken for heights and diameters, and the contents in each case multiplied by the total number of rows. A sample plot was selected as a check on this work and gave about the same average result. Sixty-six rows, covering about seven acres, were found to contain 304,590 board feet, or about 43,500 board feet to the acre.

At South Lancaster, Mass., two plantations were measured. The first, that of Mr. Harold Parker, had been investigated by the Government nearly ten years ago and four sample plots laid out and the trees numbered. A record of this data was loaned by the Department of Forestry at Washington, and with the help of this the amount of tree growth for the decade was determined. It was found that the stand was making a current annual gain of about 1,000 board feet to the acre.

The other plantation at South Lancaster is mentioned because, in this case, a thinning was made in 1908, being practically the only stand on which work of this kind was carried out. Fourteen thousand feet of box boards and 40 cords of wood were removed. The dead branches, so persistent on white pine, were knocked off from the trunks of the trees in order to improve the appearance of the grove. The planting was originally done in two sections. The sixty-year-old growth measured 43,620 board feet, and the forty-one-year-old 26,000 board feet to the acre.

A summary of all the measurements made shows that plantations 30 to 40 years old would yield, if cut, 21,910 board feet; plantations 40 to 50 years old, 32,726 board feet, and plantations 50 to 60 years old, 41,186 board feet to the acre. These results compare very favorably with native stands of white pine, measurements for which have been carefully made for several years under State Forester F. W. Rane, both in the field and at the mill. Assistant Forester H. O. Cook in 1914 compiled a table of rotations for native pine for assistance to wood-lot owners in applying the new forest taxation law. The gross returns are represented by the stumpage value obtained from a yield table made by measuring sample plots in well-stocked stands in all parts of the state. On comparison, the amounts given in this yield table are in substantial agreement with the average shown by the plantations. The stumpage rates chosen run from \$6 to \$10, which are the rates of the present day, no allowance being made for the future increase in lumber prices. By



INTERIOR VIEW OF PLANTATION

Showing the regularity of planting and growth in trees which are now fifty-five years old. It is estimated that the net profit of this white pine if cut now would be at the rate of \$149.25 an acre.

substituting, therefore, the plantations for the native stands, the profit or loss on the investment may be determined from the time when the trees are old enough to yield lumber to the time when they enter the period of old age. The cost of the land is assumed to be the first expense, and is placed at \$5 per acre. The second is the cost of planting, which is placed at \$12 per acre and includes both the raising of the seedlings at the nursery and the final planting of them upon the land selected for forest. The tax rate is placed at \$20 per thousand. The land pays taxes from the beginning, but the timber, if classified under the new law, not until it is cut, when it pays a product tax of 6 per cent. All of these expenses are carried at 5 per cent compound interest to the end of the rotation.

At thirty-five years the interest on the land value would be \$22.56, the cost of planting plus interest would be \$66.18, taxes and interest would be \$7.85, tax paid if

trees were cut \$8.18, representing an investment of \$23.35 or an investment plus interest of \$96.59. Cut at that age, the lumber yield per acre would be 17,000 board feet, valued at \$136, of which \$39.41 would be net profit. By the same process, the net profit at the age of forty years would be \$62.42, at the age of forty-five years \$80.59, at the age of fifty years, \$140.25. The maximum yield comes at fifty years. The trees would continue to grow after that time, so that the total yield in board feet at sixty-five years would be 46,200 board feet per acre, as against 37,600 board feet at fifty years; but compound interest would grow still faster at that age, and the net profit would be less in sixty-five years than in fifty years.

In the light of these measurements, can it be said that forest building and forest improvements are interests adapted only to the rich? At present prices on lumber, a pine plantation is a 6 or 7 per cent investment in Massachusetts, but an increase in stumpage values of whatever per cent will make a corresponding increase in the returns. Young men who plant forests today can begin to look for profits at once if they plant for speculative purposes, as the land commands a higher price in the real estate market after a growth of trees is established upon it than before it is planted, and profit from the sale of lumber begins at the end of thirty years, when the stumpage value will have caught up with the cost, taxes and interest.

Love of Shade Trees

By MRS. EMMONS CROCKER



MRS. EMMONS CROCKER

Ex-Chairman of Conservation, General Federation Women's Clubs and President of the American Forestry Association

ASIDE from the grateful shade on a hot summer day, few persons appreciate the value of trees on city streets. They do not realize to what an extent trees cool the atmosphere in hot weather—and, still more important, how they purify the air by absorbing the gases exhaled by man and animal and giving out large quantities of oxygen which animal life requires.

Lavish is the praise due the American Forestry Association for the work it has done in dealing with the great question of forestry—in helping to preserve the integrity of the national forests and using its influence to acquire new tracts important to the welfare of the people; in encouraging the organization of state forestry associations to look after the interests of the commonwealths.

Now it has taken up the more intimate question of city trees because, although in some states this phase is well in hand through state organizations that have in turn founded city and town societies for the care and planting of trees in the streets, there are others that are in dire need of its assistance.

It cannot receive too hearty support in this new undertaking.

I hope that all who are invited will consider it a privilege—an act of patriotism—to become members of the American Forestry Association and thereby aid in sustaining the great service it is rendering the nation.

The Bird Department

By A. A. ALLEN, PH.D.

Assistant Professor of Ornithology, Cornell University

CONSERVING THE WATERFOWL

FOR over a month now, sportsmen throughout most of the country have been enjoying the hunting of waterfowl. The frosts in the north and the falling temperature have driven them southward in ever-increasing numbers and, on favorable days, countless flocks have filled the air on their way to better feeding grounds in the south. Many have stopped in passing, lured by calls of their fellows or by decoys sporting about in attractive ponds and marshes, and many have appeared on the tables of successful gunners as the most tempting item on the menu. For the ducks and geese are far from extinct. In spite of the fact that their present numbers represent but a small fraction of the innumerable hordes that formerly swept over the country twice a year, they still visit us in numbers sufficient to be of value in the nation's food supply and to make the hunting of them a legitimate and successful sport. They have withstood the persecution of unrestricted shooting better than any other game and, with the laws that are now in force and the resting spots that have been granted them, they are likely to hold their own unless some unthinking legislature should see fit to change the statutes.

Fifty years ago the ducks received no protection at all. The supply was thought inexhaustible and they were hunted from the time they appeared in the fall until they left again in the spring, and in states where they nested they were shot by unprincipled gunners even during the breeding season. As they became more and more wary, various devices were contrived to make the killing of them easier. "Big guns" with a range far greater than that of ordinary guns were fastened in the bows of skiffs and in some places cannon, loaded with several pounds of shot, were trained upon the waters and the ducks baited within range by scattering grain. Even at night there was no respite, for searchlights were thrown upon their roosting beds and murderous volleys poured upon them. This was not sport, but it supplied the tremendous demand for them in the market.

When you consider, in addition to this barbarous slaughter, the fact that most of the United States breeding grounds in northern Indiana, Illinois, Wisconsin and Minnesota were rapidly becoming wheat fields and gardens, it is not surprising that the decrease in their numbers soon became appalling, and that the various states began to pass laws restricting the shooting, laws that have culminated in the passage of the Weeks-McLean Bill, which gives the Federal Government jurisdiction over all migratory birds, including the waterfowl.

THE passage of this bill was one of the greatest steps which the game conservation movement has ever taken and already, though it has been in force but two years, reports from all parts of the country tell of an unprecedented increase in the numbers of our migratory birds. Enemies of conservation, nevertheless, have attempted to interfere with its usefulness by cutting the appropriation for enforcing it and have even attacked its constitutionality. During the past month, in fact, a test case has been brought before the Supreme Court of the United States to determine this point once and for all. If for any reason it should be found to be unconstitutional, let us earnestly hope that the difficulty can soon be rectified so that the protection which the present law affords will not be removed and so that we may continue to reap the benefits which we are already deriving from it.

One of the chief reasons for the great increase in the numbers of migratory birds following the enforcement of this law has undoubtedly been the clause prohibiting all spring shooting, so that birds that would ordinarily be killed in many states on their way to their breeding grounds now return in the fall with their young, causing, in some places, nearly 100 per cent increase.

The stopping of all night shooting is another very desirable feature of the law, for it gives the birds a chance to feed undisturbed after sunset and before dawn. If it could have included also a measure prohibiting the sale of game anywhere in the United States, the future of the waterfowl would have been assured. This, however, seems to be a state right and up to this time only seventeen states have availed themselves of the privilege of thus conserving our game for the common good of all. As Dr. Hornaday has observed, "The destruction of game birds by sportsmen is trifling in comparison with the slaughter by commerce," and this is obviously true when we consider the facts that a single market-hunter in the South has been known to kill nearly 4,500 ducks in a single winter and that each year over 150,000 waterfowl were formerly sold in the New York markets.

In this connection there is a clause in the game laws of most states limiting the number of ducks that may be killed in a day by each hunter. The number, however, is in all cases far too generous for the best interests of conservation. Those of New York, for example, noted for their saneness, allow each hunter to kill twenty-five every day of the season, if possible. This limit was designated in the days of the market-hunter and for

some reason has never been changed. Now the sale of game is prohibited and what family can dispose of 350 pounds of duck meat, the result of a week's shooting? Most sportsmen would be content to kill but eight or ten in a day, but so long as the limit is retained at twenty-five human nature is such that every hunter shoots the limit whenever possible, either to show his skill or to keep up with the "other fellow," and certainly it is conducive to the surreptitious selling of game among a large class of hunters.

IN ADDITION to the restrictions of hunting made by the Federal law, the Government has likewise set aside, through its provisions, protected migration routes along the three great rivers of the United States, the Ohio, Missouri, and Mississippi, where no shooting is allowed, so that some birds at least will find safe passage to and from their breeding grounds and serve as a permanent breeding stock for supplying other parts of the country.

But even more effective than these protected routes for the preservation of our waterfowl are the bird reservations, both private and national, which have been established. There now exist in the United States and its territorial possessions nearly sixty Federal bird reservations, where no shooting whatsoever is allowed, and many private preserves where shooting is greatly restricted. Some of the Federal reservations, the two in North Dakota and the one at the mouth of the Yukon in Alaska, for example, are in the breeding grounds of the waterfowl, while others, such as Breton Island, Louisiana, are favorite spots for spending the winter. These little oases are doing much toward preserving and increasing our ducks, geese and swans and other migratory game.

The way in which the ducks and geese recognize this protection and respond to it is very convincing of the practicability of this form of conservation, for within the protected areas the birds become almost as tame as domestic poultry, while outside of it the same birds are extremely wary. Even in other parts of the country, where there are no reservations, after the hunting season is over, the ducks respond very quickly to any protection shown them and will soon learn to come and be fed. Take, for example, the far-famed canvasbacks which a score of years ago thronged the Chesapeake and made it famous as a hunting resort but which today have almost deserted the region and have become extremely wild. On the lakes of central New York, where they are hunted only until the fifteenth of January, they are becoming much more numerous and after the hunting season, when they are often fed to keep them from starving, they lose their fear and flock along the shores for the corn thrown out for them. The bluebills, in the same region, birds that have been shot at for over three months, many of them bearing scars from ineffective bullets, before they leave in the spring will almost feed from one's hand.

THE future of the waterfowl is much more pleasant to contemplate than that of any other game.

If the Federal law can remain and be properly enforced and receive the approving sentiment of all the people; if all the markets can be closed to the sale of game, and if the "bag limits" can be appreciably reduced, there is no question but that future generations will enjoy just as good hunting, if not better, than we of today. For even though the breeding grounds of the waterfowl in the United States are being more and more restricted by improved agriculture, there will always remain the vast areas along Hudson Bay and from there westward to the Great Slave Lake, into which agriculture will never penetrate, but which, with its lakes and marshes, is admirably suited to the needs of the waterfowl. This vast extent of territory will send each fall its great flocks of ducks and geese to the United States and the protected migration routes, the reservations, and the limited open seasons will cut down the numbers killed. In this way the breeding stock will remain unimpaired and the great army of hunters, each year receiving reinforcements, will still be able to find legitimate, health-giving sport about our lakes and marshes, and our government will be conserving one of its great national assets.

THE AUDUBON SOCIETIES

IT WOULD not be right to discuss the conservation of our wild life without mentioning the Audubon Movement, which has done more than anything else to bring about our present statutes and the establishment of bird and game reservations. The name Audubon Society was first used by Dr. George Bird Grinnel, editor of *Forest and Stream*, in 1886 and under this title began an organization for the protection of birds. The National Association of Audubon Societies was organized in 1905 with Mr. William Dutcher as president and Mr. T. Gilbert Pearson as secretary and financial agent, and the activities of the association under their direction have so increased that, as Mr. Ernest Ingersoll has written—

"The National Association of Audubon Societies is today a strong, far-reaching institution. Its platform is wide. While engaging actively in preserving wild life, it recognizes fully the claims of the sportsman, and has no fight with the man who legally kills game-birds and game-animals. In summer it guards, by means of paid wardens, virtually every important colony of sea-birds on our Atlantic and Gulf coasts, as well as on many lakes of the interior. It owns or leases many islands where ducks and sea-birds breed, and these places are wonderful bird-sanctuaries. It originated the system of Federal bird reservations, and cooperates financially with the Government in protecting them. It publishes and distributes annually over 6,000,000 pages of bird-protective literature, and the home office, where twenty clerks are engaged, has become a general clearing house for all kinds of information in reference to the study and conservation of wild birds and animals. The association is particularly active in legislative work, and has been responsible for the enactment of many laws for the establishment of state game commissions; for shortening seasons for shooting wildfowl and upland game-birds;

for prohibiting the sale of game; for destroying the traffic in birds' feathers; and in the capture of native birds for sale as cage-birds. It makes expenditures every year for the protection of big game, for feeding game-birds and song-birds in winter, and in prosecuting violators of the law."

BIRD LIFE IN NOVEMBER

NOVEMBER is the month of sparrows. The white-throated, white-crowned, fox and tree sparrows and the red polls and snow buntings have come down from the north and joined our resident species. Fields, hedge rows, lake shores and the borders of woods, overgrown with weeds, furnish abundant food, and the thick winter plumages of the birds are ample protection against the cold.

The frosts have killed most of the insects or driven them into hibernation, so that only a few of the insect-eating birds remain. These are the hardy woodpeckers, chickadees and kinglets that seek out the larvae where they are hiding for the winter or live upon the eggs

fastened to the bark and branches, and they will stay with us all winter.

Some of the blackbirds and grackles that have been feeding upon insects all summer have changed their fare with the coming of winter to a diet of seeds, and many of them are still with us. A few of the fruit-eating robins and bluebirds may still be around, and the fish-eating kingfisher and an occasional heron may likewise be seen. Practically all of the shore birds have left the northern states but the winter ducks like the old squaws, canvasbacks, golden-eyes, and mergansers, are just beginning to arrive in numbers.

Now is the time to begin putting out food for the birds. Fasten pieces of suet to the branches and trunks of trees and scatter chicken feed beneath the shrubbery in an effort to retain as many about the grounds as possible. In the December issue various forms of feeding devices and methods of attracting and taming the winter birds will be discussed, but November is the time to begin attracting the birds if you would have a large number around all winter.

Kill-dee

(Plover)

By H. L. JOHNSON

Wandering lost-one, ever at home
From Hudson's shore to Gila's strand,
Whither I will, there shall I roam.
Shot like a bolt from the Master's hand,
I love the mountains, I love the sea,
Hark to my cry, kill-dee! kill-dee!

Strong and brave, clean and true,
Sharp-angled wing, tendons like steel,
Fighting the storm or piercing the blue.
Mine the Supreme-gift, to live and to feel.
I love the marsh, abide with me,
Hark to my cry, kill-dee! kill-dee!

Gift of the Infinite, proof of God's love,
Lover of men and trusting them fully,
Lose not your faith in the power above,
Take then my message, trusting it wholly,
I bring you friendship, slay not me,
Hark to my cry, kill-dee! kill-dee!

Lost in the storm, weary and spent,
I pause for a breath in the city's glare,
Or drop for a while in the woodsman's tent,
Living like him, great toil, humble fare,
God's great outdoors for him and me,
Hark to my cry, kill-dee! kill-dee!

Eternal wanderer, never at rest,
Wanderlust ever, faithful to nature,
Optimist always, somewhere to nest,
Braving the present, no fear of the future,
I love all men, mate, I love thee,
Hark to my cry, kill-dee! kill-dee!

Logging Rasak and Lagan

By T. R. HELMS

LEAVING Singapore, one of the coastwise steamers of the Koninklijke Paketvaart, which calls at Singapore every two weeks, proceeds up the Straits of Malacca, and stops at Penang, where she takes on the mail brought by European steamers, for the west coast of Sumatra. The steamers of the Paketvaart, being of light draught, enter the harbor of Penang by the South Channel, just as the German cruiser *Emden* did, when she destroyed a Russian and a French warship early in the war. All steamers of heavy draught enter the harbor by the North Channel and leave the same way. Leaving Penang, the steamer goes west to Sabang, an important coaling station on the Island, Palo Way, which is situated off the extreme northern end of the Island of Sumatra. The harbor of Sabang is very much up to date; it has a good wharf and very modern coal sheds, and traveling electric cranes for unloading coal from vessels into the sheds, or vice versa.

From Sabang the steamer goes to Oleh Leh, which is the port of Kota Radja, the capital of Acheen, which lies about four miles inland. After leaving Oleh Leh and calling at Meulaboh and Tompat Toeon, the steamer

strikes out west for the Island of Si Maloe, before reaching which the captain of the steamer is apt to remark that it rains all the time on Si Maloe, and that this great rainfall is caused by the dense and heavy growth of timber with which the island is covered.

It appears that the people on the other side of the earth also connect forests and rainfall, on which subject so much has been written in this country.

After leaving Oleh Leh and viewing the shores of Sumatra and outlying small islands, there are to be seen numerous rocky, barren little islands. In the dry season the extreme northwest coast of Sumatra looks in most places barren and uninviting, but when after a seven days' trip from Singapore, the steamer arrives at the Island of Si Maloe, everything is green, no bare, barren land is to be seen, every little coral bank or island, no matter how small, is covered with vegetation. It is one of the greenest spots on the face of the earth. It is not subject to wet and dry seasons in the sense that some other tropical or semi-tropical parts of the earth's surface are, but has a heavy rainfall most of the time. On the main Island of Si Maloe are three good land-locked bays,



RASAK LOGS

on the island of Si Maloe, called by the Dutch *Ling* and *Sinaloe*, which is off the northern coast of Sumatra in the Indian Ocean. A peculiarity of the Rasak trees is that nearly all the mature trees are rotted in the center, but the wood cut from the sound portion is valuable and in demand. Si Maloe is said to be the greenest spot on earth.

which are good harbors. At the northern end is Sibigo, in the central part is Telok Dalam, and on the southern end is Sinabang. The Paketvaart steamers call at all three places, and bring supplies and take out timber. The island is part of the State of Acheen. The Achinese conquered the island and established themselves there,



OEY KON SEN AND HIS WIFE

Mr. Sen is the Chinese manager of the timber company's store at Sinabang, and is a capable and progressive man. His wife is half Chinese and half Malay. Her costume is that of the native Javanese of the better class.

but large numbers of the original inhabitants are still found on the island. In a convention between Great Britain and Holland, concluded in 1852, Great Britain acknowledged Holland's sovereignty over Acheen, and Holland immediately asserted its sovereignty; but the Achinese offered strong resistance. After a bloody and uncompromising war, which lasted from 1852 until 1909, the Achinese were subdued, or rather exterminated, and the country is now being repopulated with Malays and Javanese. The Nederlandsch-Indische Government is spending large sums of money to build up the country again, and to develop the natural resources and encourage trade and commerce.

The Nederlandsch-Indische Government owns and controls the mineral and timber resources of all its territory, and with the conquest of Acheen the timber of the Island of Si Maloe came under Government control. The Government gave concessions to two different companies, one at the northern end and one at the southern end, to exploit the timber of the island, under Government regulations. The two principal commercial timbers of the

island are Rasak and Lagan. Rasak is a very hard and very heavy timber, and is considered next to Teak in firmness and lasting qualities. The trees grow large and tall; it is common to see them 100 feet up without a limb. Next to the shore all around the island younger Rasak trees are comparatively sound, but in the interior most of the old, and a large percentage of the younger trees are defective in the heart. The large trees invariably are hollow. The reason assigned for this is, that on the shores the trees have light and air, but in the interior the air is excluded by the dense growth of the tropical vegetation, which also prevents the penetration of sunlight, and consequently the moisture caused by the heavy rainfalls causes the trees to become defective.

The Lagan timber is a softer timber, which also grows to large size, but is not as lasting as Rasak, when exposed to weather. It also checks very badly when it seasons, and the checks start from the heart to the outside. A stick of timber with the heart in, is virtually quartered at times after it has seasoned; but sawed into boards or dimensions that do not contain any heart, it makes fine lumber for interior work, and some species greatly resemble Mahogany. Unlike the Rasak, which starts to decay from the inside, but outside of the inner defects is absolutely sound and firm, the Lagan starts to rot and decay from the outside when its time comes, and the rot penetrates the whole tree. The topography of the island is very rough and uneven; the surface is largely irregular hills and knobs of every conceivable shape, and between these knobs and hills is swamp. The island is shaken by earthquakes at the interval of approximately twelve days;



KARINAH AND BATTIE

Two Javanese women residents of Sinabang in their native costume. Note the cut and the pattern of their skirts. The buttons, which are as close together as they can be sewed on Karinah's waist, twelve in all, while Battie's are but two, are British pounds.

that is, about every twelve days there is a quake of more or less intensity.

The Rasak and Lagan timbers grow only on the high ground, and in the swamps grows an impenetrable mass of useless timber and vines. Rattan is very plentiful and large quantities are exported. The natives have been cutting the smaller and sound Rasak trees around the bays for a long time, have hewed them square, and shipped them to markets, but the problem of getting big timber of the interior cut, is difficult. One of the companies has started to build a railroad, and has purchased regular Pacific Coast logging equipment of the heaviest type. This handles the logs all right, but the building of the railroad presents great difficulties and costs an exorbitant, almost prohibitive, price. They cannot follow a valley, because there is none, and they cannot follow a ridge, because there is none, and all they can do, is to bridge from one hill to another. Fills are almost out of the question, because the nature of the soil is such, that the heavy tropical rains wash the dirt away almost as fast as it is put there. To reduce the large logs to mer-



BUTT END OF RASAK TIMBER

Loaded on a car in the yards of the company on the Island of Si Maloe, Dutch East Indies. This company has the concession for cutting this timber granted by the Nederlandsch-Indische Government which controls the timber and mineral resources of the country.

chantable size, that is, to cut all the sound parts of the logs from around the defective center, the company has put in one of the largest type Pacific Coast band mills. The company has also evolved a plan of seasoning the timber in fresh water, thereby increasing its lasting qualities, to keep it from springing, when it is sawed later into smaller dimensions.

An extensive system of basins has been built and fresh water flows through them. When the timber leaves the mill, it is loaded by an overhead traveling electric crane of ten-ton capacity on railroad cars and taken to the basins. Alongside the basins are the railroad tracks, and the tracks of the traveling electric driven derricks of ten-ton capacity and a reach of forty-five feet, to handle the timber from cars into the basin and vice versa. After the timber has been in the basins six months or longer, it is taken to the dry sheds, where it is also handled by elec-



YOUNG JAVANESE WOMAN

This young lady is a representative of the type of Javanese in the Dutch East Indies. The writer of this article says the Javanese are closely watched by the Nederlandsch-Indische Government officials in the fear that they may learn more than is desired about the military defenses of the islands.

tric driven overhead traveling cranes, and stacked up for drying. On account of so much rain and damp weather no timber or lumber is stacked outside as is done in this country. It might also be noticed, that nobody on the island seems to be afraid of fire. No forest fires are possible as everything is always green, and the tree-tops and limbs from the trees that are cut down, are kept so wet and soggy by the constant rains, that they could not burn.

The houses and buildings are also so damp and moist, that it would be hard to set them on fire. On account of so much rain, the ground, although it has the appearance of rich soil, seems to be sour, and no vegetables grow. The only grass that grows is a coarse variety, with no nutritive value. A horse or a cow would starve on it, and consequently no horses, mules or cows are kept on the island; but there are "kerbow" (Water Buffalo) with tremendous horns, and goats and wild hogs are plentiful.

While Si Maloe is a very green island, it is not a flowery island. It is rare to see a flower or a blooming tree; although in tropical countries as a rule, plants and trees bloom in profusion. The wet climate, with little sunshine, seems to account for the absence of flowers. The mechanics employed in the construction

work, such as carpenters, blacksmiths and machinists, are Chinese, but all the operating work is done by labor imported from Java. Malays do the clerical work, do all surveying and make maps, and also make all drawings for mechanical work. The employes of the company are all housed and quartered on the concession of the company and the different houses and buildings of the company present quite a town of itself, in which the company must maintain streets, sewers, water, etc., at its own expense, and is subject to all sanitary rules and ordinances that the Governor of the island may prescribe.

The town of Sinabang proper is controlled by the Government and maintained by it. The town has five wide streets lined with shade trees, it has electric light, telephone service, police and fire departments, a customs house, post and telegraph cable station, and a barracks for native soldiers. Sinabang is also the seat of Government of the island and usually the Governor is the only white man residing in Sinabang proper, all other Government officials are either half-castes or natives. The religion of the inhabitants of the island is Mohammedan. There is not a single Christian church or preacher on the island of Si Maloe.

Traveling on one of the coastwise steamers of the Paketvaart the stranger will notice that the Malay language is the official language on board ship as well as all over Nederlandsch-Indie. It will also be noticed that the first and second-class accommodations are located on the bow and stern of the ship, while the middle section of the ship is reserved for deck passengers and cargo; which arrangement is the reverse from American and European steamships, where the first-class passenger accommodations are located amidship. On the boats are also private kitchens, both for Chinese and natives, where those who do not consider "clean" the food they receive from the ship, can cook their own food in their own manner. After listening, on American and European steamers, the class that carry cargo as well as passengers, to the rattle and noise of the steam wenchs, when cargo is discharged or taken on, it is quite a novelty to find some of the coast steamers of the Paketvaart equipped with electric hoisting apparatus, which works absolutely noiselessly.

As mentioned before, the Government of Nederlandsch-Indie owns all forests and employs a staff of Government foresters for the management of the forests of the country. The Government grants concessions to private companies for the exploitation of certain tracts, but in 1914 the Government cancelled all concessions for cutting Teak in Java, to take effect January 1, 1916, and on that date the Government itself intends to assume all the operations of exploiting the Teak timber in Java on its own account. In other words, the Government intends to go into the timber business, as far as Teak is concerned, and derive all the profits itself. Government ownership and control of forests seems to take a strong hold in the Far East. The representative of a timber company in Siam remarked, when he investigated the merits of

Pacific Coast donkey engines for dragging logs out, that they worked very well, but they would not suit his business. In the first place he could cut only those trees that were marked out by the foresters, and further, he could not cut other trees for fuel, and he would not dare to injure any trees when he removed the logs that he had cut, and which he would be very apt to do if he dragged the logs through the woods by means of a donkey engine.

GIANT PINE AT UNUSUAL ALTITUDE

AT AN altitude of 10,000 feet in the temperate zone it is generally assumed that there is little timber, at least nothing that is worthy the name. In California, however, are found many things not supposed to be so. The photograph, taken by Geologist G. K. Gilbert, of the United States Geological Survey, shows an enormous pine tree growing at this elevation, a tree which in point of size and vigor would be a credit to any altitude and latitude. The tree is a specimen of mountain pine—*Pinus monticola*—which is nearly 6 feet in diameter at the base. It was photographed by Mrs. Gilbert on the south slope of Mount Hoffman, in the Yosemite National Park.



ANOTHER OF CALIFORNIA'S SURPRISES

A giant pine, growing 10,000 feet above the sea. The gentleman standing beside the tree is 6 feet 2 inches tall.

Forest Relations between the East and the West as the East Hopes to See Them

ADDRESS OF HENRY STURGIS DRINKER, LL.D.,

President of Lehigh University and President of the American Forestry Association, on American Forestry Association Day at the Panama-Pacific International Exposition, October 20, 1915.

LUMBERMEN AND FORESTERS OF THE GREAT WEST: We who have come from the East to join you in this conference greatly and deeply appreciate your welcome because we see in it that the American Forestry Association has been taken into fellowship by practical men of the West who know well how forestry organizations can lack in practical utility and therefore not be worth consideration on busy occasions. The compliment is accentuated when the president of the American Forestry Association is asked to preside on a day like this devoted to fundamental industrial conditions. It shows recognition on your part that forestry, on its practical useful side, means forest industry, and that we have mutual recognition of this truth. We of the East do recognize it, and we wish to work with you to make the whole country recognize it, and I am glad that you have given us this chance to learn your views as to what is needed so that we can do our best in this joint national work.

The American Forestry Association is an organization older and perhaps more influential than you of the Pacific Coast fully realize. It led the early forestry movement in the country as "The American Forestry Congress," organized in 1883, later reorganized in 1890 as "The American Forestry Association." It has about 3,000 members. Its magazine has a very large circulation compared with that of the ordinary industrial publication. Far more than in most educational or industrial organizations, it includes both the people inside the movement—such as lumbermen, foresters and public officials—and the outside public which needs education and guidance. Commonly, I think, organized effort represents one class seeking to correct or restrict the other, with the confidence of but one. We, more luckily, embrace both, but this also gives us the greater and more difficult responsibility of representing the interests of both. It is not always easy to do this with justice and it is still harder to satisfy both that we are doing so.

There was a time in America when to the lay mind forestry meant forest preservation only, and I think you will concede that it meant the same to lumbermen. There was little meeting on common ground. It was in those days that the American Forestry Association was born, and for a time it was governed by such an attitude. We can hardly criticize it for this. There was need of forest preservation, and there were few to enlist except those whose understanding did not extend beyond the duty of

state and government to prevent useless destruction. They knew no way except to denounce and command. Nor did forest industry join them to show a better way. They were sincere but ignorant. Let us be fair, however, and admit that although ignorant they were sincere. And this view is still, of course, to some extent held by uninformed emotional people, who know and think little of forest industry, and view the question only from an aesthetic standpoint, the desire to preserve trees for their beauty or poetic association.

However, as the study of forest conditions progressed, a change took place. Outside of those pioneers, whose viewpoint and activity left a strong imprint on the public mind, grew up an element which was perhaps less altruistic, less public-spirited in its detachment, but also less fanatical, if we may use so strong a word, not in a critical sense, for the out-and-out reformer must be somewhat of a fanatic to keep up his courage and to be heard. But the new forestry was more practical. It appealed to justice more than to prejudice, to common sense more than to responsibility to posterity. It recognized the use of forests more than sentiment and that their use lies in service rather than in being an end in themselves.

At the same time lumbermen, in trying to preserve and foster their industry, came to see the necessity of protection and conservative methods. Unconsciously at first, both elements arrived by independent thinking at about the same conclusion—that practical forestry is forestry to the extent that pays, or at least is financially permissible under prevailing social conditions. Lumber producers called it intelligent timber management, the others interested called it forestry. And soon these naturally sympathetic elements made each other's acquaintance, and began to work together, with names and differences forgotten. That was the birth of real American forestry, the kind that will be as nearly successful as success is attainable. The Western Forestry and Conservation Association stands before the country as one of the first and foremost exponents of this same modern view. Its alliance of private, State and federal interests in those things that can be done together for mutual and public good has set an example to the United States and Canada that is being widely followed. The American Forestry Association cannot work along exactly the same lines, for it mainly represents forest education and moulds opinion, and you represent a membership owning and

managing large forest resources, but it follows the same general principles.

It has not been an easy struggle to reach this broad standpoint. An organization which contains all elements, East and West, contains many viewpoints to reconcile. We are not immune from factional dissensions when such controversial matters as states' right, national control, water-power, and the development of Alaska align our people into different camps who would wish to commit the Association unreservedly to their factional views and are far from satisfied with neutrality. And you must remember that in many Eastern States there is nowhere nearly the accord between lumbermen and foresters that your organization has brought about on this coast. The old misunderstanding still clogs progress. The old and narrow conception of forestry is not dead, and its exponents have honor and following, and, on the other hand, there are members who are not disposed to be liberal to their purely nature-loving brethren and who can look on forestry only from a narrow standpoint. The American Forestry Association has, however, insisted for several years, and I hope will permanently do so, that the Association as an institution shall stand without timidity for those sane practical improvements in forest conditions that producer and consumer can and must work for to mutual advantage. It recognizes that forestry is an industry limited by economic conditions, and that private owners should be aided and encouraged by investigations, demonstrations and educational work, since they cannot be expected to practice forestry at a financial loss. It urges forest taxation reform, removing unwise burdens of taxation from owners of growing timber. It believes in closer utilization, in logging and manufacturing without loss to owners, and in aid to lumbermen to achieve this. It demands equal protection to the lumber industry and to public interests in legislation, recognizing that lumbering is as legitimate and necessary as the forests themselves.

To these ends the Association devotes its publications, its committees, and its other means of influence. But it also realizes that to do so intelligently and effectively it must be competently advised. This is why its officials and directors include not only State and federal officials and men from forest schools and laboratories and leaders in finance and business, such as C. F. Quincy, of New York, and also such men as Col. E. G. Griggs, of Tacoma; Capt. J. B. White, of Kansas City; Joseph N. Teal, of Portland; Col. W. R. Brown, of New Hampshire; Charles Lathrop Pack, of New Jersey; J. E. Rhodes, of the Southern Pine Association; E. A. Sterling, of the National Lumber Manufacturers, and E. T. Allen, of your organization. And in its advisory board are representatives from the Northern Pine Manufacturers, the National Box Manufacturers, the National Wholesale Lumber Dealers and half a dozen similar trade organizations.

This leads me, after perhaps too long a preamble, back to my title—the relations between Eastern and Western organizations as we hope to see them. By no means is

the American Forestry Association to be considered Eastern. It is not so in spirit. Only accident, which you should remedy, makes it so in proportionate membership. But to the extent that you consider it so because of this membership, let us classify it with Eastern organizations who can extend assistance to the West through closer relations.

As I see it, forestry and forest industry alike and together are in the travail pangs of a new birth in public economy. The titles of talks to be made here today, at a forestry meeting, are more significant than anything I can say. Everywhere we see the same urgent need being emphasized—the need first for analysis of a recognized weakness, second for giving this analysis wide publicity, and third for help in applying some new and radical remedy.

If this is true, we must work together. Whether it be in Congress, in individual States, in the public mind, or in the minds of lumbermen and foresters, every move which affects this situation affects forest welfare both East and West. Successful solution of the problem will be hard enough to reach at best. It is beyond hope if the public mind and the legislative mind is confused by counter-claims and accusations purporting to represent consumer against producer, forestry against lumbering, government against industry, State against individual, and East against West. West and East united will be potent in influence and in power for good and by thorough mutual understanding and cooperation we can do much to forward our common interests.

I have not time to catalogue all specific illustrations, but a few will show what I mean. Take questions of national legislation. I believe it the duty of forestry organizations to teach the fundamentals of forest economics, to urge a national forest policy which shall make the most of all forest resources, public or private, both as a source of supply to the consumer and as employment for industry. This involves the disposal of public timber, national and State, in competition with private timber; it involves the terms under which the industry may organize to accomplish economical distribution and disposal of product, and, it doubtless involves complicated questions of domestic and over-sea transportation. How can you and we use our respective influence in these matters patriotically, wisely, and to the best effect without closer cooperation than we have today?

Or take State legislation. The influence of State legislation is not confined to the borders of the State enacting it. Eastern State legislation is liable to affect either your business in that State, or it may afford a precedent for legislation in your own State, or in some way have a reflective influence on interests in your State. This is equally true of strictly forestry legislation and of industrial legislation under which forest products are manufactured or sold.

Or take the expenditure of public moneys, whether by States or by the nation. Appropriations for the protective work of the Forest Service in the West, or for State protection or the purchase of cut-over lands, are matters

of public interest in which no State escapes the example or influence of others. I need only mention the Weeks law, familiar to all of you interested in forest protection. Originating with the purchase of National Forests in the Atlantic States, it provides funds for needed State and Federal cooperation everywhere. This work is of great importance, and this legislation as valuable to you in the West as it is to us in the East, calls for support and extension, and it should have your influence and support with your representatives in Congress this winter.

Tax reform is another matter in which uniformity of effort to a certain extent, yet with recognition of differing conditions, demands both active and concerted attention. It is one in which distance little affects the benefit or danger of precedent. Neither section should ignore the other in its activities.

The education of the public in wood and its uses is another exceedingly broad subject. Just as the West has much to gain from the permanent establishment of wood as a desirable material for Eastern consumers, so has the East to gain from public knowledge that the West can keep up the supply indefinitely, and that lumber will not become so scarce or expensive in the near future that the study of substitutes is imperative. Eastern forestry organizations can do more to spread these facts where

they should be spread than you can, but to do so effectively they need your support and your information.

In the great conventions and congresses throughout the country, and in smaller ones too, where public sentiment is influenced, there is great need that the forestry viewpoint be presented always intelligently and concertedly for our common good, and nowhere is there more conflict of influence due to lack of knowledge by each section of the problems affecting other sections.

My plea is for closer relations between us. Great and successful as you are in your work out here, and high as is the standing it has given you from ocean to ocean, I cannot believe you are quite beyond the need of our help. It has been and will be freely yours. The magazine of the American Forestry Association is glad to tell the story of what you have and what you want. Our councils and our voice welcome your suggestions. And we need your help. We have proved our sincerity by sending our representatives to make this long journey merely to be here and to hear your problems discussed, and to exchange views with you. We are amply repaid and shall be still more so if from this meeting shall come a more intimate and systematic mutual support in the work we are doing together for the welfare of American forest industry.

A Trip on the Apache National Forest

By A. P. W.

RASTUS has gone," cried the Supervisor, as we were trying to get an early start on a pack trip. "Picanniny," the other mule, was having the grain loaded on him preparatory to finishing with a diamond hitch when Rastus lifted the turnstile and out into the garden! 'Mid much cussing,—the tramping down of my pet mint bed (used in making juleps), he was roped.

Off we started to make 30 miles that day, "Sandy,"

the Airedale, and "Jock," the collie, barking and cavorting at every step.

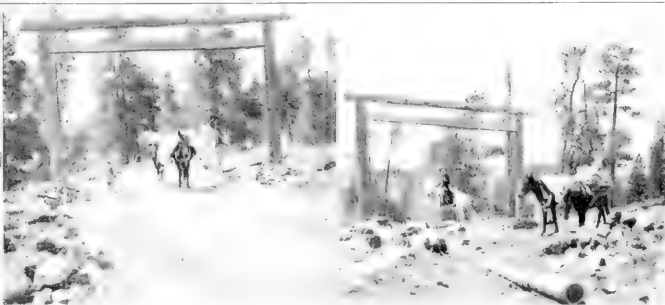
With us was a tenderfoot,—an office man. He bumped along,—his constant questions being, "How far did you say it was?" "How many miles have we gone?"

I wonder if you know about the timber on the Apache National Forest. First juniper and cedar groves starting at an altitude of 7,000 feet, fragrant, the sun oozing out the odors and filling the air with perfume. A little



THE BURROS

The Deputy Supervisor's wife and the pack train which carries "chuck" to the fire guards at lookout points.



ON THE ROAD LOADED

A portal near Fish Creek on the Apache National Forest which covers 1,376,400 acres

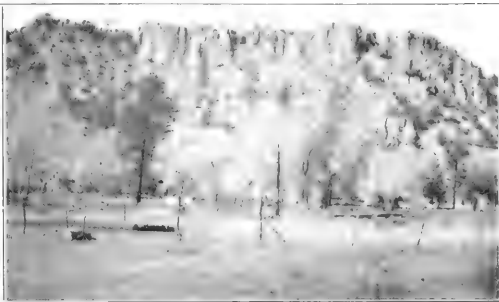
THE BURROS

Rastus and Picanniny in the foreground loaded with the packs for the fire guards.



ON THE WAY TO THE SUMMIT

The pack train loaded with supplies crossing the White Mountains, Apache National Forest.



OPPOSITE BLUE RIDGE RANGER STATION

One of the big bluffs on the Apache National Forest in Arizona.

later, also higher,—for we were then getting about 8,000 feet above sea level,—yellow pine and their babies, the “black jacks,” straight, commanding, and the leaves rustling in the cool June breeze. Our ponies stopped to refresh themselves from a cool mountain stream as they neared the mountain foothills. We then came to a wonderful open meadow. To our left the snow-clad “Baldy,” to our right and in front of us interesting knolls. On one, the ever-vigilant fire guard. We signalled to him in passing. After crossing the mountain meadow, we started to climb the real mountain, “Baldy,” entering groves of cork bark fire, blue spruce and aspen nodding to us from an old burn.

Ascending to an altitude of 11,476 feet, we came, in a tiny open park, upon Uncle Sam’s ever-welcome sign that he is on guard, the flag, floating from a pole attached to the lookout cabin. It is bachelor headquarters, but no woman could have her house cleaner. A tiny stove, shelves for “chuck” and dishes, aspen poles for a bedstead and spruce boughs for a mattress. Here the guard spends two months from June 1 to August 1.

We left our horses and climbed through snow drifts 6 feet deep to the summit where we found the guard scanning the country for any possible smoke. A protractor is on top to give readings of any fire and its location into the supervisor’s office by phone.

“What was that?”

“Is that smoke?”

A quick survey through the glasses, a squint through the needle of the protractor, located the fire at 1.30. Rushing to the telephone, the guard called up other lookout points to ascertain cross readings. Then he telephoned in to the office. He ascended the summit to keep the office posted. (The lookout guard reports fires, the patrolman goes to them.)

We rushed to our horses,—went down in twenty minutes what it had taken us over an hour to climb, “Rastus” ready to kick at anyone and anything for making him hurry. We reached the fire, a distance of 10 miles. Found campers had left their noon fire without extinguishing it. Saddles, beds, “chuck,” everything gone. The patrolman had been notified, so with combined efforts it was put out after twenty acres had burned. The

supervisor on looking up, noticed a sign that had evidently escaped the notice of the campers:

“EXTINGUISH YOUR MATCH, CIGARETTES
AND PIPE ASHES.
HELP PREVENT FOREST FIRES.”

The campers shared our chuck and beds. It was necessary to enter a trespass case against them according to law. I doubt if they leave a fire again with even warm coals.

In the meantime, I had almost forgotten our friend, the tenderfoot. He was grumbling, peevish and wanted to return. The ride was too much for him, he had seen enough, ridden too much. So, the next day, “Rastus” in the lead, we started for home, the landscape offering rare pictures to be taken, but our friend was headed, as “Rastus,” for home and a sure-enough bed.



PAT KNOLL FIRE LOOKOUT TOWER

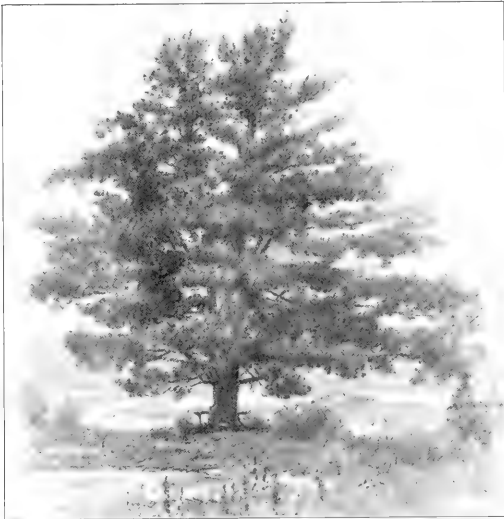
WHITTIER'S PINE TREE

By AGNES L. SCOTT

THE famous pine tree, which stands in the woodglade on the Sturtevant farm, near Sunset Hill, Center Harbor, New Hampshire, bears the name bestowed by the poet Whittier, who dedicated it under its shadows as the "Wood Giant," 1886, but which now is called "Whittier's Pine Tree."

Among the scattered groups of pines, Whittier's tree stands compact like a silent patriarch, with a splendor all its own. Its chief character is its magnificent strength, enormous trunk and powerful boughs that give it the appearance of a giant.

The Sturtevant farm is where Whittier passed many happy summers. Every morning before breakfast the



From a Sketch by C. Scott White.

WHITTIER'S PINE TREE

This pine, standing at Center Harbor, N. H., was a great favorite of the famous poet who dedicated it as "The Wood Giant," in 1886.

poet would walk through the paths leading to the center of the woodland, and in the shade of his loved tree, watch the glorious sunrise. Here he saw to the east the Cardigan Mountains; to the north, the Sandwich range; to the west, the Ossipie range; and here he saw the beautiful broad view of Squam Lake with its green wooded islands.

It was in the twilight hours that the saintly poet loved to stand under the shelter of his favorite tree and watch the mountains bathed in sunset glory. Here he surrendered himself to the mountain mystery, and his soul received the calm and strength from the glorious hues of the sun-dropped splendor as the twilight deepened around him.

As surely as he loved the mountains, he loved the wild flowers, the singing birds and flowing brooks. Of the wild flowers the golden rods were his favorite, and these he gathered in his walks by the roadsides and in fields.

It was in the large, roomy house on the Sturtevant farm, that the Quaker poet entertained the neighbors and children. A delightful companion even to mere surface acquaintances, and naturally sympathetic to all sorts of people. He always greeted everyone, never waiting to be introduced, with the accustomed greeting: "How does thee do?"

Those who have been entertained by the poet at the farm will never forget his cheerful manner, and large geniality, and his frank, straight gaze of penetrating eyes—eyes black as night which shone with that big elemental humanity. One noted the poet's seriousness and his love for goodness and truth. Everybody in New England has felt the kindly words of the sage in all he wrote, but the friends who have come in close contact with him amid the scenery of the Northern mountains can best and understand the man best, and throughout all his poems is that serene enthusiasm for the mountains.

PROCEEDINGS—OPENING OF THE FORESTRY BUILDING AT CORNELL

IT HAS just come to the knowledge of the Department of Forestry that certain persons whose names appeared on the mailing list failed to receive copies of the pamphlet containing the Proceedings at the Opening of the Forestry Building on May 15, 1914. In this pamphlet are also given the addresses delivered at the open meeting of the Society of American Foresters on the following day.

Anyone who desires a copy of this pamphlet may obtain it by addressing Professor Ralph S. Hosmer, Department of Forestry, Cornell University, Ithaca, N. Y.

PROFESSIONAL PAPERS AVAILABLE

AMERICAN FORESTRY has been informed by the Director of the United States Geological Survey that there is available, for free selected distribution, a supply of five different professional papers on forestry. AMERICAN FORESTRY will be pleased to furnish forestry professors, forestry students, or any one especially interested with the following illustrated volumes, free of any charge:

Professional Paper No. 22: "Forest Conditions in the San Francisco Mountains Forest Reserve, Arizona," by J. B. Leiber, T. F. Rixon, and Arthur Dodwell, with an Introduction by F. G. Plummer. 1904. 95 pp., 7 pls.

Professional Paper No. 23: "Forest Conditions in the Black Mesa Forest Reserve, Arizona," prepared by F. G. Plummer from notes by T. F. Rixon and Arthur Dodwell. 1904. 62 pp., 7 pls.

Professional Paper No. 29: "Forest Conditions in the Absaroka Division of the Yellowstone Forest Reserve, Montana, and the Livingston and Big Timber Quadrangles," by J. B. Leiber. 1904. 118 pp., 3 pls.

Professional Paper No. 30: "Forest Conditions in the Little Belt Mountains Forest Reserve, Montana, and the Little Belt Mountains Quadrangle," by J. B. Leiber. 1904. 75 pp., 2 pls.

Professional Paper No. 33: "Forest Conditions in the Lincoln Forest Reserve, New Mexico," by F. G. Plummer and M. G. Gowsell. 1904. 45 pp., 12 pls.

Children's Department

Devoted to imparting information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.

BY BRISTOW ADAMS

THE SPROUT GROWTH OF TREES

WE HAVE seen how new trees are started through seed from the old ones, and how tree growth may be extended from one place to another by means of these seeds. Seeds, however, are not the only source of new growth, because many trees are able to send out sprouts or shoots, and thus get started anew. By means of this power to sprout from the roots, some trees are able to renew themselves after the parent tree is cut down; and the forester takes advantage of this power or ability, in renewing the woods.

The capacity to sprout is not shared by all woods, and as a general statement it may be said that the cone-bearing

article. Some of the pines have been known to sprout from the root after the tops have been apparently killed by fires, and though this is not general it has been noted as occurring over the so-called pine barrens of southern New Jersey, where forest fires have been permitted to run through year after year until now the growth is scattered, and of little value. Northern arborvitae or white cedar sometimes reproduces itself, in the swamps in which it grows, by the process known as layering. Branches on the ground become overgrown with moss, and soil forms about them. These covered branches then send down roots and a new tree may be formed at the tip of the layered branch, with its own root system. Then the branch between the parent trunk and the point of layering may decay and the new tree take up its independent life.



YOUNG PINE SEEDLINGS

These are smaller, more delicate and tender than young grass. Even the slightest forest fire means their complete destruction.

ing trees, such as pines, spruces, firs, and the like can not and do not sprout from the stump; so that when they are cut down they are gone for good, and can be renewed only through seed. Since seedlings of cone-bearing trees are so tender, being smaller and more delicate in their structure than young grass, the importance of keeping forest fires out of pine woods can be readily seen. Even the smallest of fires just barely burning in the pine needles will set back new forest growth for a great number of years, possibly ten or more, because most conifers bear seeds in abundance only at intervals of several years, and even when such seeds are borne, conditions are not always right for their springing to life. But more will be said of forest fires and of their effects in a later

THE most notable example of the sprouting of conifers is undoubtedly that of the California redwood, one of the largest and tallest trees in the world. It sprouts readily from the stump, and there is evidence, even in trees which are full grown and many times as thick as a man's body, that they started as sprouts around a parent tree, which either through accident or decay lost its place in the forest and gave way



A STAND OF YOUNG PINE TREES WHICH HAS SPRUNG UP NATURALLY UNDER SEED TREES, WHICH HAVE BEEN LEFT

An example of how the German foresters take care of their timber and make sure of a new growth to take the place of that which has been used.

to a perfect circle of younger trees around the spot on which it stood. It would be possible for foresters to renew a redwood forest through the sprout growth, and there are now on the hills in the neighborhood of Redwood City, California, fair sized growths of redwood trees which have come up since the lumbermen cut off the timber fifty or sixty years ago. Usually, however, foresters depend upon standing trees to furnish seed for the new growth of cone-bearing trees; when there are no trees to furnish such seed they plant the seed in beds and raise the seedlings to be planted out where the trees are to stand in the forest.

In Germany, foresters have done much toward raising new forests by leaving the older trees to furnish seeds, and under these trees, when fires are kept out, the little new ones will come up as thick as they can stand together.

Almost all of the broadleaf or hardwood trees, including most of those which lose their leaves in the fall, will sprout from the stump or the roots when they are cut down. Some of them will sprout more readily than others. Hickory is one that is always likely to sprout, and sprout-growth or second-growth hickory is considered better than that from the older trees which develop from seed, because the sprouts grow very rapidly on account of the stored-up life in the roots of the old tree; and the more rapid the growth which a hickory tree makes, the more likely is the wood to be tough, strong and elastic. Chestnut trees also sprout readily, and the strong, straight sprouts furnish better material for telegraph and telephone poles than the older and more branchy first growth trees. Basswood or linden is another tree which sprouts readily.

Where there is a forest of useful broadleaf trees, which can be depended on to grow from sprouts, there is little need for seed trees, and such forests can be managed on what is known as a coppice or sprout growth plan. This plan is carried out in Europe, where there is a demand for small faggots for fuel wood and for the making of charcoal. In England, for example, there



A CIRCLE OF REDWOOD TREES

Each one of them is many times thicker than a man's body. They have evidently come up around the stump of a much larger parent tree

are many such tracts, or copses, given over to the production of this kind of wood.

BASKET makers depend on this sprouting capacity for the willow reeds from which hampers and baskets are made. Each year the willow trees are cut back, either at or near the surface of the ground, or else at the top of a short trunk, and the new straight sprouts, when peeled and bleached, furnish the material for all sorts of basket work. Baskets, by the way, furnish one of the oldest forms of carriers known to man, and are still among the best of such forms for lightness, strength and cheapness.

The willows, some of the poplars, and

other quick-growing, moisture-loving trees will grow from detached pieces. New sand bars, in rivers along which willows grow as the Mississippi, soon become covered with willow trees, which have started from branches that have floated down stream and have stranded on the bar, becoming partly bedded in the moist sand; or even while they are in the water they begin to sprout and soon send roots down into the sand and leaves and branches up into the air.

Growers of basket willows take advantage of this property and new willow plantations are set out each year from cuttings or short willow sticks set in the ground and kept moist.

Sometimes this ability of the willows to sprout causes unexpected results. A farmer, not far from the Luray Caves in Virginia, wanted to bring the waters of a spring up on the mountainside down into his dooryard. He ran a line of pipes underground from the spring to the back porch of his house and there set up a log which he had hollowed out to a point about three feet from the ground, where he bored a hole and inserted a hollow wooden spout or plug. The water ran from the spring and came out through the spout a good deal like the spout of a pump only it ran constantly, and there was no need for a pump handle. This pump-stock had not been in use very long before green branches reached out from the top of the stump, and in a comparatively

few years the clear living water was flowing steadily out from a living tree. It continued to grow, and in fact, grew so thriftilly that the persons who own the place have been compelled to put in a new and longer spout because the tree, increasing its girth, threatened to grow around and over the original spout.

These various ways which the trees have of renewing their growth show that they are not entirely dependent upon seed. They also show that the trained

forested must know the habits and history of each of the trees with which he has to deal. Of course, this is only a part of the forester's knowledge, because he not only has to know how to make trees grow in the best way, but he has to know what kinds of trees are the most useful for various purposes to which wood is put. It can be seen, therefore, that to be a successful forester one needs to know pretty nearly everything that can be known about trees and their uses.

Wood Preserving Department

By E. A. STERLING

The Modern Application of Wood Preserving Methods—Various Treatments and the Use of Treated Woods

TEN years ago maple was practically unknown as a railroad cross-tie, being included in the list of woods that decayed too quickly for this purpose. Today it figures quite largely under the head of "miscellaneous hardwoods," while in some regions it constitutes a considerable percentage of the ties treated. Clear hard maple is too valuable for flooring and other purposes to be used for ties, so for treatment the tops and smaller trees are utilized. Maple takes creosote treatment fairly well, being in much the same class as beech and red oak. It does not treat as uniformly as some of the other woods, but absorbs creosote sufficiently well to become fully protected against decay. Like most other woods which do not take full penetration, it is best to bore and adz the ties before treatment.

A NEW idea which promises to give greater economy through saving of creosote, and equal protection has been developed and applied by the Columbia Creosoting Company of Portland, Oregon. It consists of painting the ends of ties, poles and other timbers with a cheap preparation which prevents excessive endwise penetration. It is well known that the tendency of all woods is to absorb the preservative most freely and to the greatest depth in the direction of the grain. Douglas fir and other refractory woods will often show a penetration of a foot or more with the grain and perhaps only half an inch or an inch transversely with it. This endwise penetration is often more and deeper than needed, and out of all proportion to the protection on the other faces. A waste of oil is the result, and it is to prevent this that a coat of paint is first applied to the ends. The oil will go through the paint for a sufficient distance to give the needed protection against decay. Ties for the railroads of India have been treated in this way, and the process deserves investigation in connection with eastern woods.

ANOTHER unique treatment has been developed by this same company. It aims to secure more uniform penetration across the grain by punching a series of small holes to the depth desired. A machine

has been designed which punches ties at the rate of 75 linear feet a minute, the holes being one inch apart across the grain and in staggered rows 8 inches apart with the grain. The depth of the holes is about one inch, and one-eighth inch in diameter. The strength is not reduced since the fibers are pressed apart and not cut; yet the oil is given a chance to distribute itself uniformly from the holes to an extent which would be impossible without them. The same process can be applied to poles, making the treatment deeper at the ground line where most needed.

A NUMBER of well-known wood preserving experts, including Geo. E. Rex, Dr. Herman von Schuenck, O. M. P. Goss, Geoffry Winslow and F. D. Beal, will meet at the St. Helens Creosoting Company plant at St. Helens, Ore., the first week of November. A very important series of tests are to be conducted, as final demonstration of a more economical and effective method of creosoting Douglas fir which has been developed.

The wood paving block campaign continues to be waged with marked success by the lumber associations, both independently and in cooperation with the creosoting interests. During the current year contracts have been awarded for yellow pine creosoted blocks in the south amounting to over 300,000 yards. In the Chicago territory fully 1,000,000, and in the east upwards of 750,000 square yards have been brought out. On the Pacific Coast the paving interests competing with wood block have long monopolized the field. A better understanding, however, is now developing, and the people are learning that well treated and properly laid Douglas fir blocks will give the best possible street paving or factory flooring.

THE railroads continue to use and develop the wood preserving knowledge and practice. The committee on wood preservation of the American Railway Engineering Association is to hold a meeting the early part of November to discuss the further elaboration and standardization of treating practice and preservative specifications.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

EDITED BY J. J. LEVISON, B.A., M.F.

Arboriculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School

COMMON SENSE LABELS ON PARK TREES

THE ignorance of many people regarding the trees in their own back yard has long been a subject of regret to the favored few well versed in arboriculture. While it is well known that this ignorance may be overcome by a visit to botanical gardens or preserves, where experts are expected to have information on such subjects posted at conspicuous places, it has not always been the custom to make public parks do duty as a school of instruction.

Popular interest in trees, however, has of late greatly increased and park officials have in consequence begun to take notice of various means of meeting this interest.

A knowledge of the common tree species of the locality was recognized to be one of the fundamentals to begin with. That knowledge had to be given in the easiest and simplest way because many citizens find it too much trouble to go to a botanical garden to find out. If they could be enlightened unconsciously, as it were, when they go to or from their day's work, they would have no objection. On the contrary, they would be inclined to welcome any acquirement of knowledge that did not entail loss of time and money at an era when the high cost of living makes the quest of dollars rank higher than that of knowledge, of youth and of happiness.

Years ago requests began to come to the Brooklyn Park Department's office regarding the labeling of trees in the public parks. We then endeavored to comply with the evident public demand for instruction of the "he who runs may read" variety. At that time the department manufactured some labels by stamping lead plates and attached them to park trees with generous impartiality in an attempt to cover all extra species as well as native ones with useful as well as ornamental information. In many parks this system of labeling the extra species burdened the busy public with too many names and details, requiring for the average pedestrian the use of a pocket dictionary and not assisting him one whit in the knowledge of that one particular tree which adorned his own back yard.

We therefore had to devise a new label which would not immediately become lost, strayed or stolen because of their lead valuation, and a quantity of real, practical knowledge posted in the parks for general dissemination. The system which has now been adopted by the department differs from that of the botanical gardens, in that it confines itself to 100 of the most common trees—the 100 which everyone ought to know.

This label is a simple, enameled label, brief in context, thoroughly legible and without the special information usually put on labels informing the beholder of the tree's family, locality and other details.

The nomenclature used is the latest and dates on best authorities. Only the common and botanical names of the tree appear upon the labels.



Following our custom of dwelling upon the special characteristics by which almost every tree may be recognized at all seasons of the year, rather than by less permanent features, the trees were labeled in winter time and identification based upon these permanent characteristics and not upon leaves.

Park authorities always find that the public takes a real interest in the matter. The people readily respond to their efforts to give information in this manner and there is seldom a time when a stroll through such labeled parks will not result in seeing quite a number of people pause, read the labels and then look closely at the characteristics of the tree. It is a very good thing, for the simple reason that knowledge and recognition of trees by their detail characteristics and the ability to tell them apart stimulates a broader interest in nature and everything that is beautiful. An interest of this sort in the young may prove the root of higher civic pride and may lead to greater civic development.

Our common trees are so constantly about us that knowledge of a few inevitably broadens out to a more extensive knowledge of many so that soon, instead of looking upon trees as meaningless objects, they become individuals, each with a definite character of its own, and much pleasure is derived without the expenditure of extra time for these observations.

TO THOSE who are accustomed to distinguishing trees by their permanent characters, it is just as easy to tell trees apart in winter as in summer. There is the hackberry, for instance. It can be told from others by the peculiar warts upon its bark. The various maples are recognized by their buds—the Norway maple with its large, reddish-brown bud; the sycamore maple having a bud the same size and form as the Norway, but green in color; the sugar maple with its extremely pointed bud; the ash-leaf maple having a green stem; the red maple with a light gray bark like that of the beech, while the silver maple can be readily told by its curved tips; and all the maples can be told from other trees except the horsechestnut and ash by having their branches opposite each other. The horsechestnut and buckeye can easily be told apart and even if you consider some of the less common trees, you can generally find some peculiarity which will stand out above all others. The blue beech has a fluted trunk that gives the impression of well-developed muscles. The pines can easily be distinguished by the number of leaves to each individual cluster—the white pine, five leaves; the pitch pine, three leaves, and the Scotch and Austrian, two, but the former has its needles very short and twisted while the latter are long and coarse. So it is through the whole list, and the various details make a most interesting study for the observant pedestrian at any and all seasons of the year.

Before the new enamel labels were adopted the portable lead labels disappeared almost as rapidly as they were put on the trees, but the enameled ones are guaranteed to stay, as they have no financial value to those who would try to sell them. For very young trees that could not bear the weight of the label, a wire arch stuck into the ground at its base is used to bear the label. The larger trees wear their labels directly on their trunk. Among the evergreens that we labeled are the pines, larches, spruces, hemlocks and cypress, while the broadleaf class includes many varieties of the maple, oak, buckeye, ash, beech, birch, willow, sycamore, poplar, linden, elm, magnolia, hickory, cherry, mulberry, locust, walnut, butternut, Kentucky coffee tree, sassafras, gum, tulip tree, Osage orange and dogwood.

Many parks all over the country are now labeling their trees and every park department is having its own system of labeling as well as its own form of label. Some of these labels are unique and very original. Some are costly and some very reasonable. Our enamel labels in Brooklyn cost fourteen cents apiece. AMERICAN FORESTRY would be glad to hear from its readers and park superintendents on this subject and learn what others are doing in this important form of education.

ADVICE FOR NOVEMBER

CUT around the base of the trees to be moved this winter and fill trench with straw or leaf mold. This will enable the removal of the tree with a frozen ball.

2. Prune and spray same as last month.

3. Collect all fallen leaves from the lawns and, instead of burning them, heap them in a pile, mix in some manure

and turn the compost over three or four times a year. This will form an excellent mulch for your trees and shrubbery beds.

4. In specially exposed places, protect rhododendrons and other tender evergreen specimen plants with evergreen boughs. Do not resort to this unnecessarily.

TAKING THE CROOK OUT OF A TREE

EDITOR AMERICAN FORESTRY: "Being engaged in forestry work, I was recently asked my opinion of a method of getting the crook out of a young and growing tree. The tree in question was purchased for an oriental plane and has been planted in front of a property as a shade tree. The tree has a crook in the stem about six feet from the ground in the shape of a modified S, that is, the crook does not, of course, make such sharp curves; however, they can be plainly seen and the owner was advised by a nurseryman's agent to slit the bark for about six inches lengthwise of the stem and on the outside of the curves and on both of the curves; this proceeding, it was stated, would cause the stem to straighten out in a few seasons. As above mentioned, I was asked my opinion of this treatment and my advice was and I had never heard of employing any such method to straighten a tree. Further, that I personally did not approve of wounding the bark of a tree for any such purpose or, for that matter, for *any* purpose, as to do so would only be inviting fungus attack and diseases of other kinds which might eventually kill the tree. However, I put it up to the owner of the tree to decide what he should do and told him that while I had never heard of using such a method, that did not say that such a method would not be effective; I could not make any statement as to its efficacy as I was not in a position to say one way or another, but I did advise him, should he decide to try any such treatment, to be sure and sterilize any wound he might make on the tree by giving same a coat of good paint, coal tar, or some one of the other recognized agents for this purpose.

"I would be pleased to have your opinion on this subject, through the Shade and Ornamental Tree department of AMERICAN FORESTRY, as I may have a similar proposition put to me at some future time, and should the owner of the tree above mentioned follow either course of advice he has had, especially the former, which I do not approve of, I am situated so that I could watch developments and perhaps learn something of value along this line, and I also believe that any information you may be able to give on this subject through the magazine would prove interesting to a number of other readers.

H. D. LIPPINCOTT."

THE REMEDY

THOMAS B. MEEHAN, an expert nurseryman, was asked by AMERICAN FORESTRY to answer Mr Lippincott's question and he did so as follows:

"If you slit the bark of a tree, the new growth will bulge out along the line of the slit, healing the wound in one season, but this new growth extends out *beyond* the normal growth of the tree. Supposing then you

have a curve in the trunk of a tree somewhat like a modified S, as stated by Mr. Lippincott,—you would make two or more slits in the bark—about one-half inch apart lengthwise of the trunk,—the number of the slits depending upon the calliper of the tree, and on the *inside* of the curve,—not the outside as stated by Mr. Lippincott, the idea being to fill up with new growth the hollows in the curve of the tree.

"If you were to slit the bark on the *outside* of the curve the additional growth would accentuate the curve in the trunk and it would be worse than it is now.

"While this will produce the desired effect in apparently straightening the trunk, I would not advise it.

"It is true that in time you would apparently straighten the trunk,—it would have to be done year after year for several years,—but would likewise get a very gnarled and knotty appearance which would probably be as objectionable as the curves now existing. You have no doubt seen trees grafted two or more feet above the ground, where the scion has grown faster than the stock—that is just the appearance this tree would have.

"My advice would be to leave it alone. In time as the regular year's growth of the tree is made and the trunk thickens these curves will gradually fill out under the natural conditions of growth, or at any rate will not be as conspicuous as they are while the tree is small.

"If the bark of the tree is slit in the manner described—it is not necessary to sterilize or paint the wound—new bark will commence to grow immediately and fill the wound.

"I have seen old apple and pear trees,—hide-bound old stock,—which have had the bark slit from top to bottom, on all sides of the trees, and there is no question in my mind but what in such cases it is beneficial.

THOMAS B. MEEHAN."

QUESTIONS AND ANSWERS

Q. Would you kindly send me your special instructions for "heading off."

L. W., *New York City.*

A. "Heading in" is a term used to designate the process of cutting off large portions of branches, more or less uniformly, on all parts of the crown. The crown is thus very much stunted and lessened in size. The shock to the tree is a severe one and should therefore only be used in case of dying trees and trees that are going back rapidly. Some species will not stand this sort of treatment. Species like the sugar maple will not stand severe cutting at all, while trees like the silver maple, sycamore, linden and elm will respond very nicely to the treatment. Species like poplar and willow will be improved by heading them in every few years no matter whether they are in good growing condition or not. In cutting off the large branches from trees on the lawn or in the neighborhood of valuable shrubbery, great care must be taken to lower the branches to the ground by means of rope in order not to injure the plants below. The cuts must be made on a slant, the wounds covered with coal tar and wher-

ever possible a large number of suckers must be left on the remaining branch.

Q. We are developing a piece of property at Summit, N. J., lying on the end of the Second Watchung Mountain. Am about to begin planting shade trees on the streets already constructed and would like your advice as to the best tree or trees to choose. I wish a tree that is hardy, that will grow more rapidly than the average and make a good showing quickly, and one that will not require a good deal of attention after once planted. Oaks, beeches and maples are found very largely in the natural woods of the locality. I have also given some thought to the pink flowering horse chestnut. Would greatly appreciate your advice in the matter. The soil is red clay on top of trap rock, with a thin top soil over all.

H. B. S., *New York City.*

A. Plant to Oriental sycamore (*Platanus orientalis*), as the tree par excellence for your purpose. It grows rapidly, is absolutely hardy, needs little attention and is quite free from insects and disease. It is well adapted to the location of Summit, N. J., where you desire to plant. The pink flowering horse chestnut, while a very beautiful tree, does not compare with the Oriental sycamore in any of the above qualities. If you would like to purchase a very valuable book on street and shade tree planting, I can recommend most highly "Studies of Trees" by J. J. Levison, the price of which is \$1.75.

Q. I have tried to find some illustrated catalogue of tools needed and used in tree surgery, as I wish to buy a few to use on my place, but cannot find them, nor do I see them advertised in the AMERICAN FORESTRY Magazine. Shall greatly appreciate information with the address of some manufacturer from whom I might procure the necessary tools.

G. J. B., *Flat Rock, N. C.*

A. Practically all the tools necessary in tree surgery can usually be obtained from almost any well-equipped hardware store. The only precautions regarding the gouges (beyond good steel) are that the sharpening bevel be on the outside or convex side of the curved cutting edge, and that the handles be of the type which drive into a socket. If longer handles are desired, they may have to be made to order on a turning lathe or by hand, as I do not know of any one who keeps them regularly in stock. The chisel is nothing more or less than a gouge with a straight cutting edge. As a matter of fact it is rarely necessary to use one as the best saw for this work is one with the so-called clearing teeth, that is every second or third tooth is a deep one which serves to clear out the sawdust. In green wood of course the teeth have to be strongly set so as to make a comparatively wide cut, at least twice the thickness of the saw blade itself.

Q. Pictures of the European Linden, the Sweet Gum, the Dogwood and the American Beech in the last issue of

AMERICAN FORESTRY have attracted my attention and therefore I desire to ask where I can obtain some of the seeds or transplants of the varieties and whether or not you would recommend them for such an arid locality as Western Nevada.

A. J. P., Carson, Nev.

A. Would suggest your writing to any of the forestry, seed or nursery companies advertising in this magazine for seeds or transplants. As to the availability of the species you mention for such an arid locality as western Nevada, I would not encourage the consideration of the Sweet gum or the American beech, though you might be successful with the European linden, which does well in North and South Dakota where the rainfall is meager. If the ground is irrigated this, of course, would have a decided bearing on your planting, but the safest thing is to stick to the cotton-wood, the hackberry or box-elder, and the linden, as they will give you the best results. The flowering Dogwood, while very beautiful, really needs protection and considerable moisture and I would have grave doubts of any success with it in Nevada except in most unusual surroundings.

DISCUSSION INVITED

The Editor invites and would appreciate discussion, through these columns, of the following questions, raised by Mr. R. Brooke Maxwell, City Forester, Baltimore:

"It would be interesting to have members of our academy and readers of your department of AMERICAN FORESTRY to discuss two tree troubles which I have in mind. The first is a trouble common with our lindens, including the European (*Tilia microphylla*) and its varieties, *Dasystyla euchlora* and *Argentea*, and the American linden (*Tilia Americana*). The trouble is with the leaves and for several years I have noticed that about the 1st to the 15th of August these trees, a large majority of them, lose their foliage and put on a second crop of leaves. The trouble occurs not only on the footways, but also in our parks where the conditions of growth are ideal. I am inclined to think you are going to call the trouble a physiological one due to excessive evaporation and too little water, but this can hardly be the case this year for we have had a season of unusually heavy rains and the condition remains unchanged. Would you call it the linden leaf spot (*Gleosporium tiliae*)? The infection seems to be of too general a nature and too disastrous in its results to call it this.

"The second trouble is with the leaves of sugar maple. This is the same old trouble that tree men have been

calling 'physiological,' caused by too little moisture and excessive evaporation. The trouble occurs on both footways and in our parks. If it is due to unbalanced moisture conditions why should a single tree in a large plantation be affected and the others remain untouched? I have heard it called by some a sugar maple blight. Accurately speaking, I do not believe there is any such disease. Might it not be the leaf spot which is common to the Norway maple (*Gleosporium apocryptum*)?"

ARBORISTS WILL MEET IN NEWARK IN JANUARY

THE first annual meeting of the American Academy of Arborists, formed about a year ago with the aim of advancing arboriculture and landscape forestry and maintaining the highest professional standard among its members, will be held in Newark on January 8 next, in appreciation of the work done by the Newark Shade Tree Commission for the progress of arboriculture.

The sessions will open at 10 a. m. with a business meeting. Addresses will be given as follows at the afternoon session, which will open at 2 o'clock: "The Ministry of Trees," Carl Bannwart, secretary Newark Shade Tree Commission; "The Tree Faker," Hermann Merkel, chief forester New York Zoological Park and president of Academy of Arborists; "Fungus Problems of Interest to Arborists," R. B. Maxwell, city engineer and second vice-president of Academy of Arboriculture; "Arboriculture as a Profession," J. J. Levison, arboriculturist of Brooklyn Park Department and secretary of Academy of Arboriculture. New and important problems in arboriculture then will be discussed by the members. In the afternoon the session will be open to the public. About 1905, some foresters began to specialize in the care of street and ornamental trees. Since that time many cities and towns have taken the matter up and are now employing men to look after the trees on their streets, parks and public grounds. Most of these men work under the name of city foresters, foresters and arboriculturists. Some of them are trained foresters who have made a special study of shade and ornamental trees grown under city and town conditions. Some are not foresters at all but are landscape men who also have made a specialty of shade trees and park development. Others are self-educated men who are in the work because they have a natural liking for it. All these men are valuable assets to the profession.

Through the work of a few pioneers the general public is becoming interested in the work, and a great demand has been made for skilled service in caring for private estates.

Forestry at the Exposition

AMERICAN FORESTRY ASSOCIATION DAY October 20, at the Panama-Pacific Exposition, attracted there a large number of foresters, lumbermen and other members and was made the occasion for the presentation to the Association of a handsome

bronze medal by the officials of the Exposition. This was received by the president, Dr. Henry Sturgis Drinker, other officers present being vice-presidents Everitt G. Griggs of Tacoma, Wash.; Hon. George Pardee, of San Francisco, and Joseph N. Teal, of Portland, Ore.; and

Directors E. T. Allen of Portland, Ore.; Charles F. Quincy of New York City; E. A. Sterling of Chicago; Capt. J. B. White, of Kansas City, and Executive Secretary Percival S. Ridsdale, of Washington, D. C.

President Drinker, upon accepting the medal made an address describing the work of the Association and its importance to the west as well as the east.

The day opened with a meeting, in the Lumberman's Building, in cooperation with the Western Forestry and Conservation Association, Dr. Drinker presiding. His address, on the relations between eastern and western forestry organizations as the east would like to see them, will be found on page 1054 of this issue.

F. C. Knapp, vice-president of the Western Forestry and Conservation Association responded, telling of the relations as the west would like to see them, and Percival S. Ridsdale, Editor of AMERICAN FORESTRY, described what the magazine is doing to help the forest conservation movement in the United States and Canada and how it is furthering public education in forestry throughout the world.

Owing to the west's successful work in forest protection there was much interest in a paper, written by W. R. Brown, president of the New Hampshire Timberland Owners Association, and read by E. A. Sterling, on the organization of eastern timberland owners for forest fire protection and what they have been able to accomplish. A paper by Chief Forester Henry S. Graves, told about the activities of the Government in relation to the lumber industry and the value of the investigative work which it is doing, a work which is proving of great practical aid to the lumbermen.

There were also, during the day, addresses on various

phases of forest industry by H. D. Langille of J. D. Lacey and Company; E. A. Selfridge, president of the California Protective Association, and E. B. Hazen of the West Coast Lumber Manufacturers' Association, each followed by discussions.

On Monday, October 18, the Society of American Foresters held a morning and afternoon session at which there were several addresses and discussions on the work of the professional forester and the relations of forestry and lumbering and between the sessions there were visits to the forestry exhibits of the Argentine Republic, Japan, and the Philippine Islands. A banquet in the evening was the concluding feature of a successful day.

Tuesday, October 19, was devoted by the Western Forestry and Conservation Association to addresses and discussions on forest fire protection work, including Secretary E. T. Allen's report on the year's work of the Association. There were included reports of the Government's work in fire protection in the three western Forest Service districts, and also in British Columbia, together with papers on fire weather forecasts and their effectiveness; the relation of modern inventions to forest protective work with a discussion of the probable future use of aerial telegraphy or telephony, heliograph, aeroplanes, observation devices and new forms of extinguishing apparatus. One particularly interesting feature was E. T. Allen's address on creating public sentiment as an aid to securing necessary precautions in preventing forest fires.

The Pacific Logging Congress held its sessions on October 21 and the same evening many of those attending the various meetings left on a special train and spent two days among the redwood camps in the northern part of the State.

The Situation in Michigan

By H. H. CHAPMAN

THE report of the Public Domain Commission of Michigan for the year ending June 30, 1914, just issued, gives a very complete account of the work accomplished during the five years since the Commission was organized. The Commission is responsible for the management of State lands totaling in June, 1914, 592,416 acres; including forest reserves, 235,245 acres, and lands not so classified. A second department of work is that of supervising and stimulating immigration, for which purpose an agent is maintained in New York City. Still a third department, over which the Commission formerly exercised partial control, has now (July, 1915) been placed entirely under their jurisdiction, namely, the combined work of fish and game, and of forest fire protection.

The report is full of interest, showing as it does the rapidly increasing importance of the work in forestry on State lands. Thanks to the vigorous agitation conducted for years in the State, both before and after the creation of the Commission, the policy of withdrawing worthless lands from sale and devoting them to forest production is now firmly entrenched. This has been

especially beneficial in dealing with many speculative town sites platted, sold and abandoned for taxes, which have now been permanently withdrawn.

At one of the first meetings after its organization, the Commission set aside lands for forest reserves which, together with those previously reserved, brought the total to 235,245 acres. A policy of sale and disposal was pursued for the three years succeeding, during which time some 347,060 acres passed out of State ownership.

In the fall of 1912, Mr. A. C. Carton was elected as Commissioner of the State Land Office on a platform to abolish the office, dispensing with the selling of State lands, and the turning over of all lands to the Public Domain Commission. In January, 1913, he placed a minimum price of \$6.00 per acre upon all State lands, and withdrew them from sale and entry. At the next meeting of the Public Domain Commission they confirmed this action, and directed that no State lands be offered for sale in the future and that only such lands as were required for school house sites, cemetery purposes, railroad rights of way, or similar public purposes be disposed of. The Legislature then passed an act to

abolish the office and turn all lands in the State over to the Public Domain Commission, and the Land Office is now a thing of the past. All State lands are now under the control of the Public Domain Commission, with the exception of lands granted by the United States Government for specific purposes, such as the primary school, agricultural college and university lands; and all lands under the control of the Commission will eventually be used for forestry purposes.

At the request of the Public Domain Commission, the Legislature also passed an act allowing the State to exchange lands with the United States Government, corporations and private individuals, for the purpose of consolidating its forest reserves. Later, Congress authorized the exchange of United States Government lands with the States so that it could procure the lands within the boundaries of its reserves. Under this act 50,000 acres have been examined for exchange with the United States Government and private individuals, and the exchange of about 1,600 acres has been made with private individuals.

The Commission also has the right to buy lands for forest reserves.

The purpose of these measures is to consolidate the present reserves by the elimination of private holdings of non-agricultural lands. There are fifty-two State forests in Michigan at present, the two largest of which each contain about sixty square miles or 38,000 acres of land. The majority are at present small in size and composed of somewhat scattered holdings, which must in the future be brought together.

This need of consolidation has been emphasized by the improvement work actively undertaken upon five of the forest reserve areas. Forest planting to restore the forest is a necessity on most of the Michigan reserves. Repeated fires following logging have left no second growth of value over wide areas. Planting demands fire protection consisting of fire lines, watch towers and telephones, with the accompanying force of lookouts and rangers, without whom no amount of physical preparation would avail. Planting also requires much labor, supervision, teams and equipment, including nurseries. This calls for houses, barns, barracks and waterworks. Such a plant must serve a large area to be economical and efficient.

Michigan has had such a plant on the Higgins Lake Forest Reserve, of 13,580 acres, for several years, and has also installed headquarters houses, barns, lookout towers, fire lines, telephones upon the Houghton Lake, Fife Lake, Lake Superior and Ogenaw State Forests, whose areas are, respectively, 38,578, 7,102, 38,007 and 4,199 acres, bringing a total of 101,468 acres under administration. Two more forests will be put under management during 1915, but, although the Commissioners intend to extend the work of bringing the remaining forests under management, they will find it increasingly expensive as the areas administered become smaller and more scattered.

The work of forest planting and fire line construction initiated and brought through its experimental stages by the old Forestry Commission at Higgins Lake has been

greatly expanded and as more funds became available initiated on other reserves. A standard fire line is in use, following the section lines, as the country is so flat as to preclude any advantage of ridge lines. These fire lines are first cleared 16 feet wide, then grubbed of stumps and roots for 12 feet, then a 10-foot strip is plowed. This strip is cultivated twice a year to preserve a dirt surface and destroy grass or other growth. Two hundred and seven miles of line have been built, at a cost per mile varying from \$47.09 to \$81.94, although by utilizing old logging railroad grades the cost per mile was but \$8.63. The lines serve as vantage points for backfiring, and may even stop a small fire automatically, but can never be depended upon to do it without the active work of fire patrols. From these lookout towers, in which lookouts are kept during the dry and dangerous seasons, there radiates 20.5 miles of telephone lines, connecting headquarters and the nursery. These lines are used only for forest protection purposes. On one reserve is a specially equipped automobile that takes the first crew to the fire when it is discovered. Later on they are followed by the teams and equipment necessary to extinguish the fire if it is too large a one to be handled by the first crew.

The plantations are further protected by fire lines around each forty acres. These plantations now cover 1,409 acres, and will be extended far more rapidly in the future. Norway pine constitute 52 per cent of the area, and white pine 38 per cent. Since the Norway pine is practically free from dangerous insect and fungus enemies and has a large measure of fire resistance after attaining merchantable size, the preference shown for this species is commendable. It also outgrows white pine on sandy soil. It may be questioned whether this policy of close planting, up to 2,300 plants per acre, is sound practice. The advantages of early securing a forest cover and thus reducing the grass and inflammable herbage must be offset against the certainty that such close stands will soon become too crowded, and serious loss from stagnation result before they reach a size permitting the removal of profitable thinnings. Over 1,000,000 seedlings have been sold and distributed throughout the State. Dead and down timber to the value of \$3,363 has been sold.

The appropriations for the work of the Commission have gradually increased from \$9,700 to \$105,000 per year.

To sum up, Michigan ranks third in area of State reserves, third in number of acres planted, fourth in area of State forests, and fifth in size of State appropriations for forestry. Mr. Carton states that the number of acres set aside for forestry purposes should in reality be listed as 600,000, as all of the lands belonging to the State which are under the jurisdiction of the Public Domain Commission are practically subject to exchange, and are in fact lands that will be used directly for forestry purposes or exchanged for other lands to be so used. When this process is completed, Michigan will rank third in acreage of State forests.

Many of these forests will be used for the propagation

of game. Elk from the Yellowstone Park have already been placed on the big reserve in Roscommon County.

The completion of the work of land classification, exchange and consolidation is the most important work ahead of the Commission, and must precede any great extension of the work of developing the individual forests.

The report contains two sub-reports, one by C. M. Granger and one by J. G. Peters, both of the U. S. Forest Service, offering certain suggestions for the future improvement of the State work. These reports call attention to certain weak points in the present organization. The work of the State Forester, who in other States is entrusted with large educational and administrative duties of state-wide application, has in Michigan been strictly limited to the development of the State Forest Reserves and their protection. Fire protection in the State has been thus divided between the State Forester on State lands, and the State Forest Commissioner, who is also the Game and Fish Commissioner.

The consolidation of the fire protection service under the Commission, secured in 1915, is a step in the right direction, and can be made to work out well provided the Commission clearly recognizes the two fundamental principles of organization upon which efficiency in other States has depended. The first of these is an independent set of fire wardens, who are not saddled with the responsibilities and drawbacks attached to the enforcement of game and fish laws. The temptation to obliterate the distinction between game and fire wardens in order to make a better showing and use each State warden more effectively should not blind the Commission to the fact that the fire problem requires special treatment to be solved at all, and that a proper public attitude is the keynote to the enforcement of the fire laws. The time is not ripe for such "economies," and the effect will surely be to reduce efficiency or nullify the efforts of the State fire wardens.

The second principle is the placing of forest fire protection in the hands of a trained forester or woodsman, whose chief interest lies in the field of forestry, and not of fish and game protection. The most successful form of organization, and that which is found in nearly every State which maintains a forest fire department, is a separate force of State or local fire wardens not connected with fish and game administration, and under the direction of a State forester or fire warden whose time is either entirely devoted to forest fires or whose other interests and energies are exerted along forestry lines rather than those of fish and game protection. Fire protection is essential to forestry, and while it affects fish and game indirectly, it is not the primary consideration in this field. The Conservation Commission of New York, under which these two departments are consolidated, has never made the mistake of destroying the identity of its fire warden force, but has from the first maintained separate wardens for these two distinct fields of operation. Nor has this State entrusted its fire laws to the administration of the game warden, but has always maintained a separate administrative head for the fire protection work, who has for years been a trained forester. This plan is earnestly urged for consideration in Michigan, under the new consolidation of these departments.

[NOTE.—The States which maintain separate administrative heads for forest fire protection and separate organizations of forest fire wardens, not connected with fish and game administration, are Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Maryland, North Carolina, Virginia, Kentucky, Tennessee, Texas, Wisconsin, Minnesota, Montana, Idaho, Washington, Oregon and California.

The remaining States, with three exceptions, are largely agricultural or have not established State organizations for fire protection.]

Editorial

STATE FORESTRY ASSOCIATIONS

STATE forestry in this country, after twenty years of development, is yet in its struggling infancy.

In some few states, commendable progress has been made in developing state organizations for fire protection, and in educating the public to a new and sane attitude towards forest fires. In a still smaller number of states the question of state forest reservations has been aggressively agitated, with far-reaching results. But taken as a whole, the forestry movement in the individual states is struggling with tremendous obstacles, due to many causes. A clearly defined state policy for administration of lands worthless for agriculture and their restoration to productiveness through forestry confronts the inherited weaknesses of our individualistic form of government.

Indifference to public or commercial welfare, the gauging of results solely by immediate private profits, the horrible inefficiency of the corrupt partizan or spoils system of public service, which, should it be exposed to such urgent stress as that of England or France in the present war, would either crumble or give place to efficiency, all constitute obstacles which threaten not only to seriously interfere with, but to almost completely prevent, the final establishment of state forestry on a sound permanent basis.

The success of state forestry means nothing short of a complete transformation in the general attitude of entire state communities towards the economic treatment of forest land. Such constructive work requires long-continued, patient and intelligent effort on the part of

men whose knowledge of the aims and purpose of state forestry rest on the secure basis of technical and professional knowledge. State forestry departments must be so constituted that such men are not only secured for the work but are kept in the service of the state on a permanent basis which permits them to give to their work the cumulative knowledge and efficiency of years of experience. If the office of state forester is to become a political plum, technical foresters will be replaced by politicians or by young and inexperienced foresters who, for the sake of a job, are willing to take a chance on being replaced when the administration changes. No results worth considering will ever be accomplished in state forestry under such a system. "By their fruits ye shall know them." The states which today are rapidly progressing in fire protection, in state forest reserves and in other forestry lines, are in practically every instance served by state foresters who have been retained for several years by non-partizan commissions and who expect to continue in those positions as their life work, in the same manner that an efficient employe of a business corporation plans on devoting his ever-growing ability to the work of his employers, without fear of being deposed for arbitrary reasons wholly unconnected with his character or services.

But this condition, through which alone states can secure results, comes into sharp conflict with the spoils system which in many places and by many methods is seeking rehabilitation under cover of a reaction from too much progressivism. One favorite method of demolishing a non-partizan forestry board at present is by a reorganization of forestry, usually by a combination with other conservation interests, notably those of fish and game protection. Such proposed legislation will be found in most instances to provide for the arbitrary political appointment of the state forester instead of permitting

him to be selected by the non-partizan board. Another method is the curtailment of appropriations for non-partizan forest fire warden forces below the point of efficiency. In a state which has failed, through improper organization, to secure efficient forestry administration, the appropriations devoted to forestry are dissipated in salaries and expenses which produce no lasting results and the final outcome must be the failure and abandonment of the propaganda itself.

To secure these vital conditions of success, forestry sentiment must be organized and active. The logical method of expression is through a state forestry association. A few states have such organizations, notably Massachusetts, Pennsylvania, Minnesota, Michigan and, of late, New York. To be successful and to accomplish its purpose, a state forestry association must have an active and well-informed secretary, who can devote a large part of his time to the work of the association. Without such a secretary no association can grow beyond a merely nominal strength. As soon as the association can afford it, the secretary should receive a salary. He should be a capable organizer and business man, as well versed in forestry as possible. Such a secretary will cause the association to grow rapidly.

An association which has developed into a strong, progressive and wide-awake organization, can not only secure needed legislation, but can by the weight of its influence prevent the passage of spoils legislation and can maintain the integrity of the state forest service against the efforts of politicians to dominate and control the personnel and the appropriations. Without such an association public opinion, unorganized and often led astray by false information, will be practically helpless. State forestry rests upon the expressed will of the people, and the state forestry association is the means of expressing this will effectually.

TAXATION AND CONSERVATION

IF CONSERVATION of the forests which they own is practical, then lumbermen will practice conservation. Just how such conservation may be made practical is a decidedly interesting problem and the opinion of lumbermen who have given thought to it is valuable.

One such lumberman is Charles L. Latimer, president of the Northern National Bank of Ashland, Wisconsin, who, in a recent letter to *AMERICAN FORESTRY*, said:

"I am very much interested in the literature received from time to time from your association and, being a lumberman of some years' standing, have some ideas about the best way to preserve our forests, and in this connection would say I believe we should begin with proper legislation and particularly tax legislation. As the taxes are now, in practically all of the states standing timber pays an annual tribute going higher and higher each year, thus putting timber owners in a very uncomfortable condition—forcing a man to cut his holdings in order to realize something besides taxes for his investment, in so doing, owing to market conditions, he is compelled to leave a large amount of valuable timber, either

to be blown down or burned up. Under proper tax conditions he would only be compelled to cut as fast as the market would warrant, and when he did cut, should he pay a cumulative tax, there would be coming to the timber owner exactly what belongs to him and no more. What timber remained would be for future years or future generations.

"Proceeding a little further with our legislation, in order to cut our timber clean we should legislate so that timber from other countries would not come in competition with our own as it does at this time. My opinion is that there is as much timber wasted in the United States today, owing to free admission of lumber into the United States, as would offset the value of lumber that is imported from Canada and British Columbia. The American people are out just the amount of money we pay the outsider for his lumber.

"It is hardly a practical proposition to reforest, or to perpetuate the forests we now have, until we have legislation that will protect the forests. I believe the true solution would be the cumulative tax, together with a sufficient duty upon imported lumber that would enable us to cut our forests clean as we go along."

Forest Notes

A Conservation Measure

T. R. Helms, a member of the American Forestry Association, writing from New Orleans says:

"Do not try to see how many logs you can cut up, try and get all the lumber you can get out of them.

"Try to make lumber, instead of simply cutting up logs.

"You work for the interests of the company if you save all the lumber you can. Lumber is money, do not waste it."

This is quite different from what it was years ago, when the efficiency of the sawyers was judged by the number of feet of log scale they would saw in a shift, and consequently they would cut up the logs the quickest way they could, regardless of how much or what kind of lumber they got.

Prof. Brown Back from 6,000 Mile Trip

Nelson C. Brown, Professor of Forest Utilization in the State College of Forestry at Syracuse, has returned from a 6,000 mile trip through the National Forests of the Rockies and Cascades. Professor Brown left Syracuse in June and went directly to New Mexico where he studied methods of utilizing and protecting timber in the Southern Rockies. He then went up through California, visiting the redwood lumbering north and east of San Francisco to the Puget Sound Country. There he visited some of the largest sawmills in the world and not only studied methods of utilization and manufacture, but looked carefully into the matter of methods used by the western lumberman in supplying the eastern markets. After studying conditions in Idaho and Montana he visited the White Pine section of northeastern Minnesota, where much of the best White Pine is coming from today. Professor Brown brings back to the College a large amount of illustrative material which will be used in instructional work and in the forest museum of the College.

Ten Buffalo Calves

The Government's herd of buffalo on the Wichita National Forest, in Oklahoma, which is also a Federal game preserve, has been increased by the arrival of ten calves, according to a report received by the Forest Service from the supervisor in charge. The herd, which now comprises sixty-two specimens of the almost extinct bison, is in good condition, says the supervisor, and promises to continue increasing at a rapid rate.

Prof. Chaffee on Extended Trip

Prof. R. R. Chaffee, who is in charge of the course in lumbering at Penn State Forest School, is making an extensive trip

through the northwest and along the Pacific coast studying the large logging operations and visiting the National Forests. Prof. Chaffee expects to return in November to take charge of the new optional course in lumbering which has recently been established at Penn State.

Syracuse Registers 274 Men

The State College of Forestry at Syracuse, N. Y., has just closed registration for the college year with 274 men. These men have registered for four and five year professional courses in Forestry and represent 55 counties in the State and 12 States outside of New York. Some of the largest county representations come from Westchester, New York, Erie and Onondaga. The following States are represented. Massachusetts, Vermont, New Hampshire, Connecticut, New Jersey, Pennsylvania, Ohio, Kansas, Virginia, Wisconsin, Minnesota and District of Columbia. Russia and Armenia are represented as foreign countries. Besides the 274 men in the professional courses in the State College of Forestry at Syracuse there are 18 men taking the one-year practical course in the State Ranger School at Wanakena.

What Minnesota Needs

C. C. Andrews, secretary of the Minnesota State Forestry Board writes that: "Forest consumption has been going on in Minnesota seventy years, and there is now need of strong measures for reforestation. There is in this State a great deal of land that is chiefly valuable for the production of timber, some of which is bare, exposed to sun and wind and growing poorer every year. It is true that in places one now sees a fine regrowth of forest, but on an average, in my opinion, after twenty years of particular observation, not more than 5 per cent of it is well restocked (close growing), with valuable kinds of timber trees. It will take nature unaided more than a century to renew our forests; the State must assist. Thoughtful citizens should keep this matter in mind and help educate a public sentiment that will cause another legislature to give reforestation a proper start."

Wirt as Chief Fire Warden

George H. Wirt has been appointed chief forest fire warden of Pennsylvania in accordance with the recent act of the Legislature providing for reorganization of the forest fire warden system. In this reorganization the State forestry department will take advantage of its foresters as they are now located on State Forests and use them as centers of inspection of as many local fire wardens as they can conveniently

handle. In this way it will probably be able to keep in close touch with all of the fire wardens in at least thirty-five counties of the State and those counties which are most wooded. Following that the department shall take steps to organize the system in other counties by cooperation with local organizations of sportsmen and other bodies interested in forest preservation. It will also attempt to institute a complete system of fire towers all over the State and carry on a campaign of education against forest fires. Unfortunately, the department will have to be somewhat limited in the last two propositions during the next two years, owing to the fact that for this period of time the Legislature and Governor have given only \$45,000 for the work.

Mr. Wirt graduated from the Biltmore Forest School in February, 1900. In April of that year he began service with the Pennsylvania Department of Forestry as a State Forester. In 1903 he was placed in charge of the State Forest Academy and had charge of it, together with the Mont Alto State Forest, until May, 1910. At that time he was sent to Harrisburg and placed in charge of the work of inspecting private tracts and assisting private individuals in the handling of their woodlots, together with other miscellaneous technical and office work.

Wisconsin's New Forester

Professor F. B. Moody, for the past two years extension professor in forestry at Cornell, has taken up his new duties as a member of the forest, fish, and game commission of the State of Wisconsin. By this action he becomes not only a member of the commission, but the State Forester, succeeding E. M. Griffith, who recently resigned.

Professor Moody went to Cornell from Wisconsin, where he was a member of the State Forestry staff, and it is stated that his thorough familiarity with Wisconsin conditions led to his choice as a member of the Wisconsin commission. While he is being congratulated on the new opportunity, great regret at his leaving is expressed by his colleagues at the State college of agriculture, where he has been one of the most popular members of the forestry faculty.

He has been closely in touch with the lumbermen, and particularly with the farmers, of the State in his woodlot demonstrations, and has been commended for his sound common sense on forestry problems and his practical familiarity with them.

Professor Moody's successor in the extension work in forestry has not yet been chosen, and probably will not be selected until the members of the Forestry School return from the Adirondacks. The activities of the entire school have been transferred to an Adirondack logging operation, where the Senior Class is now securing practical training in woods work.

Canadian Department

By ELLWOOD WILSON

Secretary Canadian Society of Forest Engineers

The campaign against those responsible for setting forest fires has been waged vigorously and successfully this season. The Lower Ottawa Forest Protective Association has eight convictions against settlers who carelessly allowed their clearing fires to get away from them, and the St. Maurice Forest Protective Association has had one very important conviction and ten more cases under way. These convictions are having an important effect as they show that the laws are really meant to be enforced and bring home to the careless ones the necessity of taking precautions, in a way which appeals to them. As soon as the Governments of the respective Provinces make it necessary to have permits in order to start fires for clearing, no matter what the time of year, settlers' fires will be a thing of the past.

The Canadian Society of Forest Engineers has just been incorporated under the laws of the Province of Ontario. This Society has had a healthy and steady growth and is increasing in importance and influence. It now numbers forty-eight active, thirty associate, two honorary and two student members. Mr. P. S. Ridsdale, Secretary of the American Forestry Association, has just been elected an Associate Member.

An interesting experiment was undertaken by the Laurentide Company, Ltd., this season. On a good deal of their waste land which is being planted there are old hardwood stumps and a good deal of young hardwood brush. This grows much faster than spruce or pine and on two of the plantations was seriously retarding the growth of the plantations. A couple of small goats were purchased and turned into these plantations but they promptly commenced to eat the planted trees as well as the hardwood. The Company's herd of reindeer was then tried and although they have been grazing on the plantations all summer they have not eaten a single spruce or pine but have cleaned off the poplar, birch, and maple well and the coniferous plants show as good a growth as those in the open. A few plants have been injured where the deer have made roads but the number is so small as to be entirely negligible. The feed has agreed with the deer and they are in wonderful condition. This proposition of natural hardwood regeneration on burnt over and cut over lands was beginning to be a serious one as it is entirely out of the question to cut this, either before or after planting, and it retards the growth of the plants dominated by it to such an extent that it seemed almost hopeless.

The *Canadian Lumberman* for Sept. 15th prints an excellent article on "The Problem of Slash Disposal" by Mr. Clyde Leavitt, Forester to the Conservation Commission. The whole question is thoroughly discussed and definite measures to help the present situation are proposed, all of them practical and practicable.

Mr. R. H. MacMillan, Chief Forester of British Columbia, and acting at present as special trade commissioner, traveling abroad in the interests of his Province, has completed his work in England successfully and is now en route to South Africa.

Work has commenced on the large new storage dam being built by the Quebec Government to control the flow of the St. Maurice River. This dam is forty-four miles from the nearest railroad, the National Transcontinental, and barges and steamers are being provided to carry supplies, cement, etc., to the first rapid, a distance of twenty-eight miles and from that point to the dam site, sixteen miles, a railroad will be built. This dam will be the largest water conservation scheme in the world and will hold back twice the amount of water stored by the enlarged Assouan dam on the Nile. It will be about 2,000 feet long and eighty feet high at the highest point. There are many large lakes above this dam, one being over thirty miles in length, and the level of all of these lakes will be raised. The timber which will be destroyed is for the most part scrubby black spruce, balsam, birch and poplar and little of it has any commercial value. There are no settlements of any kind, only one Hudson Bay Post on Lake Obiduan, the country being inhabited by Indians.

Tenders are also being asked for a dam to be constructed at the outlet of Lake St. Francis, on the St. Francis River, on the south shore of the St. Lawrence, which serves a number of important industries which have been much hampered by low water in the summer time. It may be of interest to American readers to know that in the little Indian village of Pierreville, near the mouth of the St. Francis River, it is said, the grandmother of Senator Matthew S. Quay, of Pennsylvania, was born. She was an Indian woman of the Abenaki tribe and I am told that Senator Quay's picture hangs over the altar in the Indian Church.

The report of the Fire Inspection Department of the Dominion Railway Commission shows that during 1914 a total of 1,346 fires were reported in forested sections within three hundred feet of railroad rights-of-way, on lines under the juris-

dition of the Railway Commission. These do not include Government Railways or lines under Provincial charter, about 15 per cent of the total mileage. A total area of 191,770 acres was burned, valued at \$443,442, of which \$202,987 was merchantable timber. Although the season was one of the worst in years the railway fires show a decrease and the situation is steadily improving. Two suits were entered against railways in the Parry Sound District in Ontario and the Grand Jury in making its presentment protested against the non-enforcement of the forest fire laws and the negligence of the officers charge with this enforcement.

There is at present a great demand for box shooks for making ammunition boxes. The specifications are very strict and there is difficulty in obtaining material.

His Eminence the Cardinal-Archbishop of Quebec, always a strong supporter of the work of the Canadian Forestry Association, will soon issue a letter to be read in all the Churches of the Province, reminding all faithful Catholics of their duty to protect the forests from fire and to conserve them for posterity. This will be of great assistance in impressing upon all the people the necessity of using greater care with fires and also of observing the forest fire laws.

Mr. George Chahoon, Jr., a Director of the Canadian Forestry Association and Associate Member of the Canadian Society of Forest Engineers, has just been elected President of the Laurentide Co., Ltd., the largest and most progressive paper company in Canada, to succeed the late Sir William Van Horne. Mr. Chahoon, like Sir William, was born in the United States, being a native of Au Sable Forks, in the Adirondacks, where his family has long had paper interests. He is still a young man, being only forty-three. He took charge of the Laurentide Company about twelve years ago and has built it up to its present high standing. His broad general interests and open mindedness early persuaded him that only happy and contented employes give their best work and he has done everything to make Grand Mere, not only livable but also attractive and has succeeded in building up one of the prettiest villages in Canada. Realizing that a cheap and steady supply of raw material was of vital necessity to this Company he became interested in forestry and has done more along practical lines to utilize what this science had to offer than almost any man in Canada, taking not only a selfish interest in it but looking at it from the broadest standpoint and urging the Provincial Government to a more progressive policy. The first large forest survey in Quebec was that made by his Company and it is also the first one to take up commercial planting on a large scale.

Sr. Don Ricardo Cordoniu, who has been for many years in charge of the work of the Spanish Government in reforesting the sand dunes and control of torrents and tree planting in the mountains, has had conferred on him, on the occasion of his 67th birthday, the Grand Order of Elizabeth the Catholic and Agronomical Merit. The insignia of the order was given him by public subscription. Sr. Cordoniu is the editor of *Espana Forestal*, one of the heads of the only forestry school in Spain and a member of the society of Amigos del Arbol.

The last number of *Espana Forestal* has just been received and is a very creditable piece of work, the illustrations are excellent and there is more attention paid to the aesthetic and artistic side of forestry than in any other forestry journal published.

Secretary Robson Black, of the Canadian Forestry Association, has just made a trip to the territory patrolled by the Lower Ottawa Forest Protective Association and to the Ontario Government Nurseries and plantation, at St. Williams, Ont. Fifteen acres are covered by the nursery and about eighteen hundred acres have been taken over from farmers and planted up. Mr. E. J. Zavitz, Provincial Forester, deserves great credit for the efficient way in which he has handled this work and for the excellent condition of the nursery and the good he has done in awakening public interest and in turning a barren section into a fine prospective forest. The pine plantations have now reached a height of nine and ten feet and are in excellent condition. Enormous numbers of hardwoods of all sorts are grown for distribution.

Mr. Black also investigated the "fake settlers" in the Township of Boyer, Province of Quebec, and showed the disastrous result of their being allowed to take up land simply for the purpose of cutting off the timber. This is an abuse which has been a crying shame but which the Province is rapidly controlling, and soon hopes to make a thing of the past.

British Columbia Notes

Under the direction of the Hon., the Minister of Lands, an attractive pamphlet entitled "British Columbia Timber" has been prepared for distribution among the buyers in overseas markets. It is intended to draw the attention of importers overseas to the forest products of the province, and especially to the facilities for exporting British Columbia lumber. Consisting of nearly forty pages, and containing thirty illustrations, the pamphlet treats of the principal exportable woods, their qualities and uses, together with information concerning their strength, values and suitability for various uses. Also a pamphlet entitled "How to Finish British Columbia Wood," giving full details and directions for hand-

ling and finishing woods and the different kinds of paints, stains and varnishes which are suitable for getting the effects desired.

At a recent meeting of the British Columbia Forest Club a very interesting paper on the Forests of Central British Columbia was read by Mr. H. R. Christie, and one on general administrative problems in forestry work by Mr. W. N. Millar.

The Hon., the Minister of Lands, is in receipt of advices from the Tete Jaune Cache district, reporting that during the month of August there were seven hundred thousand feet, board measure scaled, being timber cut by the Canadian Northern Pacific Railway during its construction through the timber limits in the North Thompson Valley, and representing the addition of \$2,600 to the provincial revenue in stumpage and royalties.

While its lumber industry is quiet, it is believed that much development will take place in that district as soon as economic conditions permit.

Fifty-five fires have been reported this season, some sixty acres in all having burned over, with damage to rather less than three hundred thousand feet of standing timber. Ten of these outbreaks, affecting twenty acres and damaging about two-thirds of the timber mentioned, were due to lightning. Hot, dry, windy weather for the past few months rendered the position one of great hazard, and it is a tribute to the efficiency of the fire-wardens that the losses and fire fighting expenditures have been kept within comparatively small limits. The splendid spirit of co-operation existing throughout this large district has been a valuable asset, several instances having occurred of settlers walking or riding many miles in order to report the outbreak of a fire.

Land-clearing by settlers has been extensively undertaken this year, and good crops are reported generally, especially in view of the fact that many areas are virgin ground, and have been broken up for the first time this year.

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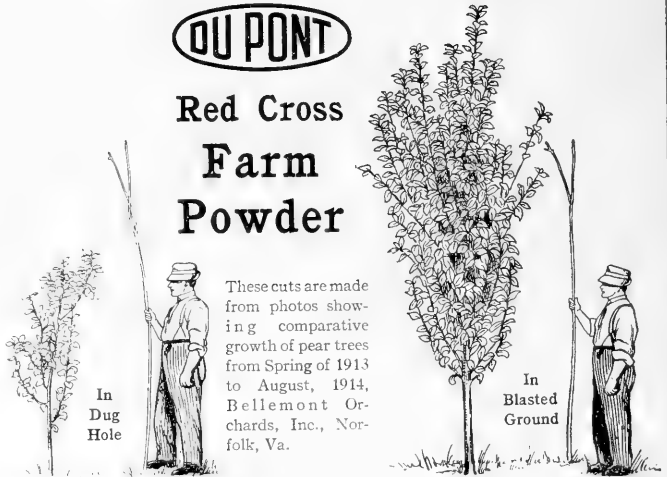
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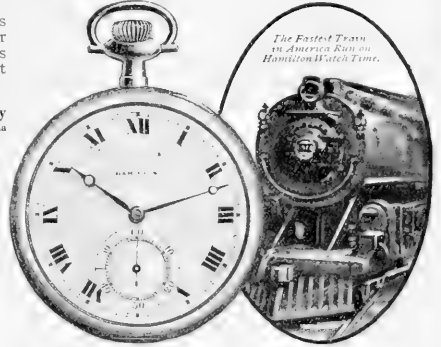
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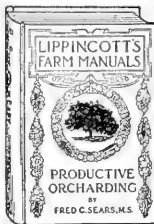
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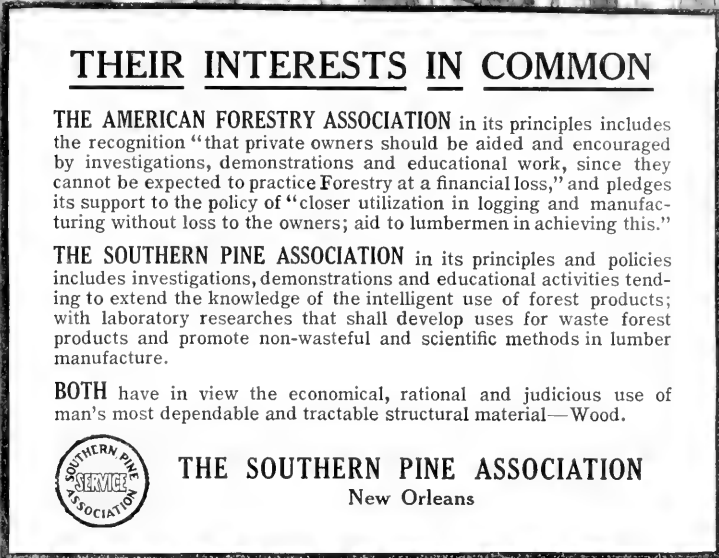
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American Forestry

Vol. 21

DECEMBER, 1915

No. 264



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IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

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Washington, D. C.

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dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages;
cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water;
prevent erosion of land; and are essential to the beauty of the country and the
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IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that
private owners should be aided and encouraged by investigations, demonstrations,
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suited for farming and those best suited
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AMERICAN FORESTRY

The Magazine of the American Forestry Association

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December, 1915. Vol. 21

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THE DAY OF NO TIMBER

Is farther away now than the ultra-conservationists ten years ago said it was when they spread an alarm of exhausted supply.

THE theory of exhaustion has been dismissed. Wood is still abundant. It is still and always will be the warm, friendly material that makes four walls a cosy cottage or a magnificent mansion. Our regard for it is inherent. Our children will continue to use it because its adaptability, beauty of finish and sound absorbing qualities give it a home-making charm that no other material possesses.

AND the uses of wood are multiplying phenomenally. We are just now coming to know its real values and save them. Practical by-product utilities that represent more than 60 per cent of the usable value of trees are now known, in addition to lumber which utilizes only one-third. Others will be found. With added use there is added worth.

LUMBER need not go higher in cost to consumer to make profitable for all time the ownership of timber. Forest protection, new uses, close utilization, efficient management and economical distribution will constantly add to the value of stumpage and eclipse the "overhead." Stumpage—the raw material—will take the gain.

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American Forestry

VOL. XXI

DECEMBER, 1915

No. 264

White Ash

Identification and Characteristics

By SAMUEL B. DETWILER

IN OLD Norse legends the ash tree is called the Tree of the Universe. This name is an appropriate one, for ash wood is exceptionally strong and elastic for its weight, and for centuries it has been highly valued for the good qualities that make it so useful in the modern world. The spear with which Achilles fought had a shaft of ash; the Indians made use of this wood for bows, paddles and canoes. Today ash wood is used wherever superior strength and elasticity combined with lightness in weight are required. Such uses range from baseball bats and snowshoe rims to musical instruments and aeroplanes. Most of the ash wood, however, is consumed in car construction, axles, poles and other parts of vehicles, handles of all kinds, wooden ware, agricultural implements and furniture.

Ash trees may be said to be the most highly educated of our common trees, since in the process which has caused one species to differ from another, they have acquired characteristics which botanists recognize as being very high in the scale of plant development. There are thirty or forty species of ash in the world, growing mostly in the temperate regions of the northern hemisphere. In North America, sixteen kinds of

ash trees are known. The olive-tree, the fringe-tree, the lilacs, forsythias and privets are all in the same family as the ash, but the mountain ash is not related to the true ashes.

The white ash is the most beautiful and the most useful of the American species, although in commerce the wood is seldom separated from that of the black, red, blue or green ash, which are often found growing with it. White ash is native to a wide territory, from Newfoundland and Nova Scotia west to Minnesota and south to Florida and Texas. It is found on rich, rather moist soil, on low hills and near streams, but it is not usually found in swamps such as the black ash often frequents. It is nearly always found growing mixed with other trees that love rich, moist soil. The best white ash grows in the lower Ohio River basin.

In the forest the trunk of the white ash is generally straight and free from branches until it divides into a short, the first conical or round market. In the optical in lumber spreads from New England? Between 1712 and 1718 ash "rafters" to the number of 1,100 were bought in Portugal. Rafters were blanks from which boat oars were made. This wood was



From "Pennsylvania Trees" by J. S. Illick

THE WHITE ASH

1. A branch with a cluster of pollen-bearing flowers and young leaf size. 2. A cluster of seed-bearing flowers. 3. A full leaf, one-half life size. 4. A cluster of fruit, one-half life size. 5. A section of a winter twig, one-half life size. 6. Section of a winter twig, enlarged.



BARK OF THE WHITE ASH

The bark is grayish-brown, rather thick upon the older trunks, and is sharply divided by diamond-shaped fissures into rather flattened ridges which are covered by thin, close-fitting scales.

diameter of two to three feet, but occasional specimens one hundred and twenty feet high and five or six feet in diameter may be found.

The greyish-brown bark is divided by deep, diamond-shaped fissures into narrow, flattened ridges that run lengthwise of the trunk. The surface of the ridges is covered with thin, tightly attached scales. Unlike black ash, which has an elastic, corky bark that powders easily when rubbed with the hand, white ash bark is firm and does not crumble. However, the scales on the ridges gradually wear away so that old trunks often have smoother bark than younger trees.

The buds of white ash are rather large, broad, short and blunt, and of a rusty-brown to dark-brown color. At the end of the twig is a bud larger than the others, on which it is plainly seen that the buds are covered with scales that stand opposite one another, like the halves of a clam shell, instead of overlapping as do the scales on the buds of most of our trees. Usually there are two smaller buds at the base of the terminal bud. All of the scales are in pairs, opposite each other on the twig; a crescent-shaped scar appears beneath each scale where the leaf was attached. These scars are large, raised and very noticeable.

1750 McCollars of other species of ash by

and heavy, standing opposite angles to the branch. When twigs appear clumsy, very orderly appearing are grey-

ish or greenish-brown. They are sometimes covered with a bloom, which, when rubbed off, leaves the bark shiny, showing plainly the large, pale lenticels, or breathing pores of the bark.

Instead of one large leaf-blade, each leaf consists of five to nine leaflets. The entire leaf is about ten inches long; at the end of the leaf-stem is a single leaflet below which are usually six leaflets, arranged in pairs. The leaflets are three to five inches long, about one and one-half inches broad, and are borne on a stalk one-fourth to three-eighths of an inch in length. This stalk on the leaflet of the white is much longer than on the leaflets of the other species of ash. The leaflets are broadly willow-shaped, dark green above, light green and often hairy on the lower surface. By midsummer the down has worn from them and they are perfectly smooth. The silvery color of the lower surface of the leaflet is peculiar to the white ash and gives rise to its name.

The flowers appear in May, before the leaves; the pollen-producing flowers are in dense, reddish-purple clusters, which turn yellowish in color when the pollen is shedding. The seed-producing flowers are borne in open clusters on separate trees; they are small, vase shaped and purplish.



Courtesy of the Manual Arts Press

THE LEAF OF THE WHITE ASH

The leaves are about ten inches long with five to nine leaflets which are three to five inches long and an inch and a half broad. When full grown they are usually smooth and dark green above and pale below. A few hairs are sometimes found along the veins on the lower surface

The fruit ripens in the fall and hangs on the trees, in clusters, far into the winter. The seed is one-half to three-quarters of an inch in length, resembling an oat-grain in shape. One end of the seed tapers to a point and is attached to the tree by a short stem; at the opposite end is a narrow wing about twice the length of the seed. Unlike the seeds of other ashes the wing is narrowed at the point where it joins the seed, and does not extend down the sides of the seed. In the black ash the wing completely surrounds the seed.

The wood is hard, strong, close-grained and tough. The heartwood is brown and forms a sharp contrast with the wide band of much lighter colored sapwood. The rings in the wood that mark each year's growth are set off plainly by lines of wide pores.

White ash grows rapidly for a tree whose wood is of such high quality. It has numerous insect and fungus enemies, none of which are very serious, and it is an excellent tree for mixing with white pine and other species in forest plantations for the producing of commercial timber. For ornamental purposes, its stiff, open habit of branching often affords a desirable contrast to bring out the beauties of trees with more delicate branch systems, like birch or beech. The foliage appears late in the season and falls early, but its soft, rich light-green color and the dense graceful masses of leaves, combined with the pleasing outlines of its well-proportioned top, gives value to the white ash for planting on wide avenues and estates. The finely divided root-system makes it easy to transplant. It grows well in decidedly wet, compact soils, although it is best adapted to drier situations. It is a good tree to plant near railroads or in other places

exposed to smoke, since it is less affected by smoke than the majority of shade trees.

In fall coloring the white ash is distinct from other trees. At first the entire mass of foliage turns purple



Courtesy of the Manual Arts Press

THE AREA OF WHITE ASH

then chocolate and from this to a violet brown, and finally to a salmon or yellow with a shade of lilac. When the leaves have faded nearly yellow they begin to drop from the tree.

It is not difficult to grow ash trees from seed. The seed should be gathered in the autumn. They may be sown at once or kept for planting in the spring by placing them on the surface of a garden walk, covering them with a box. A trench should be cut around the box to keep the water away. The seeds will not grow if kept too dry.

Commercial Uses of White Ash

SEVERAL species of ash are cut and marketed in this country, often without any attempt to distinguish one from another. Sawmills list ash without naming the particular species, and the woods of different ashes are so much alike that factories frequently have no interest in separating them. Their general uses are similar, and an examination of the lumber seldom reveals much difference in appearances or other qualities. The production of this lumber appears to run fairly even from year to year. There was a small increase from 1899 to 1900. The reported output for the whole country was 252,000,000 feet in 1907; 291,000,000 in 1909; and 246,000,000 in 1910. Much of the apparent difference was due to a difference in the number of mills reporting for the several years. The foregoing figures represent all the ash

lumber produced in the United States, and not white ash alone. Probably more than half of the total is white ash, and five or six other species make up the rest.

All of the early settlers east of the Mississippi River, and some west of it, encountered ash. Few farms were cleared without cutting this tree. Though it entered to a small extent into practically every use which the farmer, carpenter, mechanic, and lumberman made of wood, early writers mentioned it less frequently than some other

timbers because it was not peculiarly fitted for any special purpose, as some others were. Some of the first American ash in the market went to Portugal in lumber shipments from New England. Between 1712 and 1718 ash "rafters" to the number of 1,100 were bought in Portugal. Raftermen were blanks from which boat oars were made. This wood was

Character and qualities—Heavy, hard, strong, ultimately brittle; rings of annual growth contain several rows of large pores which occur in the springwood and in slowly-grown specimens occupy nearly the whole ring; medullary rays numerous and obscure; color brown, sapwood much lighter, often nearly white

Growth—Height 45 to 100 feet, diameter 3 to 6 feet

Supply—The commercial range of white ash lies in all states east of the Mississippi River and occurs west of that stream in Texas, Louisiana, Arkansas, Oklahoma, Missouri and Iowa



A FINE WHITE ASH

This tree is in South Park, Rochester, N. Y. The white ash usually reaches a height of seventy to eighty feet and in the open the crown is decidedly round topped and extends almost to the ground. In the forest the trees are usually tall and massive, clear from branches for a considerable distance from the ground, and with a narrow, somewhat pyramidal crown.

a commodity in the English market at an early date, and largely supplanted the ash from the Baltic Provinces. It was made into oars, as had been done in Portugal, and as is now done in the United States. The English employed it also for capstans, levers, bars, blocks, handspikes and pins.

Long before the Revolution the farmers of Susquehanna County, Pennsylvania, fenced their land with rails split from the unusually fine ash trees there. It is probable that the custom of putting ash to such use was general at that time, though the fact is not often mentioned in pioneer accounts. Ash splits well, and is an ideal rail timber in all things except that it has poor lasting qualities. Rails decayed in a few years.

It is recorded in the travels of John Lamson, early in the seventeenth century, that ash bark was good food for beavers. That seems a matter of trifling moment at the present day, but it possessed some importance at a time when

the skins of beavers constituted a considerable article of commerce.

Ash was one of the woods of which flax brakes were made when home-manufactured linen was a valuable article. Saddle trees and stirrups were among indispensable commodities in the making of which the wood was useful. Long-drawn splits bottomed rude chairs. It is said that the term "cane ash" dates from that custom. The splits were narrow, thin ribbons of ash, stripped from billets, and they were woven into chair bottoms and backs. They resembled the ribbons of cane or rattan commonly employed in chair work. The term "cane ash" is yet heard in some parts of the south, but is generally applied to extra fine timber without reference to the use that may be made of it.

Three long bows procured very early on the coast of Virginia by explorers, and now in the Ashmolean Museum, Oxford, England, are said to be ash. They show the use which the Indians made of this wood when they had the whole forest to choose from. The three bows at Oxford are highly polished and are nearly as black as ebony. The Indians probably strained or painted the wood.

White men made bows of ash in Virginia and elsewhere in the East, but not the kind used in archery. Such bows formed part of the equipment of heavy freight wagons. They arched six or seven feet above the bottoms of the wagon bed and the waterproof cover or



A WHITE ASH STAND

This is a typical and almost pure growth of white ash at Mount Glead, Ohio. On the left side the trees are too near together for proper growth and the poorer ones should be cut out.



Courtesy The Hardwood Record

LARGEST ASH LOG IN THE WORLD

It is forty-five feet long, measures fifty-one inches in diameter at the big end and thirty-five at the smaller. It is owned by the Southern Hardwood Company and was exhibited in the Industrial Parade at Nashville.

tent was stretched over them. Before railroads were built and such wagons carried freight long distances, the merchandise was kept dry by the goodness of the canvas cover and the reliability of the bows. One such wagon route led from Baltimore, Maryland, to Knoxville, Tennessee, and another from Philadelphia to Pittsburgh. The wagons on their long journeys usually went in caravans of from five to thirty.

In 1750 Peter Kalm, the Swedish traveler, saw the Swedes and Finlanders of New Jersey making bowls and dishes of what he called "ash knobs," and he wrote of it as though it was a common practice among them. The custom was not confined to New Jersey. The wood selected was a burl varying in size from a quart measure to two gallons or more. The interlaced and contorted fibers prevented the wood from checking or splitting. The bowls were generally made by hand, a rather slow and laborious process, but Joseph Dodderidge wrote of their manufacture about 1780 near the Ohio River as though they were sometimes made on a lathe. An ash bowl of the primitive kind is in the Hancock House collection at Lexington, Massachusetts. If it is a fair sample they were very crude utensils.

Ash is preeminently a factory wood. The annual sawmill output is approximately 250,000,000 feet, and nearly all of it goes to mills and shops to be further manufactured. The largest factory de-

mand is in the states of Wisconsin, Michigan, Illinois, Missouri and Arkansas. From 45 to 50 per cent of the entire cut of lumber in the country is converted into manufactured commodities in these five states. The articles are so numerous and of so many kinds that they can be treated only as classes. Almost every industry that use a wood in considerable quantity finds place for more or less ash. It is reliable in whatever position it is placed. Manufacturers in Michigan list it as material in 92 articles and it is listed for 96 in Illinois.



Courtesy Dunley Lumber Company.

ASH LOGS READY FOR THE MILL

The annual output of the sawmills is about 250,000,000 feet and nearly all of it goes to mills and shops to be further manufactured. Almost every industry that uses wood in quantity finds place for more or less white ash.

A large portion of the ash supply of the country goes to the farm in one form or another. The amount made into agricultural machinery, tools, and implements is large, as is apparent from a list of the more common articles of this class: cornhuskers, cornshellers, hay presses, shredders, manure spreaders, grain binders, plows, hay stockers, soil rollers, potato diggers, threshing machines, and feed cutters. Some of these are made partly of ash, and others almost wholly of ash.



Courtesy, J. G. Spalding & Brothers
BASEBALL BAT MADE OF WHITE ASH

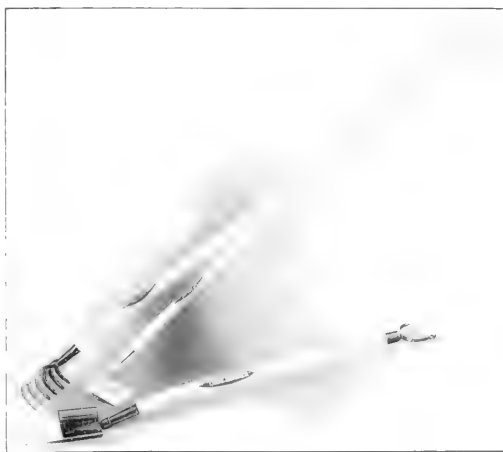
It is a great handle wood. Some of the handles belong to farm tools, others do not; but in all cases the wood is employed for handles because it is stiff and very strong. The preference which European farmers and gardeners show for American tools is said to be due in part to the excellent ash so generally used. Shovels and rakes are cited as particular cases. Other tools which are generally equipped with ash handles are pitchforks, hoes, spades and scoops. The same wood is often employed as handles for ice hooks, cant hooks, brooms, mops and whips.

Notwithstanding the almost universal presence of mowing machines on American farms, scythes are as numerous as ever, and the handle or snath is generally made of ash, as it has always been. The blanks of which snaths are made

are first split to insure against crossgrain, then steamed, and bent to the desired form. A century ago it was customary to use them without bending, and such are still in use in some localities, particularly in the mountains of North Carolina and among the descendants of French settlers in Louisiana. It is claimed that the largest ash tree on record was manufactured into scythe snaths.

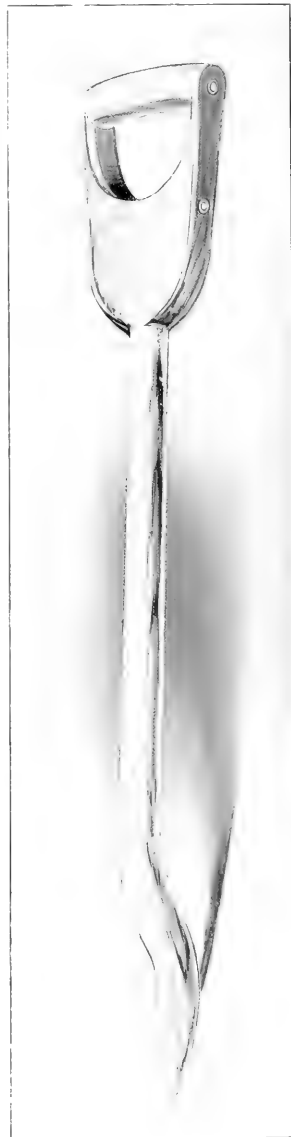
Baskets used by farmers and gardeners for grain, fruit and truck are often made of ash, particularly the hoops or bands which strengthen the thin splits constituting the woven frame of the basket. Singletrees, whiffletrees, eveners, and neckyokes are products made from even-grained ash.

The demand for ash in the boat industry has increased in recent years, though for a long time the use of the wood had been large. In Louisiana and Arkansas millions of feet of the best ash found in the primeval forests are yearly manufactured into boat oars. This commodity goes to all parts of the civilized world. For light oars and paddles, spruce is satisfactory, but for the heavier, stronger article,



Courtesy, American Fork & Hoe Company
WHITE ASH HANDLES

to its strength and toughness, white ash is particularly valuable for the manufacture of farm and garden tools.



Courtesy, American Fork & Hoe Company.

SPADE HANDLE MADE OF WHITE ASH



Courtesy J. G. Brill Company.

WHITE ASH IN STREET CAR CONSTRUCTION

White ash is used extensively in electric cars and auto busses, forming the principal body parts; i.e., the side and corner posts, and the slats for the seats. It is also used for the finish of the cars.

ash is supreme among our woods. Its stiffness leads to its employment in the lower frames of vessels, large and small, but particularly among the small. This wood forms the frames of portable boats, which sportsmen and explorers carry into regions not accessible to boats of the ordinary kind. Canvas skiffs with ash frames have played an important part in the exploration and development of Alaska and other remote northern regions. The old voyageurs dragged their boats, weighing hundreds of pounds, up rapids and over portages; the present day travelers roll up and transport on their backs boats

of equal carrying capacity and of one-tenth the weight.

Other articles of ash, which are useful in boat construction or on board, are handspikes, levers for capstans, tackle blocks, and pins for the attachment of cordage. For these purposes its chief competitor in early years south of New England was red oak, and hickory was and still is a competitor. Ash blocks for hoisting sail, and for loading and unloading, are yet much used on board vessels. This same wood is employed as finish in cabins and staterooms.

The use of ash for bows on which to stretch the covers of freight wagons has been continued from early times till the present. Vehicles of the prairie schooner type are now scarce, but wagons of many other kinds demand ash for bows. Numerous business vehicles are in this class. Missouri wagon manufacturers use 1,150,000 feet of ash yearly; those of Arkansas 2,600,000; Illinois, 2,200,000. In Michigan ash leads all other woods in the automobile industry, the annual demand being about 7,000,000 feet. It appears probable that the automobile industry in this country demands more ash than goes



Courtesy American Fish & Ice Company

FINISHED OX BOWS OF WHITE ASH



Courtesy American Fish & Ice Company

OX YOKES OF WHITE ASH

to the wagon makers. It is frame material and only best grades are acceptable. In horse-drawn vehicles a considerable quantity of ash is made into tongues of heavy wagons, poles of carriages, and shafts of buggies. It is employed as axles for heavy wagons. In lumber regions



Courtesy A. E. Chase Company

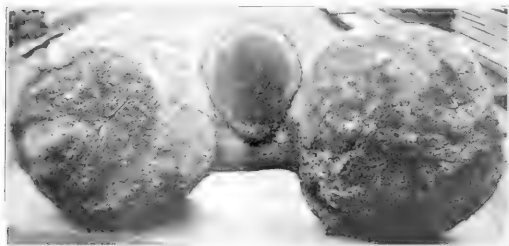
WHITE ASH FOR "TRAP STICKS"

The wood is usually used in the construction of musical instruments and this pedal trap work for pianos is made from the very best quality of solid white ash

it is in common use for log wagon rollers. In light vehicles, in addition to uses previously named, it is employed as frames for bodies, and thin boards are best for curved panels. Ash is made into vehicles of yet smaller size, and appears as parts of baby buggies, push carts, and hand sleds. Frames of sleighs and cutters are often made of this wood. Its strength and toughness lead to its employment as beds for coal wagons and stone carts.

Railroad cars owe much to ash. Some is employed a frames and other as finish. It frequently serves the latter purpose in suburban car construction. The entire finish inside is often of ash. More than 3,500,000 feet a year are used by car builders in Illinois, and nearly as much in Missouri.

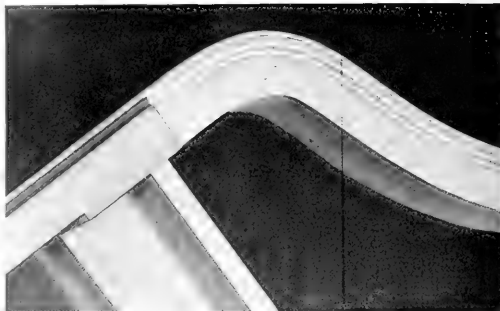
Ash is preeminently a wood for miscellaneous uses.



A GLOSSY WHITE ASH TWIN BURL

The burl is a result of the splitting and the burl is in demand

It is peculiarly suited for a few purposes, and is fit for almost anything that demands a hard, strong wood. A list of industries in which it is employed will show this. It was reported by the following industries in Illinois in 1911: Boats, butter tubs, boxes and crates, buggies and light vehicles, cars, chairs, slack cooerage, electrical apparatus, freight and passenger elevators, farm machinery, furniture, handles, incubators, machine parts, mantels and cabinet work, novelties and toys, musical



Courtesy A. B. Chase Company

GRAND PIANO RIM

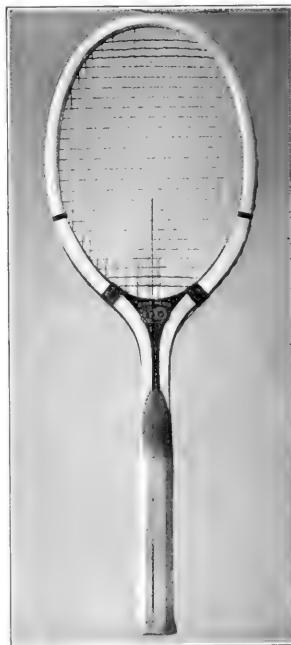
This is made in three layers, the narrow or thin layers being of white ash and the light and dark layers being a combination of white ash, maple and poplar

instruments, picture frames, refrigerators, sash, doors and blinds, window and door screens, school and lodge supplies, sporting and athletic goods, store and office fixtures, tanks, plumbers' woodwork, trunks and sample cases, vehicles, well and road machinery.

When it is remembered that each of these industries uses ash for a number of purposes, the general importance of the wood becomes apparent. For instance, it fills a hundred places in furniture, and appears as both outside and inside material, filling one place where strength is needed, another where hardness is the chief essential, and again where good appearance is sought.

Almost every musical instrument that uses wood of any kind has a place for ash. The largest pipe organ has it, and it goes into the mandolin, and nearly all instruments between these extremes owes something to this wood.

It is largely employed by the makers of athletic goods. A common article is the baseball bat. The best type, called "slugger," is usually of ash. The bunnisher, a tool which smooths the bat, hardens the surface by friction, so that the impact when the ball strikes does not dent the wood. Tennis rackets and croquet sets are frequently made partly of ash



Courtesy A. G. Spalding & Brothers.

WHITE ASH IS MUCH USED IN TENNIS RACKETS



Courtesy Dudley Lumber Company.

ASH IN A LUMBER YARD

Ash is usually cut as thick as possible, to the advantage of the log, and to produce the best quality of thick stock. The low grade is undesirable in thick lumber and is usually cut into 4/4 x 5/4 thickness.

Bent rims, the kind used in the manufacture of circular measures, sieves, and cheese boxes, are made of no better wood than ash. It bends without splinters parting from the surface.

A very small but highly important use for ash is in the construction of aeroplanes. Wood of great strength, stiffness and of moderate weight is demanded. Ash is

not equal to spruce in this respect, but is next to it. A property of ash which greatly increases its value for airships is its straight grain. It is possible to cut long pieces with little or no crossgrain, though to do so the logs must be carefully selected. Ash appears in the propellers oftener than in the frames. Some builders construct the propellers of narrow strips glued together, thereby lessening the liability of unseen defects in the wood. A built-up propeller may contain a strip of ash in the middle of each blade.

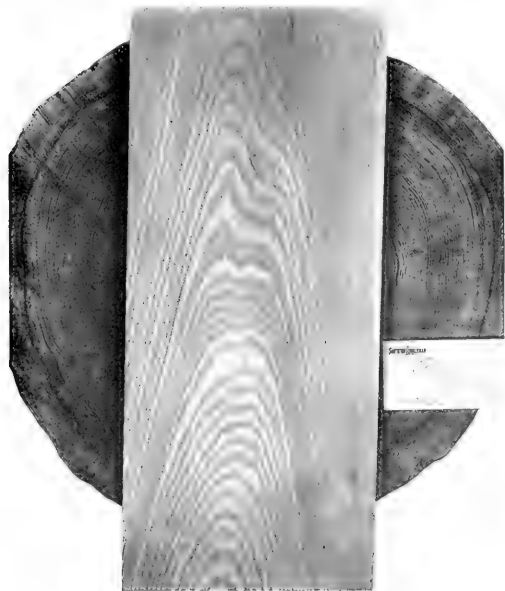
The strength of ash leads to its use as sucker rods for pumping oil wells. These are slender pieces of wood, joined end to end, and aggregating great length. They reach from top to bottom of deep wells. A weak wood could not stand the strain but would pull apart.

The use of ash as flooring and interior house finish is of great importance. The difference in hardness between the

spring wood and summer wood of the annual rings causes unequal wear, and this lessens ash's value for flooring, but this has no effect on it when employed as interior finish. Stair builders find it valuable, particularly for newel posts, capitals, and other turned work of large size. It is sometimes shown with the natural grain, and sometimes artificial grain is imparted with a camel's-hair brush to imitate quartered oak. Parquetry flooring is one of its uses, and wainscoting another.

It holds a place of considerable importance in cooperage. Its open pores exclude it from most places in tight cooperage, but it is serviceable as pork barrel staves. Slack coopers are able to use it for many containers. It is excellent fuel, and has always been in demand for that purpose, but in late years its increased value has caused it to be diverted to other uses, except inferior trees and the waste from sawmills and factories.

(Much of the information in this article was secured by the courtesy of the United States Forest Service.)



Courtesy of the Southern Lumberman

WHITE ASH BOARD

WHAT BIRD DESTRUCTION COSTS

COLONEL G. C. SHIELDS, president of the League of American Sportsmen, says the destruction of birds costs this country the stupendous sum of \$1,000,000,000 a year, and supports the statement by statistics which deserve to be studied by every citizen who desires to be informed upon a question in which this whole nation has a profound interest. Because quail, prairie chickens, meadow larks and other birds which feed on bugs and insects of many kinds have been swept away by thousands, the cotton growers of the South lose \$100,000,000 a year by the depredations of the boll weevil.

Rock Avalanches

BY GUY ELLIOTT MITCHELL

"Beware the pine tree's withered branch,
Beware the awful avalanche."

BUT the avalanche bringing down hundreds of tons of packed snow, which is feared by the foresters and mountaineers of the West, is a mere mimic phenomenon compared with the tremendous rock avalanches which occur occasionally in various portions of the North American continent. The snow avalanche may sweep a trail some scores of feet wide for a distance of a mile or more down the mountain side, shattering to kindling wood, it is true, every tree in its path; rock avalanches, however, have scalped entire mountain faces, many feet deep and thousands of acres in area, removing millions of tons of rock and soil, covering entire valleys with the débris, damming streams and forming sizeable lakes. Rockslides of enormous magnitude have poured down the mountain sides in Alaska and British Columbia, but in the very heart of the United States—in the magnificent San Juan Mountains of Colorado—are probably the most extensive American rock slide areas.

Rock or land slides are of several sorts. They may

result from a breaking away of a rock mass—perhaps an entire portion of a mountain of unstable equilibrium as in the case of the great Frank rock slide later referred to—when the falling mass sometimes smashes to fragments and flows down the slope with incredible swiftness, or the slope of the mountain may have an underlying stratum of sand, or slippery clay, or other material which in an exceptionally wet period will not stand the weight of the overlying mass, or the slide may be surficial—the removal of a few feet of mud. In any case the destruction in the affected area is usually complete, while in a rock slide of first magnitude objects may be buried by a flow of broken rock to a depth of 100 or more feet. And when one of these unstable areas gets ready to slide, not all the engineering resources in the world could stop it, nor does it take more than a few seconds to do its work, leaving a sweep of waste of a hundred times greater magnitude than the most terrible avalanche of snow and ice.

The last destructive landslide in the San Juan Mountains was fortunately in an uninhabited area. It occurred



ROCK STREAM (MOGON BASIN)

The crumbling of the mountain peak which resulted in this great rock flow, greatly reduced its bulk and lowered its altitude by probably several hundred feet. This tongue of "flow" is three-quarters of a mile long. It is a talus or "shale glacier" and is between the old and new avalanches of the famous Carol Beck mine.



ROCK STREAM AT SILVER BASIN

Viewing this enormous rock pile from a distance, one is impressed with its likeness to a great tongue of some viscous substance. The singular, billowy surface also suggests a slow, lava-like flow. All observed rock flows, however, have been of lightning-like rapidity. It is at the head of Silver Basin, San Juan Mountains, in Colorado.

less than a generation ago in the Cimmaron Creek Valley, covering several square miles, and every living creature in the stricken area was doubtless killed outright. The scene of the slide was visited within a few days by Whittman Cross, then as now a geologist of the United States Geological Survey, accompanied by a photographer. The area had been well timbered, but the trees were all overturned, broken down, or standing at various angles, presenting a weird and grotesque picture. Slopes were exposed bare and many fissures gaped widely. Yet this slide, Doctor Cross says, was largely surficial—a soil slip rather than a rock or land slide—and not to be compared to a real rockslide. In another locality in the San Juan Mountains the C. H. C. Hill, near the town of Rico, progressive slipping is actually in effect at the present time and there seems to be no guarantee that the Cimmaron slide may not at any time repeat itself at this point. At one place near the town the stump of a tree has been split apart since the tree was felled and the two portions were recently observed by Doctor Cross to have separated about 5 feet in a period of four years. This earth crack was traced for several hundred feet. Any unusually wet period, such as Doctor Cross believes

to have caused the Cimmaron slide, may precipitate a catastrophe at this point.

It is the injection of the human element which largely determines the importance of natural catastrophes. The San Francisco earthquake a hundred years ago would have been of comparatively slight importance because but few people would have been affected. On the other hand, were the New Madrid earthquake of a century ago to now repeat itself, instead of terrorizing a few scattered pioneers in the Mississippi Valley it would probably kill a host of people, destroy big cities and cause incalculable damage. The eruption of Vesuvius or Etna is always a terrible calamity because of the thousands of inhabitants clustering on the slopes of the mountains; yet two years ago Mount Katmai, in an almost uninhabited section of Alaska, erupted with far greater violence than the worst Vesuvian outbreak and since no one was killed it has been looked upon principally as a most interesting natural phenomenon. On the other hand a prospective landslide of 40 or 50 feet of earth a few years ago at Mount Vernon would have been a national calamity. Fortunately this approaching slide was taken in hand in time, the dangerous under-

drainage was diverted and the home and tomb of Washington saved from slipping from its bluff into the Potomac River. But the lady regents who manage Mount Vernon may well at their annual May meeting appoint each year a committee to examine the small drainage tunnel which was cut to divert the water from the Washington grounds, and observe carefully that it is doing its duty. Were these the days of soothsayers, one of them might safely prophesy:

greatest of the earlier catastrophes, known as the Silver Mountain slide, has, along with many others, been mapped and described by the Geological Survey. It covers 12 square miles and the amount of rock which crashed down the steep mountain sides can be estimated only in hundreds of billions of tons.

With the true rock avalanches, it is the younger mountain systems, geologically speaking, which are most subject to convulsions. Those of the Himalayas which—



ROCK STREAM AT HEAD OF AMERICAN BASIN

Great as was this rock flow, in comparatively recent times, there were thousands of others incomparably greater in the early history of the San Juan Mountains in Colorado. The surfaces have been converted to the untramed eye

into soil and overgrown by forests and the evidences of sliding obliterated

"When the stream which drains Mount Vernon runneth dry,

Then the ancient home of Washington shall die."

The landslide areas of Colorado show that in long gone prehistoric ages, comparatively recent geologically but many hundreds of centuries before the first man, there must have been terrific disturbances in these mountains. The evidence is plain that there have been thousands of slides, some of them of enormous magnitude. Possibly the great saber-toothed tiger which ranged the valleys below and the prehistoric animals upon which he preyed may have heard the terrifying roar of the descending rock masses, but man was not present. One of the

though of course millions of years old—are comparatively recent examples of mountain building, have constant slides which would constitute great catastrophes were their slopes and valleys populated. Sir William Conway describes an instance of rock tumbling where the spur of a large mountain mass pitched bodily into the valley below. The front of the mountain had been undermined by springs, and in a twinkling of an eye a large part of the mountain slid down and shot across the valley, damming its river with a lofty wall, and forming a large lake. Masses of rock were hurled a mile away, blocks of limestone weighing 50 tons being sent through the air like huge cannon shots. This slide carried with it at least 800,000,000 tons of rock and debris. Many



Photo by Whitman Cross, U. S. G. S.

SLUMGULLION MUD FLOW

At the head of Slumgullion Gulch, Colorado, 11,500 feet altitude, the underlying rocks, having become decomposed into mud, were unable to hold the weight of the overlying rocks and the whole mass flowed down the gulch. The flow was six miles long, and dammed a fork of the Gunnison River, creating a lake. The sparse tree growth shows

that the flow occurred many years ago.

such Himalayan rockslides have been recorded in the last half century, while among the remote and uninhabited regions of the great ranges numbers more are of constant occurrence. The formations of the Colorado landslide area point to many slides in the past even more stupendous than these. Fortunately this wholesale catastrophe era is ended for the mountains of the United States although the recent Cimmaron slide shows that all danger is not past, while the rock avalanches of the Alps and Alberta indicate that man's mining operations may precipitate such disasters.

Apart from the study of landslides with reference to the safety of human life, there is economic value in their investigation as bearing upon man's search for the precious metals. The geologist and the mining engineer look for coal and for metalliferous deposits in certain rock strata, and in undisturbed rock formations these strata are fairly regular, at least their position can be generally determined. There may be rock faults but these the keen geologist can trace. However, it is evident that even a geological wizard or a John Hays Hammond must be perplexed when the surface of a mountain slides off and two or three strata come tumbling down

and spread themselves over the slopes and valleys to depths of from ten to one hundred feet.

Doctor Cross, of the Geological Survey, says that the failure to recognize the true significance of the landslide phenomena has led to very great loss of time, labor and money in prospecting of the Rico Mountains in Colorado. The reason that much of the areas prospected have not been recognized as landslide in character is because the great slides of the San Juan region occurred long ago, and many of the surface traces have been obliterated.

Landslides are believed to be due generally to moisture which undermines foundations. In the San Juan, the upper strata are porous volcanic and conglomerate rock and these rest upon a sandy shale. There is no drainage, and consequently at times this unstable foundation becomes insufficient. The earlier physical formations of the San Juan Mountains were much bolder than at present. High, narrow ridges and peaks prevailed but the sloughing of billions of tons of their materials has greatly reduced the relief of the country. Many of the rockslides of the San Juan region have taken the form of veritable flows or rock streams. When seen from a distance these resemble glaciers covered with debris. To realize the terrific effect of recent landslides when asso-

ciated with human activities and to picture what would have been the result had a thriving mining town been in the pathway of even the small Cimmaron landslide, one



Photo by Whitman Cross, U. S. G. S.

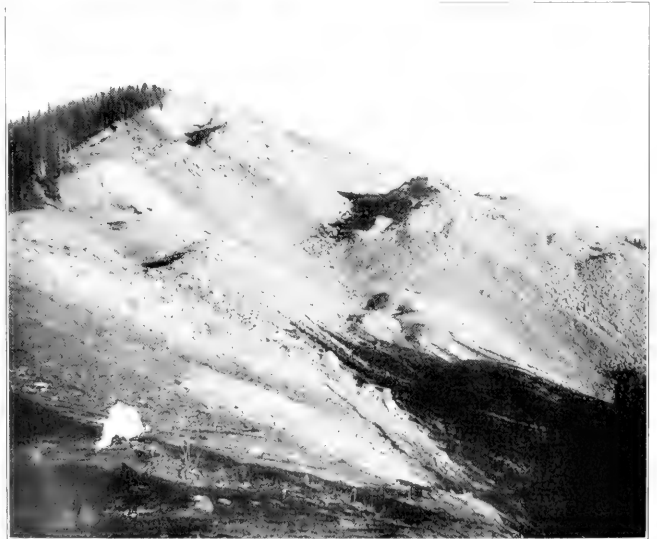
LIZARD'S HEAD

Once upon a time this lofty pinnacle in Colorado, 14,000 feet high, bore no resemblance to a lizard's head. That was before the major portion of the peak broke away from its moorings and crashed down the mountainside, a rock avalanche constituting millions of tons of stone.

must turn to the account of the great Elm landslide in Switzerland in 1881 or the Frank slide in Alberta in 1903.

The town of Elm is the highest village in the Serf Meadow. Overshadowing it rose the steep Plattenbergkopf, the outmost buttress of a greater mountain mass. About half way up this hill was a slate mine. A creek began to form above the mine, which became twelve feet wide, swallowing up all surface drainage. It was believed that the mountain would ultimately fill, but no one thought the danger imminent. Rocks began to fall at intervals. September 11 was a rainy Sunday. Rock masses kept falling and the mountain groaned and rumbled. People gathered to watch the falls, interested but not alarmed. Yet the villagers might better have lingered to witness a hundred-ton dynamite explosion. Suddenly a mass of the mountain broke away from the east side of the Plattenbergkopf, crashed down over the slate quarry and spread away over the flat. No one was killed by this fall, though the rocks reached within a stone's throw of where the sightseers were gathered. The people of the upper village now took mild alarm. A few minutes after a second and larger rock mass tumbled down over the west

side. The gashes made by the two united below the slate quarry and left the enormous mass of mountain isolated and unsupported. Then four minutes later those who were watching the phenomenon from a distance beheld the whole upper portion of the Plattenbergkopf—12,000,000 cubic yards of rock—suddenly shoot down the hillside. The great mass pitched forward with tremendous velocity until it reached the slate quarry. Then the upper part shot forward horizontally straight across the valley and up the opposite hillslope. A great wind was flung before it, which blew trees about like matches and lifted houses through the air like feathers. The avalanche, shooting with incredible swiftness across the valley, struck the opposite hillslopes obliquely and was immediately deflected like water down the level but fertile valley floor, which it covered in a few seconds to the distance of nearly a mile and over its whole width—a million square yards—with a mass of rock debris from ten to sixty feet deep. Before the avalanche there lay a peaceful village and fertile



FACE OF LANDSLIDE MOUNTAIN

The slopes of many mountains in the landslide area of Colorado have been scalped bare of every vestige of vegetation. With tens of thousands of tons of rock descending like a flash, the most heavily wooded mountain sides are swept like grass before a prairie fire.

grain fields; within twenty seconds a solid gray carpet had been spread, beneath which rested the remains of 150 human beings, their houses and their fields. The rock torrent had swept away half the village, its sharp edge cutting one house in two. All within the fatal edge were destroyed; all without were saved.

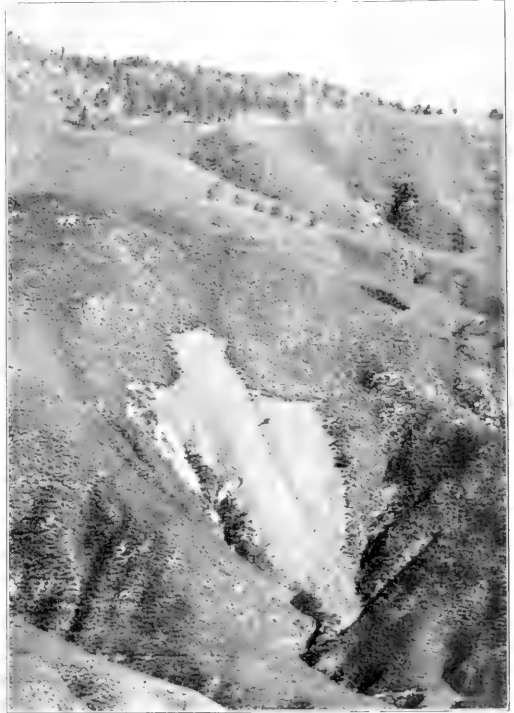
More recent than the Elm rockslide and nearer home was the disaster which ground to atoms part of the town of Frank, Alberta. Frank, an important coal mining center, is overshadowed by Turtle Mountain, a precipitous series of cliffs arising some 3,000 feet above the valley. Without warning, on April 29, 1903, a huge rock mass half a mile square and several hundred feet thick broke away from the mountain and plunged into the valley beneath, breaking into innumerable fragments and hurling itself up onto the opposite slopes to a height of 400 feet. Within a minute a square mile of pleasant valley was covered with jagged rocks from 3 to 150 feet deep. Provisionally the greater portion of the town lay outside the course of the rock deluge; nevertheless seventy people were killed. One man, hearing the fall of the mountain, ran to his door in time to see the slide flash by, only a few feet in front of him. Another, hearing the noise, looked in time to see the fall of the mountain and almost instantly the spread of the material over the valley like a viscous fluid. Yet some of the rocks constituting the flow are forty feet square. Over two miles was traversed by the flow, which constituted 40,000,000 cubic yards of rock. It is believed that coal mining in the valley hastened the slide, nevertheless Turtle Mountain undoubtedly possessed a weak base. As it was, only one peak of the mountain slipped. Had the steep shoulder which looks directly down upon Frank gone, too, the entire community would have been engulfed. The Canadian Geological Survey investigated the phenomenon and warned the people to move up the valley, away from the mountain; the second peak, too, might go at any time. Little attention, however, was paid to the warning, so heedless is humanity, until winter before last, when the fearful groaning and grinding in the mountain told the inhabitants of the town in unmistakable terms that they stood in the pathway of imminent destruction; then the entire community hastily emigrated up the valley beyond the possible grasp of their fearsome neighbor.

HUGE NATURAL ARROW

FEW more singular natural phenomena can be found anywhere in the country than the great arrow head which may be seen on the desert-like slopes of the Coast Range in California. Strange, too, that this arrow should point directly to water in a part of the country where water is recognized as the most vital of Nature's gifts.

In 1851 Captain Hunt, leading a band of Mormon immigrants, descended the western slopes of Cajon Pass, California, after a journey of 500 miles across the Great American Desert, and beheld before him a smiling and well-watered valley, such as had not greeted his tired eyes and those of his companions since the departure of the caravan from the slopes at the base of the Wasatch Mountains, in Utah. On the mountain side near the Cajon Pass the travelers beheld the perfect form of a gigantic arrow pointing directly to a terrace at the base of the mountain where the few Spanish inhabitants of the valley told them great springs of healing waters

gushed forth. This arrow head is about 1,500 feet in length and perhaps one-half as broad. It is due entirely to the barrenness of the soil and the light color of the growth within its area as contrasted with the surrounding dark green chapparal. To the Mormon immigrants, however, as to the Spaniards who had preceded them,



INDIAN ARROW HEAD

One of the most singular natural features of the Pacific Coast of California is a gigantic, barbed arrow head which, strangely enough, points directly to a group of springs with medicinal and healing properties.

and particularly to the aboriginal Indians, such a matter-of-fact explanation as this did not suffice. It was to them the symbol placed upon the mountainside by the unseen hand of the Supreme Being to guide them to the healing waters at the base of the slopes.

The hottest of the waters that rise from this group of springs has a temperature of 202 degrees, and the discharge from all the various associated springs, some hot and some lukewarm, amounts to several thousand gallons a minute. A resort has been built adjacent to some of the more important of the springs and their water is used in bathing pools and for medicinal purposes. Water from other of the springs escapes to the stream flowing from Waterman Canyon which is taken out at the edge of the valley and used, as are other waters from these same mountains, for irrigation of orange orchards in the lower lands. The hottest spring of the group is called El Penyugal. Another, and a cool spring, Fuento Fria, is located about one-quarter of a mile north of the present hotel.

The Annual Meeting

THE thirty-fifth annual meeting of the American Forestry Association will be held at the Copley-Plaza Hotel, Boston, Mass., on Monday and Tuesday, January, 17, 18, 1916.

The chief feature of this meeting will be reports and discussions concerning the effort to secure an extension of the appropriation for the continued operation of the Weeks Law. This is so important to New England and the Southern Appalachians in particular, and to the whole country in general, that a larger attendance than at any other annual meeting of the Association is expected, and desired.

On the evening of Monday, January 17, there will be a joint forestry banquet of the American Forestry Association, Massachusetts Forestry Association, and all the other forestry organizations in New England, at which are expected as speakers a member of the Cabinet and several of the leading men of the country.

Tickets for this banquet are \$3.00 each. Reservations for it are desired at once.

Send in orders, with or without the money, to P. S. Ridsdale, Secretary American Forestry Association, Washington, D. C., or Harris A. Reynolds, Secretary Massachusetts Forestry Association, 4 Joy Street, Boston, Mass.

Those desiring special tables of six or eight for special parties will please give notification as soon as possible.

The program for the two days' meeting is as follows:—

Monday, January 17 -

9.30 a. m.—Meeting of the Board of Directors.

2 p. m.—General Meeting.

Welcome by the President.

Report of the Secretary.

Report of the Treasurer.

Appointment of the Nominating Committee.

Addresses—The Weeks Law Situation.

New England Forestry Problems.

Municipal Forests.

Report of the Nominating Committee.

Election of Officers.

General Business.

7.30 p. m.—Joint Forestry Banquet.

Tuesday, January 18 -

10 a. m.—Addresses.

The National Forestry Situation.

Forestry and Lumbering.

Suggestions for American Forestry Association Work.

City Forestry and Its Future.

2 p. m.—Addresses.

State Forestry organizations and Problems.

State Fire Protection Work.

The War on Destructive Tree Insects.

White Pine Blister Rust Menace.

4.30 p. m.—Meeting of the 1916 Board of Directors.

Adjournment.



MR. CHESTER W. LYMAN, OF NEW YORK CITY
Director of the American Forestry Association

CONSERVATION is an important factor in "preparedness." When the supreme test of war comes it is vital for a nation to have natural resources available as well as men and munitions.

Conservation ensures the perpetuation of the industries dependent upon natural resources, and when one nation is pitted against another in a life and death struggle industrial supremacy may determine the result. So the present war should give us a conception of conservation vastly more impressive than any considerations of sectional, temporary or mercenary advantage. We must have natural resources in abundance back of our fleets and forts for adequate defense of the nation's life, and conservation is the constructive principle essential to this end.

CHESTER W. LYMAN.

How Cigar-box Wood Is Secured

By C. H. PEARSON

THERE is perhaps no tropical wood better known than the so-called Spanish cedar of the West Indies and the Spanish Main. It is often referred to as cigar-box cedar, because the bulk of this wood is used for making cigar boxes. In the European trade it is known as cigar or sugar-box wood, since the term cedar as used in the American trade has at present no botanical significance and is, therefore, too confusing to be applied to a wood that belongs to the mahogany family of plants. The name cedar was originally given to this tree because of its resemblance in fragrance to the European cedar or sabine which is a cone-bearing tree known in Spanish as *cedro*.

Botanically speaking the term cedar should be applied only to certain species of the large group of cone-bearing trees, but it has long since been used as a generic or comprehensive trade name for the woods of a good many distinct kinds of forest trees. Some of these grow in America, some in Europe and others in Asia and Africa. The cedar of Lebanon, used so extensively in ancient times in the construction of temples and other large edifices, is famous in Scripture. The tall deodar of northern India produces the fragrant and most durable wood known in the trade as Indian cedar. The Atlas

cedar of northern Africa is another important wood to which the name cedar may be correctly applied. There are at least twelve distinct species of coniferous trees in the United States and equally as many in other parts of the world that are called cedar. In addition to these there are about thirty species of broad-leaved trees the woods of which are designated either locally or in the large markets as cedar or *cedro*. Chief among these are ten or more species of *Cedrela* to which the cigar-box wood belongs. These species are confined largely to the tropical parts of America and the most important one of them is the cigar-box wood, *Cedrela odorata*.

The generic term *Cedrela* was the original common name of the closely allied mahogany tree which grows in the same region as the cigar-box wood. The specific name *odorata* was given to this species because of the aromatic odor which can be easily detected in all parts of the tree. The leaves and small twigs contain numerous minute oil glands which, when crushed, give off a fragrance that can be detected for a considerable distance. The leaves and twigs are collected in parts of Cuba, Costa Rica and Nicaragua and used for distilling the commercial cedrelawood oil, which is sometimes used to give cigar boxes made from spurious cigar-box wood



CEDAR SLICES ON THE WHARF AT PORT OF SPAIN, TRINIDAD, READY FOR SHIPMENT

Practically all of the cedar sliced in this port goes to Hamburg where it brings from forty to sixty-five cents a cubic foot and has been sold for as high as seventy cents. With the steadily decreasing supply it is certain that the price will advance.



A CEDAR NEWLY CUT AND SQUARE TRIMMED FOR MARKET

The cigarbox tree is generally from eighty to one hundred feet high when cut and of from four to five feet in diameter above the root swelling. The trunk supports a massive crown which spreads gracefully over an immense area. It is usually broad and flat topped especially in the open.

the desired fragrance. The oil is exported to China, where it is known as ch'unshu or hiang ch'un.

Cigar-box grows in the warmest parts of America and is found in abundance in Cuba, Jamaica, St. Domingo and other West Indian Islands; it has never been reported from southern Florida, where its close ally, the mahogany, thrives on some of the keys and parts of the mainland. The bulk of cigar-box wood at present comes from Mexico, Central America and South America, where it is said to enjoy a wider geographical range than any other tree species. It is well known that this wood is exported from Colombia, Venezuela, Trinidad, and the Guianas, but it has not yet been satisfactorily determined whether the so-called cedar from the Amazon River valley and that which has been shipped from points along the Parana River in Argentina is the true cigar-box wood of commerce. It is probable, however, that the wood obtained in Brazil and in the country farther south is from several entirely different species, as the structure of the wood and the almost entire lack of odor indicate.

In its native state the tree grows in those regions where vegetation is abundant and the climate is warm all the year round. The soil and climate of tropical America are naturally adapted to the production of this important timber tree and there is no reason why the territory lying within its natural range of growth should not produce a large surplus of this wood which, next to mahogany, is

by far the most important kind that is now being shipped from tropical America to this or any other country. In nature the trees are seldom found in large clusters or groups, but singly and often much scattered. This does not argue that the tree would not grow well close together or in what the forester calls a pure stand. In fact, there are already a number of plantations which have proved successful and they are generally regarded as a source of considerable wealth. Many individual trees show a remarkable growth for their age. Trees only 16 years old have attained a height of 50 to 60 feet and a diameter of 1 to 2 feet. The rapid growth of cigar-box wood makes it suitable for reforesting the denuded areas in tropical America.

Mr. H. H. Markley in the May (1915) issue of *La Hacienda*, describes a plantation of 300 trees, 27 years old, which at the prevailing price of this wood is worth \$10,000. These trees were planted from nursery stock about 12 or 14 inches high in five rows at a distance of 18 feet apart each way. They received no care except that which resulted from cultivating the cocoa trees among which the young trees were planted for shade. There are a number of larger plantations in existence. One of these plantations in Mexico has about 20,000 trees, which at the present price of the wood will be worth one-half million dollars after the trees have attained merchantable dimensions. There is every reason to believe that the propagation of this tree under or-

dinary conditions can be made a very profitable undertaking on most of the denuded or otherwise unutilized areas in the West Indies and the mainland of tropical America. In common with all the other species of *Cedrela*, it may easily be propagated by seed or by cuttings and layers. It produces large quantities of seeds at a comparatively early age, and in locations where the soil is suitable the young trees spring up naturally in great abundance.

The cigar-box tree is usually of considerable size, generally from 80 to 100 feet high, but in some localities it attains a height of 125 feet. When it arrives at maturity it is one of the monarchs of the forest, often measuring 4 or 5 feet through above the root swelling. Occasionally trees are found in the forest that measure 9 feet in diameter 10 feet above the ground. As do practically all trees of the mahogany family, the trunks develop enormous buttresses which extend 8 or 10 feet above the surface of the ground. Above this root swelling the stem is usually round, straight and cylindrical, especially in locations where the trees have grown up in a forest or are surrounded by other lofty trees. The bark of the trunk is at first smooth and gray, but later in life it becomes rough and takes on an ashy-brown color. The trunk supports a massive crown which spreads gracefully over an immense area. It is usually broad and flat-topped, especially in the open; in the dense forest it develops a more or less cone-shaped crown. The small twigs give rise to beautiful foliage, bright, glossy and light, clinging so long to the spray as to make it almost evergreen. The flowers are pale yellow and arranged in large drooping panicles resembling those of the well-known Chinaberry tree. The fruit is a dry capsule, brownish in color, and about the size of a large plum.

Cigar-box wood generally comes on the market in the squared condition and free from sap; the latter is usually very narrow in old trees and of a reddish-white color. The heartwood is of a cinnamon-brown color. It is moderately light in weight, soft, strong, very durable in contact with the soil, works and splits easily, is susceptible to a high polish, shrinks and warps very little, has a very pleasant odor which it retains indefinitely, and possesses a bitter taste. The wood contains a gummy substance or semi-resinous juice, which tends to preserve it from attack of fungi, white ants and marine borers. The quality of the wood varies much according to the situation in which the trees grow. The wood obtained from trees grown on rocky upland soil and exposed to dry conditions is usually much harder, darker and susceptible of a higher polish than that from low, moist situations. In Trinidad the trees with hard and heavy wood are locally known as balata cedar, because the bark of the trunk is nearly similar to that of the balata tree. The Cuban growth is usually regarded as the best for the majority of uses to which cigar-box wood is put. The wood produced in wet or periodically flooded regions, as is the case in parts of southern Mexico and in the Amazon River valley, is very soft and frequently develops an excess of gum in its pores. Upon exposure to heat and light this gum diffuses in irregular spots de-

preciating the value of the wood. Careful buyers of cigar-box material reject wood having this defect.

The importance of opening new territory which has not yet been culled of its cigar-box wood has long been felt. Several decades ago large quantities of this wood were to be found in easily accessible places in Cuba, Jamaica and Trinidad and along all the rivers in southern Mexico and Central America, but with the constant demand for high-grade cigar-box wood the bulk of the best trees have been cut and shipped. At present nearly all the available timber of this species is far removed from the larger streams which are the only means for trans-



STUMP OF A CEDAR 156 YEARS OLD

This tree was cut on Trinidad Island in 1912 where it is best known as Balata cedar because the bark is somewhat similar to that of the Balata tree. The quality of the wood varies much according to the situation in which the trees grow.

porting the logs to the shipping ports. As a result of this there has been an advance in price of cigar-box wood which many regard as considerable; but as a matter of fact, it represents no more than the increased cost of production including the increased cost of transportation. The permits to cut this wood cost more than they did formerly and the available trees are further back from the streams and often extensive improvements must be made to get the logs out at all. Labor costs more than it did ten or twenty years ago.

There is a pronounced feeling among many of the leading exploiters that still higher prices could be obtained for this valuable wood, upon the score of its intrinsic merit. It has a greater strength and is incomparably better than any other, with an equal degree of softness, for making cigar boxes. It will be seen that in this use a matter of 10 or 20 cents more a cubic foot, while apparently a large increase in price, would in fact be so

small a percentage of the price of the finished article as to be negligible. Long use of this wood for cigar boxes has demonstrated that as a matter of economy to the users it would stand an increase in price of 25 per cent and still be an economical material to be employed for that purpose. In Havana the wood sells for about \$100 to \$150 per thousand board feet. The range of prices (New York inspection) for the Cuban wood is from \$80 to \$110; for Mexican from \$60 to \$120, and for Central American grades from \$60 to \$90 per thousand board feet. These prices are quoted in the New York markets for logs scaled by the one-fifth rule. Although Cuban wood is considered the best, the growth from Trinidad has in recent years taken the lead in price. Practically all of the cigar-box wood produced in Trinidad goes to Hamburg, where it brings from 40 to 65 cents per cubic foot, and has been sold for as high as 80 cents.

It is not likely that the use of the wood will decrease. It seems that the increase in importation and use of the wood now depends greatly upon the development of sources of supply. At present the grand aggregate supply for the world's use appears to be at a standstill, but there are immense resources of this wood in the tropical countries and it can be a matter of but a few years before new districts will be opened up and perhaps the old ones further developed so that the supply will be temporarily increased. The extent of its use is likely to be limited only by the supply. The imports of cigar-box wood entered for consumption in the United States show a steady increase, their value in 1914 being nearly a million dollars.

The principal points from which cigar-box wood is exported are Tecolutla, Frontera, Cazonas, Laguna, Santa Ana, Chiltepec, Campeche, Coatzacoalcos, Minatitlan, Nautla, Tonzala, Cheucan, in Mexico, and also from a few points on the west coast. The chief ports in Central and South America are Belize, Panama, Colon, Porto Cabello, Carthagena, Puerto Colombia, Maricaoibo, Georgetown, Para and Bolivia. A good deal of the material comes from points on the islands of Cuba, Hayti and St. Domingo, Jamaica and Trinidad.

The uses of cigar-box wood do not vary except that perhaps they are becoming more restricted. Its principal use in this country and in Europe is for making cigar boxes. It is made also into furniture of all kinds and is much admired for its rather close grain and beautiful satin-like luster resembling true mahogany. In fact cigar-box wood is considered by many a near equivalent to true mahogany for many purposes. In tropical America it has as many uses as the white pine has in this country. It is recommended for house construction and especially for interior trim, because white ants are said not to attack it. This is ascribed partly to the strong odor it exhales and also to the bitter taste of the wood itself. Another important use for this wood is for shingles, which are said to outlast those made from any other tropical wood. The logs coming into this country are too expensive to be converted into shingles and it is safe to say that fully 80 or 90 per cent of the logs entered

here go to the cigar-box factories to be manufactured into shooks and in this form are shipped to the various cigar-making centers like Tampa and Key West.

PRIZE FOR FIRE PROTECTION

IN ORDER to reduce the danger of fire after lumbering, the Vermont Forestry Department offers a prize to the lumber company that makes the best disposition of its slash during the winter of 1915-1916. The prize offered is the maintenance during the fire season of 1916 of a state or federal patrolman to protect the holdings of the company making the best effort to protect itself. This patrolman will be in addition to the regular force which has been maintained the past two years.

In offering this prize the Forestry Department does not impose any impossible conditions. It does not specify in what way the slash shall be disposed of. It does not require that the slash throughout a cutting shall be disposed of. It may be on a strip along the edge of the cutting. It is, however, stated that no applicants will be considered who have not made some disposal of slash over an area of at least 100 acres.

A NATIONAL FOREST ABOLISHED

THE President, upon recommendation of Secretary of the Interior Lane and Secretary of Agriculture Houston, has signed a proclamation abolishing the Kansas National Forest, to take effect on December 1, 1915. This National Forest is located in Finney, Kearny, Grant, Hamilton and Haskell Counties, comprising the sand-hill region of Western Kansas, and the public lands therein aggregate 138,729 acres of the total of 262,787 acres within its exterior limits. Of these 138,729 acres, 3,022 are withdrawn pending proposed legislation to reserve the same as a game refuge, there being a small herd of antelope in that region believed to be the last of their kind in Western Kansas.

BIRD'S-EYE MAPLE

M^{R.} ROBERT T. MORRIS of New York writes to AMERICAN FORESTRY as follows: "The excellent article on 'Commercial Uses of the Sugar Maple' in the November number of AMERICAN FORESTRY does not give due attention to one point of considerable consequence,—the value of bird's-eye maple for veneer purposes. Some years ago in Maine I ran across a man who devoted himself to searching the forests far and near for specimens of bird's-eye maple. He told me of finding one tree for which he had received \$200, if I remember correctly. I asked him why he did not set out one million sugar maple seedlings on land worth \$3.00 per acre, current local value, and then graft all of these seedlings from a valuable bird's-eye maple. This according to uncensored mathematics would give him about \$200,000,000 profit at the end of say sixty years,—a couple of years after his death perhaps. His reply was that he hadn't thought about it."

The Bird Department

By A. A. ALLEN, PH.D.

Assistant Professor of Ornithology, Cornell University

ATTRACTING THE WINTER BIRDS

ONE of the reasons for the present wide-spread interest in birds and bird-study has been the possibility, in recent years, of gaining an intimate knowledge of some of them in a comparatively easy manner. In the days when it was considered necessary to shoot a bird before anything could be learned about it, the number of ornithologists and the number of bird-lovers was relatively small.

The things that were learned, while of greatest importance to science and the cause of ornithology, were not the things that would serve to interest the laymen. The bird's skin and skeleton exhibited in the museum, like the stone and mortar from which the building was made, attracted only passing interest from the crowds. When the living bird was exhibited in a cage in the zoo, the crowds stopped for a moment longer, and now that the time has come when the stuffed specimen and the caged prisoner are giving way before the wild free bird, the whole populace stops to watch the small creature which, unafraid and unconcerned, goes about its life, not in the obscurity of the woods or fields, but in the yard, in the tree next to the house, on the very window sill. When bird-lovers discovered how to attract and tame wild birds by the simple process of offering them the food which they liked and needed, they unwittingly so simplified the introduction to the study of birds that thousands of people have stepped across the threshold which formerly they hesitated to cross. They have now, through their knowledge of birds, acquired an interest in the out-of-doors. An interest which increases a hundredfold their enjoyment of walks afield, camping and outing trips, which breaks the drum of every day, and even adds a spark of life to the talk to and from business.

For many of our birds, and particularly the winter birds, venture far into the heart of great cities, wherever they find trees and the possibility of eking out a living through the barren months. When they find a place where food is plentiful, they remain in the vicinity until the supply is exhausted, and if the supply never becomes exhausted, and if other conditions are satisfactory, some species such as the woodpeckers, nuthatches, and chickadees will remain to nest and bring their young to the source of supply.

Let us see, then, what it is necessary for us to do in order to attract to our homes a merry troupe of winter visitors, bring them to our window sills, tame them so that they will feed from our hands, and keep them about us all through the lifeless months.

WHAT FOOD TO USE

The winter birds that may be expected to come to a feeding shelf are of two kinds, seed-eaters and insect-eaters. Among the seed-eaters in northern United States are the junco, the redpoll, the pine siskin, the crossbills, the grosbeaks, the song and tree sparrows and the blue



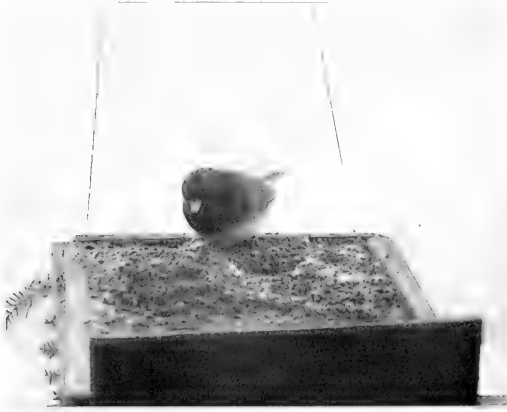
A FRIENDLY CHICKADEE

Most birds learn to trust the hand of one who feeds them regularly and eventually, ordinarily, their fear and even come to one's hand for food. The birds are one of the most confiding.

jay. In southern U. S. one could also expect the white-throated and white-crowned sparrows, the blackbirds, and the cardinal, and in the western states other species of finches and buntings. For seed-eating birds, good foods to use are millet, hemp, buckwheat and cracked grain of any sort, or better still, mixed chicken feed such as is sold for young chicks, sweepings from a neighboring mill, or hayseed from the barn floor.

The insect-eaters are the woodpeckers (the downy and hairy woodpeckers very widely distributed, the flicker, red-bellied and red-headed more common southward), the nuthatches, the chickadees, and the brown

creeper. The woodpeckers find their natural food by drilling into the chambers of wood-boring larvae, the others find insects, pupae or eggs in the crevices of the bark. All of them, however, are very fond of beef suet, and once they have found a piece fastened in the tree, they will return to it again and again until it is all gone.



A JUNCO ON AN ANTI-SPARROW SHELF

The shelf is hinged to the window sill and supported at its outer edge by springs so that it bounces when a bird alights upon it. House sparrows are ordinarily too suspicious to feed on this sort of a shelf, while the native birds seem to enjoy the motion.

Sunflower seeds and crumbs of raw peanut are relished by both insect and seed-eating birds.

WHERE TO PLACE THE FOOD

One should not expect the birds to be tame at first, or to come immediately to the window sill. One of the greatest pleasures to be derived from feeding birds is to watch the gradual loss of timidity and the increase in confidence of the birds that come regularly to feed. At first they will be as wild as any birds of the woods, but gradually, as they find themselves safe and unmolested, they lose their fear when a new bird arrives among the regular visitors, he is always noticeably more timid than the others, and sometimes remains shy for several days.

In placing the food it is well to bear in mind that eventually one wants all the birds coming to the same place, either at a shelf at the window or to a place in the yard where it will be easy to watch them. It is well to first select the place where you wish them to come, whether you immediately build the shelf or not. Then, from this as a center, place the food along radiating lines to a considerable distance from the house. The more pieces of suet put up, the more quickly the birds will find it, and the sooner they will come to the window sill. It is necessary for only one bird to find one piece of suet in order to have eventually a considerable troupe coming regularly, for birds are ever on the alert watching their fellows as well as searching for food on their own account. When one bird finds the suet, the others will see him and soon follow.

At first it will be necessary only to tie the pieces of suet to the branches without protection of any kind, and the more conspicuous the places selected, the better. Later if there are many squirrels, or crows, or house sparrows about, it will be more economical to move the suet to the trunk of the tree, holding it in place by a piece of wire screening (one-half-inch mesh) through which the smaller birds can peck. This precaution will keep the squirrels and crows from imposing upon your hospitality and carrying the suet away in one piece. The house sparrows, moreover, are soon discouraged in trying to cling with their feet to the vertical trunk while feeding, but the native birds find this the most natural and the easiest way. Another method is to suspend from the outer branches, by strings, small wire baskets filled with suet. These baskets can easily be made from an ordinary piece of wire, as the size and shape are not important. Instead of using wire, some persons prefer to use a bag knitted from string and of such coarse mesh that the birds can easily peck through it. A half of a cocoa-nut makes a very satisfactory basket.

THE FEEDING SHELF

As soon as any of the birds have been seen eating the pieces of suet, it is time to put up the feeding shelf. This should be placed at a window on the sheltered side of the house (usually the south), preferably the one nearest to a



THE "ANTI-SPARROW" WINDOW FEEDING BOX

A chickadee is about to enter the box. The glass back admits plenty of light but keeps the food free from snow and ice if the box is placed so as to open to the south. One third of the floor is hinged and supported by springs. Satisfactory, rubber bands

tree. If the window sill is very broad, it will be sufficient to nail a cleat along the outer edge to keep the food from blowing off. Usually, however, it is more satisfactory to fasten a board, from eight to twelve inches wide, to the sill to act as a shelf. It may be made the entire

length of the window sill or only a part; but the larger it is, the more birds will feed together, for our native birds all want plenty of elbow room while feeding. A narrow strip should be fastened to the edge of the shelf to keep the food from blowing off. At the westerly end a small evergreen tree or large branch should be fastened. This offers shelter to the birds and proves as attractive as the food itself. It may be nailed to the window casing, or a hole may be bored in the shelf to hold it. It should be as large as can be conveniently held in place.

An even better device than the window shelf is the window feeding box here illustrated. An ordinary soap box is used and the bottom replaced by a pane of glass so as to admit plenty of light. One side is then rested on the window sill and the inner end nailed to the casing, while the closed glass side faces the north and the box opens to the south. This box has the advantage of protecting the food from the snow and ice so that it is always available when most needed. Evergreen branches or a small tree fastened nearby will help its attractiveness.

In many places house sparrows are so numerous that they will consume all of the food as fast as it is put out and leave none for the native birds, so that it is necessary to find some way to curb their enthusiasm. A very simple, yet effective way of protecting the food from their depredations is to hinge the front half of the floor of the box and support it at the corners by weak springs so that when a bird alights it bounces up and down. House sparrows are naturally so suspicious that when they feel the shelf give way beneath them, they lose no time in getting out of the way and never stop long enough to get any of the food. Our native birds, on the other hand, are unsuspecting and accustomed to feeding about the swaying branches of trees, so that the more the shelf bounces, the more they seem to like it.

In case there is not a satisfactory window at which to feed the birds, this box can be placed on a post in the yard four or five feet from the ground. An evergreen tree, a bit of shrubbery, or a pile of brush should be in the near vicinity to serve as a way station from the nearest trees, for most of the birds hesitate to fly long distances

through the open even to get food placed for them.

Another simple form of feeding shelf for such a place in the yard is made from the top of a keg or barrel, protected from the weather by a hood improvised from barrel hoops and a piece of white cloth and covered with a few evergreen twigs, as here illustrated. The front half of this may likewise be hinged to keep away the sparrows, and it may rest on a pivot and be provided with wings like a weather vane, so that it will always face away from the wind and snow. Various modifications of this device will undoubtedly occur to the reader.

If nothing but sparrows come to be fed, one should not get discouraged, because they will act as decoys and, eventually, their chirping will call other more desirable birds to the feast. One need not fear that they will drive the other birds away, for, next to the chickadee, the sparrow is the biggest coward of the lot, and frequently a single nuthatch will put a whole flock of them to route.

NOTES

Early in November the Boy Scouts of Mt. Vernon, N. Y., were told by Mr. Rockart, of the Shade Tree Commission, how the scouts could build bird houses under his supervision to be sold to the residents of Mount Vernon, thus keeping more birds with us through the winter. The birds are of untold worth to the city, not only for their beauty and songs, but particularly for their great assistance in fighting all kinds of insects

injurious to the trees of the city.

FELLING EGYPT'S TREES

THE trees of Syria are falling fast before Turkish axes, and their loss will be heavily felt when the war is over. Owing to lack of fuel, the fine pine forest on the outskirts of Beirut, a popular resort for the people of the city, is fast disappearing. But a severer economic loss will entail on the immense and rich olive plantations lying on the stretch of plain between the sea and Lebanon. It takes years before olive trees begin to bear, and the prosperity of thousands has depended on the crops of these orchards.



AFTER YOU, SIR

A simple form of feeding shelf for the yard with a chickadee waiting for a jump to the top. The shelf is made from the top of a small barrel; the hood from pieces of the hoops covered with white cloth and decorated with hemlock. The shelf is placed on a post four or five feet from the ground located preferably near shrubbery or evergreens.

Daniel Boone's "Bar" Tree

BY WILBUR R. MATTOON, *Forest Examiner*

JONESBORO, Tennessee, a station on the Knoxville Division of the Southern Railroad, is located in the extreme northeastern portion of the State. It is the oldest town in Tennessee and during a time in the eighteenth century was the capital of the transmountain State of Franklin. A two-hour drive over hilly roads northeast from Jonesboro brings one to a tree which stands as a living record of an event in the life of probably the first white man to venture into the heavy forests formerly covering the western slopes of the middle Appalachians.

Of peculiar interest is the inscription borne by the tree to the effect that

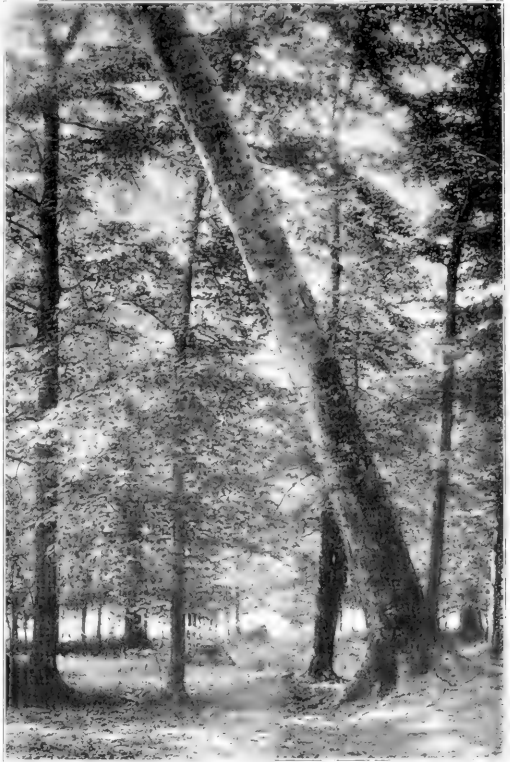
"D. Boon cilled A BAR On Tree in thE yEAR 1760."

Because of the natural growth, however, and particularly the great number of initials of persons, States, towns, and dates "nicked" in the bark, no trace of the original inscription is now visible. Its presence on the tree is fully authenticated by historic record. Several old inhabitants living in the region stated to the writer that the inscription remained legible as late as 1815 to 1885, or from 30 to 40 years ago; and further indicated its location on the upper, or east, side of the tree, at a height of about six feet above the ground.

The tree is clearly a veteran of long standing. It is a beech, measuring 28½ inches in diameter at breast height (4½ feet above the ground), by about 85 feet in length, and about 44 feet to the first limb. The tree leans toward the south at an angle averaging perhaps 30 degrees. Its wide spreading, thrifty head centers above a point 45 feet distant from its base. The true vertical height of the tree, due to its striking and menacing lean, is between 70 and 75 feet. The tree stands on the smooth, west-facing, moderately steep slope of Carroll Creek which runs into Watauga River somewhat below Boone Creek. A tract of virgin timber, located not more than 100 yards away and composed of trees of oak, poplar, hickory, basswood, and walnut, of very large size and good development, indicates excellent soil and moisture conditions. It is to be regretted that a few years ago the forest tract surrounding the tree was cut over for all the timber except beech which now composes perhaps about one-quarter of the original stand. As a result, the tree is subjected at times to strong wind pressure.

The superficial roots at the base of the tree are freely exposed and, acted upon by frequent alternate wetting and drying, are subject to the harmful attack of wood-rotting fungi. One strong lateral root, on the upper or

anchorage side of the trunk, has recently cracked and broken due to heavy strain and rapid deterioration of the root wood. With a little labor further soil erosion and root exposure might be greatly checked and the day of the downfall of the tree probably be deferred for years. An effective method would be to drive low stakes of some lasting wood, red cedar for example, and strew the surface of the ground with brush wood, lopped short to allow ready access of visitors to the tree. The present



"D. Boon cilled A BAR On Tree in thE yEAR 1760."

This was the original inscription cut into this great beech tree, it is believed by the famous Daniel Boone. The tree is about 350 years old and is still in prime condition, although it needs protection from soil erosion about the roots.

grazing of cattle and other stock about the tree is very detrimental,¹ and could be prevented by the construction of an enclosure around the tree some 5 to 8 rods square.²

¹The removal of the natural ground cover of shrubs and herbaceous plants allows the sun to dry out and bake the soil. Erosion then takes place and the effect is marked by the reduced vigor of the tree.

²As this tree is on privately owned ground, the owner alone should not be expected to letray the cost of preserving this tree as a public monument. Public spirited citizens of the vicinity should be able to secure the permission of the owner to preserve the tree and should find little difficulty in raising the small sum necessary to safeguard this interesting historic possession.

To the forester the question of the origin and antiquity of the inscription is of much interest. Boone and other hunters are known to have been in Tennessee about the year 1760.³ Was the inscription about the "Bar" cut by Boone himself at the time indicated, or by his friends at some later date as a record of what they knew had previously happened?

In the spring of 1769, Colonel Richard Henderson of North Carolina, having under consideration the purchase



THE BOONE TABLET

Erected on the famous beech tree on the Boone trail from North Carolina into Kentucky

of land from the Cherokee Indians, employed D. Boone and other hunters to make a reconnaissance and report on a large tract of land lying in what now comprises the eastern parts of Kentucky and Tennessee. A metal tablet erected by the Tennessee Daughters of the American Revolution near the tree marks the location of the "Daniel Boone Trail from North Carolina to Kentucky, 1769."

If inscribed in 1760, the inscription remained legible for from 115 to 120 years. That this may have been possible there is very good evidence, in spite of the well-known annual growth of the bark from the inside and the natural shedding on the outside. Mr. G. W. Simpson, living about four miles west of Jonesboro, and for many years County Surveyor of Washington County, states that he has repeatedly fully identified original exterior boundary trees along the old "North Carolina grant" survey in Tennessee, after a lapse of 125 years. The double inverted V (thus \wedge) was found plainly recognizable on trees which tallied completely with the survey notes in respect to species and peculiar form, such as a forking of the main stem. During a careful search over the bark of the Boone tree for old dates, one was found which read "1815." The outline of each figure, although very shallow and dim, was clearly traceable and unmistakably read by each of four persons in the party. This was on July 31, 1915, one hundred years after the

date of the inscription. Among many dates, 1862 and 1868 were very plainly readable, after a lapse of 47 and 53 years, respectively. In this connection, it should be recalled, however, that growth of both wood and bark is much more vigorous in the earlier half than during the latter half of the life of trees. Wounds consequently heal over more rapidly during the earlier period.

It is interesting thus to know that bark incisions are retained by the beech for periods of fully 100 years. Based upon growth measurements of the beech in other parts of its natural range, made by the Forest Service, U. S. Department of Agriculture, the present age of the Boone tree is estimated at between 340 and 360 years. Using the same authority, the tree had reached a diameter of about 16 inches in 1760, when the noted explorer, carrying a long Deckhard rifle, hunting knife, and tomahawk, blazed his way westward across the mountains into the attractive hill and valley country of what is now eastern Tennessee.

TEXAS' FORESTRY OPPORTUNITIES

MR. J. H. FOSTER, recently appointed State Forester of Texas with headquarters at College Station, has entered upon his work with the conviction that he has one of the best opportunities of any state forester in the country to render service to the people. Naturally the yellow pine and hardwood region of east Texas offers the primary field of work. Other regions of the state are, however, nearly if not quite as important. Trees should be made to grow on the great plains for shelter belts and for ornamental purposes. The wood lots of central Texas should be improved and made productive on lands which are of no value for other purposes. Forest areas in the rough limestone sections of the Edwards Plateau should be so managed that they may hold the waters in the tributary streams and so far as possible prevent floods and overflows on our river bottoms below. There is no section of Texas where an interest in trees is not important, or we may say, where the people are not in some way interested in tree culture.

According to reports, the yellow pine in Texas will have practically ceased to be an important commercial resource within thirty years or less, if the cut-over areas chiefly valuable for the growing of timber are not protected from fire and managed in some way which will insure continuous production. According to the Bureau of Corporation, there are standing in east Texas about sixty-six billion feet of timber, a third of which in round numbers is short-leaf and loblolly pine, a third long-leaf pine, and a third cypress and hardwood timber of various kinds. It may be said that these figures are considered by some of the best estimators to be far too high. At the present rate of cutting, even sixty-six billion feet will last less than thirty years. After that, to satisfy the demands of a rapidly increasing population, the supply of timber must come largely from outside the state and the consumer will have to pay the price of the lumber plus the freight, which together will amount to much

more than the present price of the local product. This problem affects not only the eastern region, but the entire state. Texas can produce all the timber it will require for all time by re-foresting certain of the cut-over lands which are chiefly of value for timber production.

One of the large problems in this state will be to improve the streams in order to make them navigable and to reduce as far as possible the annual overflows. The Federal Government is expending millions of dollars



J. H. FOSTER

Recently appointed as the first state forester of Texas in accordance with the law passed by the last legislature. He has a most important work to do.

annually in river and harbor work in Texas. Many people do not realize perhaps that one way to aid in this work is to maintain a forest cover at the headwaters of the streams which will tend to prevent rapid run-off after severe rains and to prevent the washing of the soil. It would seem that ultimately the state may have a duty to perform in the direction of maintaining state forest on areas adjacent to the headwaters of important navigable streams.

Until the field of work of the state forester has been carefully mapped out, it is impossible to make any definite plans for the future. The chief problems which will engage his attention may, however, be mentioned as follows: 1. Fire protection; 2. a study of the grazing problem which is undoubtedly closely related to the fire problem; 3. protection of the headwaters of streams and the possible establishment of state-owned forests; 4. the development of better farm woodlots in the agricultural portion of the state; 5. the encouragement of tree planting in treeless regions of the state; 6. a study of the problem of forest taxation.

Without enlarging upon these various possible lines of work, it may be stated that the opportunities for rendering service to the state are large. There are many agencies which can be brought into line to assist in carrying out these measures. The Federal Government offers aid to the state in various directions, such as in fire protection, agricultural extension work, and in experimental

investigations. It is Mr. Foster's desire to work not only with the Federal Government, but to cooperate with all the agencies in the state which have similar interests. Texas already has a live forestry association. The lumber interests are favorable and friendly. The farmers, through their various organizations, will undoubtedly find much of interest along forestry lines.

There is a distinct advantage in having this new work closely related to the Agricultural & Mechanical College and with the State Experiment Station. According to the forestry law, the state forester is in charge of a new department of forestry and is forester to the Agricultural Experiment Station. Eventually there will be some strong courses of instruction added to the curriculum of the College so that students, particularly the agricultural students, may become familiar with the forest conditions of the state and learn to appreciate the importance of trees and to care for them in connection with their farms.

MICHIGAN FORESTRY WORK

THE Michigan Agricultural College was one of the first institutions to start a Department of Forestry. In addition to the regular work of instruction, the College has been active in developing forestry in the State, chiefly in the agricultural districts. The head of the Forestry Department is Forester on the staff of the Agricultural Experiment Station and the College employs a Field Agent in Forestry who devotes his entire time to extension work. The College maintains a large forest nursery and small planting stock is sold at cost to people in the State. In the year 1913 to 1914 the number of small trees distributed was two hundred and twenty thousand, and it is estimated that about two hundred acres of private lands were planted through the activity of the Agricultural College in that year. During the past year, three hundred and twenty-two thousand trees were distributed, sufficient to plant about three hundred acres of land. The greater part of these trees go to farmers and are used for forest plantations, wind breaks, fixation of shifting sands along the lake shore, etc. The College has also been very active in developing forest management of existing woodlots. It is now establishing experimental willow holts in various places. Its organization for forestry work in the agricultural districts is very complete.

The Act for the exemption of small forests from taxation placed the rules and regulations and certain other matter pertaining to the act under the State Board of Agriculture which naturally handles forestry matters in the agricultural districts.

A. K. Chittenden, Professor of Forestry at the College, says:—"I believe that forestry work in the agricultural communities can be handled most satisfactorily and to the best advantage through the Agricultural Experiment Station and the Agricultural College, as they come in touch with such communities and are familiar with the problems met with. I regret that an impression is often given that Michigan is doing little or nothing in forestry in the agricultural districts, because on the contrary, it is doing far more than almost any other State."



Courtesy American Genetic Association

THE LARGEST SHADE TREE IN THE UNITED STATES

This giant is a sycamore at Warrington, Indiana. It is forty-four feet six inches in circumference near the ground and 150 feet tall. This species, besides having the largest shade tree in the United States, is also one of the best species of shade tree, being peculiarly able to stand the smoke, dust and gas which, in cities, have to be overcome by any tree which prospers. It is also unusually resistant to attacks by insects.

The Biggest Shade Tree is Also Best

THAT the largest shade tree in the United States, as brought to light by the prize contest held by the American Genetic Association, should turn out to be the eastern sycamore is not surprising, say government foresters. The sycamore has long been re-

garded as the largest deciduous tree in North America and its range of growth is hardly second to that of any other broad-leaf tree; for it can be found from Maine to Florida and as far west as Kansas.

The bestowal of the prize on a sycamore at Worth-

ington, Indiana, which is 44 feet 6 inches in circumference and 150 feet tall, draws attention to the fact that foresters and arborists are nowadays recommending the species especially for city planting. They say that long experience with sycamores planted in city streets has shown that the species is peculiarly able to withstand the smoke, dust, and gases which are usually an unavoidable complement of urban life. In addition, the sycamore is as resistant to attacks of insects and fungi as almost any species, and is a quick grower; at ten years of age, a healthy sycamore usually is already large enough for shade, as well as for decorative purposes. As for the latter, there is hardly any eastern species which is generally held so picturesque as the sycamore. With its strikingly mottled bark and magnificent stature and conformation, the sycamore has a marked individuality and can not be mistaken for any other species, either in the summer when the foliage conceals its structural form, or in the winter when the leaves are absent.

A common objection to the sycamore as a lawn tree is its habit of dropping its leaves before autumn. From this characteristic it is sometimes called a "dirty tree." Recently a letter was received from a suburban resident who has a sycamore on his lawn. "My sycamore tree is very beautiful," said the writer, "until about the first of August, when its leaves begin to fall. Is there any remedy that I can apply to the tree to keep it from dropping its leaves so soon?" It was necessary to tell the correspondent that this was a characteristic habit of the tree. This drawback, however, is practically the only failing that the sycamore has, and it is offset by many desirable qualities.

On the other hand, there is little prospect of popularity, foresters say, for the valley oak of California, which was decided to be the largest nut-bearing tree in the United States, the contest unearthing a specimen in San Benito County, which is 37 feet 6 inches in circumference and 125 feet high. The valley oak is a very beautiful tree, but it attains maturity only after three or four hundred years; its wood is too tough, knotty, and otherwise imperfect to be good for lumber; the tree grows too slowly to be planted for shade or decorative purposes, and, being found only in California, it would have a small field of usefulness. Horticulturists say that the valley oak is not popularly considered a nut-bearing tree; for its acorns are not generally used for food, although, of course, they are edible. Foresters say that the chestnut and the black walnut are the largest nut-bearing trees in this country, and the contest did, in fact, unearth a chestnut, near Crestmont, North Carolina, which is 33 feet 4 inches in circumference and about 75 feet tall.

The contest brought forth photographs and authentic descriptions of 337 trees in all parts of the United States, making a distinctly valuable contribution to existing knowledge of native trees. It was found that, in all probability, there is no living elm larger than "The Great Elm" at Wethersfield, Connecticut, which is 28 feet in circumference, and about 100 feet tall, and is estimated

to be 250 years old. Many remarkable specimens of species which ordinarily attain only small sizes were unearthed by the contest, furnishing new records of maximum growth. A sassafras was brought to light at Horsham, Pennsylvania, which is 15 feet 10 inches in circumference at four feet from the ground, whereas, for example, not long before this a Georgia town claimed that it had the largest sassafras tree in the world, though this tree was only something over 7 feet in circumference. A white birch was found in Massachusetts with a girth of 12 feet 2 inches; a pecan was found in Louisiana with a circumference of 19 feet 6 inches, and a catalpa in Arkansas with a girth of 16 feet. The tallest tree found is a yellow poplar in North Carolina, which is 198 feet high and has a circumference of 34 feet 6 inches.

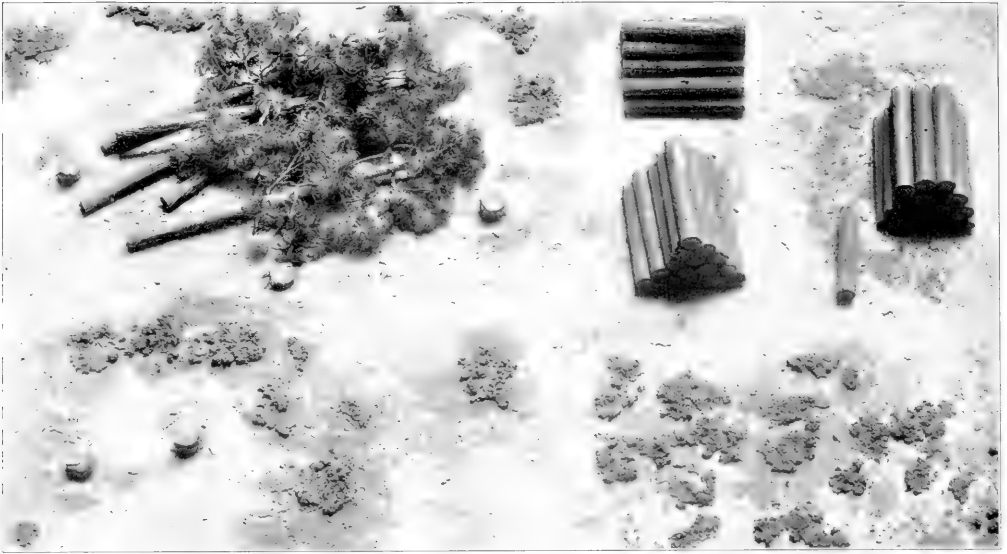
The value of the contest lies in its contribution of new information as to the maximum growth attained by deciduous species and the localities in which the different species seem to grow best. The relative sizes of the coniferous species are fairly well established, the Bigtree of California, for example, being the largest in the world; but information on the size attained by deciduous trees in this country has been very incomplete.

ARTICLES ON NATIONAL PARKS

AMERICAN FORESTRY takes pleasure in announcing that starting in the January issue it will publish a series of profusely illustrated articles on the scenic features of the National Parks by Mr. Mark Daniels, Superintendent of National Parks.

USE THE DEAD LEAVES

EVERY shade tree owner in New York State should learn the simple lesson of conservation which nature is teaching in our forests in the utilizing of the autumn leaves. Where a few shade or forest trees are throwing their foliage about the home grounds, they should by no means be raked up and burned because it is like burning so much valuable stable manure, but they should be composted where that is possible or used as a mulch around flowering perennials, roses and often large trees. By wetting the leaves thoroughly and then weighting them down by sticks or soil, they will be a splendid winter protection and the weight and moisture of the winter's snow will bring about rapid incorporation of the mulch with the soil. Where autumn leaves are to be used as a mulch about fruit or very young shade trees, some care must be exercised in not putting the mulch too close to the stems as there is danger of the mulch harboring mice which during the winter might girdle the young trees.



MODEL OF WASTE IN A LOGGING OPERATION

This photograph is one of a series of five models prepared by the Forest Service for exhibition purposes to indicate the "Loss of Wood from the Forest to the Consumer." The first model shows the trees growing in the forest, the contents of which in board measure was taken to be 100 per cent of 45,000 feet. The second model, shown above, represents the "Logging operation." Here the trees referred to in the description of the first model are shown as having been felled, with tops laid aside and logs piled. The waste here is in the tops and stumps, and has been computed to represent together 13 per cent, or 5,954 board feet of the original trees, 87 per cent or 39,546 board feet of the original trees being the contents in board measure of the logs secured in the operation.

The Forest Service Exhibit

BY DON CARLOS ELLIS

THE exhibit of the United States Forest Service at the San Francisco Exposition, which was viewed by many thousands, was most valuable in imparting a knowledge of forests and all they mean to the people. The purpose of the display was to show, first, the need of forest protection because of the value of the forest to the health, wealth and beauty of the country, and because of the great destruction of forests, due to waste in use and to fire; second, the results of Forest Service investigations in the reduction of waste by the use of better methods of manufacture and the making of by-products, the preservative treatment of timber and proper wood conditioning; third, the protection and administration of the National Forests; fourth, the use of these Forests are very much used by the public; and fifth, the nature of the most important of those uses.

As the visitor entered the exhibit space from one of the main entrances the display which caught his eye was a series of five models showing the progress of wood from the forest through the sawmill and the planing mill to the finished house and telling the waste of wood incident to each step. This waste amounts to about 65 per cent of the original tree. Alongside these models was a

series of four models of a paper machine, a wood distillation plant, a woodworking factory, and a tannic extract plant, bearing labels suggesting that much wood waste can be utilized in the manufacture of such by-products as paper, alcohol, acetate of lime, wood flour, acetone, turpentine, rosin, tannic acid, and oxalic acid, and many small wooden commodities. Above the case containing these models was a frieze upon which many of these commodities, the by-products which can be manufactured from waste and specimens of the waste, were displayed. The Forest Service has established a wood-waste exchange for bringing those having waste wood to dispose of in touch with those who can use it.

A miniature impact timber-testing machine was at work upon a raised platform, beneath which were displayed timbers whose resistance to various kinds of stress has been determined at the Forest Service laboratories. Pictures of the various types of timber-testing machines were placed at the ends of the table.

An exhibit of special interest to lumbermen was a working miniature of the humidity dry kiln used at the Forest Products Laboratory, Madison, Wisconsin, in which both temperature and humidity can be controlled



MODEL OF WASTE IN A SAWMILL OPERATION

This is the third of the series of five Forest Service models showing "Loss of Wood from the Forest to the Consumer" and illustrates a "Sawmill Operation." The piles of rough lumber shown to the right of the sawmill represent 44.30 per cent, or 20,250 feet of the original trees. Just back of the lumber piles can be seen the trimmings and edgings which comprise 7.56 per cent, or 3,462.48 board feet of the original trees. To the left of the picture are shown a pile of slabs and one of sawdust. The former represents 18.88 per cent, or 8,647.04 board feet and the latter 11.47 per cent or 5,233.26 board feet of the original trees. In this operation there is lost in handling and standardizing 4.79 per cent, or 2,193.82 board feet of the original trees. The total waste in the sawmill therefore amounts to 42.97 per cent or 19,556.60 board feet of the original 45,000 in the standing trees. Two other models complete the set, one representing the planing mill operation and the other the building operation, each with its respective actual raw material consumption and resultant waste accumulation expressed in per cents and board foot quantities in reference to such contents of the original trees. The object lesson presented by the full set of models is intended, as mentioned above, to show the total loss of wood from all causes from the forest to the consumer. In building the average eight-room frame house it has been ascertained that approximately 35 per cent of the raw material is utilized and 65 per cent wasted, such waste for the most part being necessary.

The results of investigations which the Service has conducted in the preservative treatment of timbers were shown by photographs and charts. A supplement to this display had been placed in the exhibit of the Bureau of Mines in the Palace of Mines. It consisted of eight mine timbers which have had service in a Pennsylvania coal mine.

The great central model of an idealized Ranger District on a National Forest showed also reforestation work, permanent improvement work not directly related to fire protection, such as a Ranger Station and a drift fence, and the important public uses of the forests. These uses were shown by a forest homestead, a timber sale, a patented mining claim in operation, a water-power development, a free-use summer camp and a hotel operating under a special-use lease. Two mountain streams had their rise in the upper reaches of the model's landscape and formed a junction before they disappeared down the valley. Actual water was used in these streams and lent much to the realism of the exhibit.

The various features of the work of the Forest Service and the various uses to which the forests are put, which were exemplified in the large model, were amplified by other exhibits surrounding it.

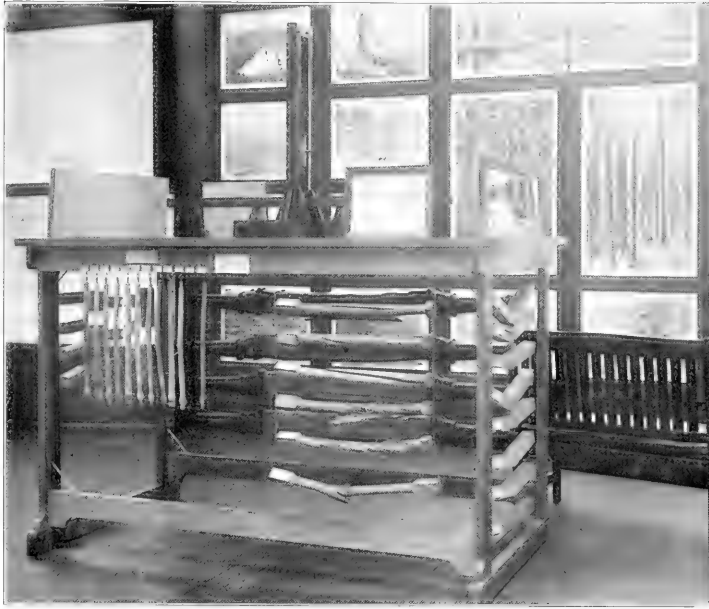
On one side of the central model three models, 4 feet square, of an acre of western yellow pine were shown on a scale of about 1 inch to 10 feet; so that trees 180 feet high in the forest were 18 inches high on the model. The model in the center showed the acre in its virgin condition ready for logging. On one side was shown the acre after it has been logged under Government regulation on a National Forest, with stumps cut low, logs cut from high into the tree tops, young growth protected, brush piled

for burning, and a future forest insured. To the other side the same acre was shown as it would appear under the wrong kind of logging. Stumps were high, large tops were left unused, many logs were shattered by careless felling, young trees were broken by old ones falling upon them, young trees were felled, dead trees left standing, and the brush lay where it falls, constituting a serious fire menace. In the pedestals under these models were panels of all the important species of wood sold on National Forests. On the wall behind was a chart showing that timber sales on the National Forests have grown from 68,475,000 board feet in 1905 to 626,306,000 feet in 1911.



COYOTE KILLING A LAMB

The Forest Service rangers conduct a vigorous warfare on the National Forests against predatory animals and kill thousands of them each year. This was one of the models at the Exposition.



RESISTANT POWERS OF WOOD SHOWN

A feature of the Forest Service exhibit at the Panama-Pacific Exposition which was of great service and interest to users of wood for various purposes.

Specimens and descriptions of important range plants growing on the National Forests and some of the most important poisonous grasses from which the Forest Service is trying to protect livestock, were displayed in show cases, above which were shown photographic enlargements of livestock grazing on the National Forests and of various improvements being introduced by the Service for the benefit of the livestock industry, such as the development of water holes, the building of drift fences and experiments in grazing sheep in coyote-proof pastures. Next was a mounted group of a coyote killing a lamb. The label for the group stated that livestock owners lose about \$15,000,000 from predatory animals a year, that over four thousand of these animals are killed every year on the National Forests and that the Government has this year appropriated \$125,000 for their destruction on the National Forests.

One of the most popular exhibits was a working erosion model six feet square, which showed some of the effects of deforestation on stream flow and surface formation. Two hills of the ordinary clay were built up on the rear of the model. One of the hills was covered with moss and foliage to represent a forest or brush cover and the humus soil beneath it; the other hill was bare of vegetation. A sprinkler arrangement sent down a shower of water in the form of rain on both slopes. The water flowing on the bare slope rushed off the surface immediately, carrying soil with it, and depositing it in the stream bed and the lake at the front of the model. The water flowing on the protected hill was absorbed by the natural reservoir which the forest affords and seeps out

regularly as clear water. Water fell on the forested hill daily since the opening of the Exposition and no soil had to be replaced. The stream on this side of the model and the lake below were filled with clear water. Farm land below the forested slope was in good condition; below the deforested hill the river had overrun its banks, flooded the farm land and left deposited upon it the infertile clay of the hills.

Placed between this model and the large central model of the idealized National Forest was a relief map of a complete watershed on the Chelan National Forest, Washington, which showed a typical watershed protected by forested slopes.

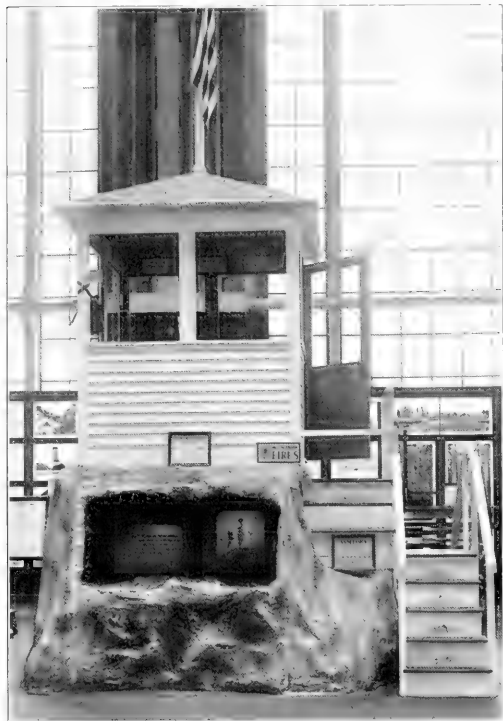
Three great windows in the rear of the exhibit were covered, up to ten feet in height, with sixty-three large colored transparencies showing forest types in different parts of the United States and abroad, forested and

deforested watersheds and the erosion due to deforestation in this country and in China, various important activities on the National Forests, picturesque scenery and recreation sites on the National Forests, types of National Forest land in different parts of the country, uses to which the National Forests are put, roads, trails, bridges, telephone lines and other permanent improvements on the National Forests, wind breaks of trees and their benefit to crops.

On the wall spaces between windows were a relief map and two charts. The relief map is on the curvature of the earth, gave the locations and names of all the National Forests, and showed that they are situated along the mountain ranges where they protect the headwaters of streams rising in these mountains, as well as assure the future timber supply. Above this map was a list of the important uses to which these National Forests were put by the public in 1914. These uses were as follows: 626,306,000 board feet of timber cut by purchasers, 120,575,000 board feet cut by settlers and others free of cost, 9,238,863 head of livestock grazed, 266,797 horsepower available at water-power plants, 16,760 permits in force for other special uses of land, 1,500,000 recreation seekers visited the forests, 1,200 municipal water supplies protected, \$838,980 of receipts made available for local schools and roads, 161,000,000 acres of land administered to protect irrigation and navigable streams fed from the forests of the West. The third chart showed that only one-fifth of the timbered area in the United States is held in Government ownership and properly protected.

That Alaska is not a barren and treeless waste was

convincingly shown by a four-foot Sitka spruce log from the Tongass National Forest, Alaska, measuring sixty-one inches in diameter, which stands in the Alaska exhibit. The log was cut from a tree 180 feet tall, measuring seven feet at the base.



MODEL OF FIRE LOOKOUT STATION

A Forest Service exhibit which attracted much attention and into which thousands of visitors to the Exposition climbed.

Because of limited space, not all activities of the Forest Service could be covered in the exhibit. Much of the work not touched upon in the display could be learned about at the government motion-picture room in the Palace of Liberal Arts, where 12,000 feet of film showing Forest Service activities were projected; from the publications displayed upon a table in the exhibit; and from the illustrated lectures on the National Forests and Forest Conservation given from once to thrice daily.

The exhibits of the Forest Service and of the other branches of the United States Department of Agriculture were not entered into competition for awards. This was in keeping with the precedent established at other international expositions in which, as in this, the United States was the host nation.

INVITE A FRIEND

AMERICAN FORESTRY magazine is now so well worth having that each member of the Association is asked to invite a friend to become a subscribing member.

STATE FORESTER AND MARYLAND TOWNS COOPERATING TO IMPROVE PUBLIC SHADE TREES

UNDER date of September 8 the State Forester of Maryland addressed a letter to the public officials of all incorporated towns in Maryland suggesting a cooperative and systematic means of improving existing conditions in public shade trees. Briefly, this plan provided for practical work to be devised and carried out under the State Roadside Tree Act of 1914, and the method of procedure set forth in the letter was the result of several months of successful experience in the carrying out of the duties delegated to the Board by the present Act.

Free of cost, the State Forester offered to take a tree census in any town where application was made by the proper officials, the census taking account of the trees, their kinds and locations, and to be followed by a report caterpillars of the brown-tail moth spin a web in the fall with recommendations for such planting and general improvement as the census showed to be required. The preliminary examination is succeeded by the performance of the work advised in the report, all work being carried out under the personal direction of a State Forest Warden whose services are made available for such duties at a reasonable per diem rate.

That the possibilities of this offer have been appreciated is attested by the fact that during the next three weeks several towns and cities in the State took advantage of this offer to secure expert aid; preliminary examinations have in most cases been made, and the work to be done will be pushed as rapidly as possible.

INCREASE OF TOURISTS IN THE NATIONAL PARKS

REPORTS received by Secretary Lane from the Superintendents of the various National Parks in the West, administered by the Department of the Interior, indicate that during the park season just closed there has been a great increase in the number of tourists visiting these great playgrounds. In Yellowstone National Park in 1914 there were 20,250 visitors, and this year two and one-half times as many—51,820. Yosemite National Park in California was visited this year by over twice as many people as entered its gates last year, 31,642 names being recorded during the season as against 15,145 last year. Again in Mt. Rainier National Park there has been an increase in the number of visitors of over 100 per cent—34,814 in 1915 as against 15,038 in 1914.

Secretary Lane declared the policy inaugurated two years ago of permitting automobiles to enter the parks to be a success, and that it would be continued in the future. In Yellowstone National Park automobiles were admitted for the first time on August 1. They operated under a very carefully worked-out schedule which has proven to be very satisfactory. The Park was visited this season by 958 cars, carrying 3,513 people, which points to a much fuller enjoyment of the wonders of Yellowstone National Park by motorists next year.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

EDITED BY J. J. LEVISON, B.A., M.F.

Arboriculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School

PARKS AND THE PUBLIC

MUNICIPAL parks and the trees on our streets are not, as is generally supposed, intended for the mere pleasure of the people. In many respects they play as important a part in the development of the citizen as any other of the mediums purposing his betterment. What a wonderful training school the parks could be turned into for the development of character, for training the observative powers and the aesthetic judgment, for physical improvement and for inspiring the youth with a love for all that is wholesome and refined.

Much as has already been said about the influence of city trees and parks on the public welfare, trees as an aid to public health is a subject which has been discussed

quite often and hardly needs comment here. Trees as an aid to the city beautiful needs no argument when one but glances at the accompanying photographs. Buildings and bridges can only be made a part of a beautiful landscape when properly set off by trees and shrubs, but cannot be made the principal feature of a charming landscape without the trees and shrubs.

The value of trees to the citizen has even been discussed from the educational and moral point of view. But wherein the park and estate superintendents and city foresters can be of help in bringing the trees and shrubs in closest touch with the public has not yet been discussed to any extent and this is the object of the following lines.

The program for the park authorities is a wide one and



A BRIDGE IN THE HARTFORD, CONNECTICUT, PARK

The photograph is especially valuable in demonstrating the effect of a simple rustic bridge to the rural landscape. Any other form of bridge—
with its bold outlines, or with its ornate details—would detract from the view instead of adding to it.



A BEAUTIFUL VIEW IN THE HARTFORD, CONNECTICUT, PARK

This is an excellent example illustrating the value of vistas in park development. Deep vistas in any planting give depth to the scene and afford the observer the opportunity to satisfy his natural desire for long perspective and indefiniteness of distance. Most of the fundamental principles of landscape gardening are embodied in this view. The unity of the picture as a whole and the great variety in composition, material, texture and surface treatment are striking features of this scene. Water in any form is always very pleasing and in this particular form it helps to make the scene more restful. The arrangement of the plants is very good. The specimens in the foreground are adequately low and neatly kept. In the middle ground are the medium-sized trees, and in the rear are heavy masses of large-sized trees.

I venture to cite some of the means by which park officials may stimulate a proper appreciation for the beautiful and a keen sense of regard for the parks. I know that I will be cannonaded by many park commissioners and park superintendents, who will say that this is impossible of accomplishment, that many citizens lack that sense of appreciation and will insist on making cow-paths across lawns, that children are imbued with a destructive instinct which prompts them to break the leaders of newly planted evergreen trees, and that the average citizen does not give a care about the name of the tree he so often stops to admire. I grant that these conditions do exist. I witnessed them in our own city. But how are we to overcome them? Is it possible to overcome them, and to whom should this duty be charged? I maintain that it is possible to overcome them and that it behooves the park authorities to do it. People are not possessed of an innate tendency to destroy, and children do not necessarily seek an outlet for their surplus energy in the ruination of property. The whole question merely offers an opportunity for a practical lesson in civics, in the development of good taste and for the instilling of a genuine love for all which is beautiful and close to nature. It will require patience and will probably entail the loss of considerable material—I mean trees, shrubs, and flowers. But that

would really be a small loss completely justified by the results. We would not expect to teach any practical lesson in a laboratory without a sacrifice of demonstrative material. Why then expect a different disposition of the park material—nature's laboratory—when it becomes necessary to teach a lesson in civics. Of course, we cannot afford to make constant sacrifices and still have well-kept parks. But it is a condition we have to face at one time or another, and until we have taught the lesson we must bear the losses cheerfully.

Here is what may be done to make our parks attractive: The usual means are tennis courts and facilities for football, field hockey and croquet, golf links, musical concerts, rowing, merry-go-rounds, indoor flower shows and outdoor flower beds, shelters, refreshment stands, and seating, driving and riding facilities.

The modern parks, however, have gone a bit further and have done the following: They have labelled their trees, removed the keep-off signs, circulated information about trees and landscape features of the parks, introduced park concerts, lectures, moving-picture shows, story-telling meetings, public refreshment stands and exhibits.

This close relationship between good citizenship and proper environment is so rapidly being recognized that



A PART OF THE HARTFORD, CONNECTICUT, PARK SYSTEM

Here the interesting features are the broken skyline, the variety of texture in the foliage and the partial concealment of the buildings. The skyline carried high by the mass of trees and accentuated at another point by the tower exemplifies sound principles of landscape gardening. The weeping willow in contrast with the coarser foliage of the neighboring shrubs and trees add much interest and the careful planting around the buildings brings them out just enough to help the scene without making the architectural feature out of place in its quieter surroundings.

the old-fashioned idea of furnishing the citizens with set and artificial gardens is fast disappearing and instead many communities are acquiring vast ranges of woodland, mountain, lake and river scenery and placing at the disposal of their citizens these community forests, amidst which they may roam at will. In the acquisition of these parks the object sought is not the formal promenades, but spacious areas in which the public can lose itself, forgetting for the moment the restrictions of city life and reveling in the largeness of nature. Formerly our conception of a park has been, in many cases, as a storehouse for elaborate buildings, ornamental cut stone and floral designs. Such parks do not afford the rest, inspiration and refreshment which the city-wearied senses need so much. In such parks the city dweller cannot find the relief for his mind and body which could be found in the poetic charm of the quiet woodland or the rural landscape.

There are times when the formal and costly park is a necessity. Small city squares must be more or less formal in design and they are, of course, very necessary to every city of considerable size. But there are also strong arguments in favor of the woodland park. The woodland park in this country is a comparatively new departure in park development, but the charm of nature in the simplicity of its woodlands is not new. All we

need to do is to apply our forestry principles to the handling of these woods and collect that which nature might scatter and we are sure to have a woodland park far more attractive and wholesome than the formal garden. The cost of starting and maintaining a forest park is also far less than the amount required for a similar area of formal park. There are only a few forest parks in this country, but while our cities are still young it is possible for them to set aside small tracts of woodland in their suburban sections at a small cost and within a few years they will find themselves the possessors of ground not only worth many times the original cost, but also of inestimable value to the health and development of their citizens.

QUESTIONS AND ANSWERS

Q. Almost without exception, the shade trees in this city are trimmed in the early Spring and the trimming consists of cutting back all the large limbs. The shade trees in this locality seem to grow much faster than the same trees in the East. The box elders, hard and soft maples, black locust and poplar all send out such long shoots in a year that it is difficult to shape the tree by trimming, so the trees are cut horizontally through the center of the crown, the result being a lot of sprouts from the stubs of the limbs, making a very hideous tree,

especially in winter. Can you suggest the proper way to trim these trees and still prevent rank growth of new shoots?

Will you tell me why the trimming should be done before the leaves fall? Is not the winter just as good a time as early fall?

D. P., *Boise, Idaho.*

A. Box elder, locust and poplar trees lend themselves to severe and frequent cutting. They grow so fast that unless they are cut in they become either too tall or too thin and are liable to break in wind storms. The cutting, however, need not be done too frequently. All that is necessary is to control the crowns whenever they become too tall or sparse looking. This will prevent their appearing so stubby. Maple crowns should be kept compact by an occasional light clipping from the tips inward, but they should not be headed in, as you describe, unless they are very old and failing. Silver (soft) maples will require more frequent cutting than the other maples. The sugar maple should be cut but very little, if any. We suggested trimming ornamental trees in the Fall as a general policy because in that season the dead branches can be distinguished from the live ones with more certainty and ease and the climbing can be done with greater safety and ease than in winter when the branches are brittle and slippery.

Q. I would appreciate it if you could give me some information relative to the most desirable sprays for various tree diseases or insect attacks, or refer me to some article or book on the same. I also would like to have your opinion as to the most desirable spacing for street trees, such as elm, hard maple, etc.

W. W. M., *Chicago, Ill.*

A. It would hardly be practical to give you a complete list of all the spraying materials and the proportions in which they are to be used. This would vary so much with the character of the insect and the time of application that in each case you should have specific advice from your local State Entomologist or from the Department of Agriculture. There are a number of good publications relating to the particular materials and their applications, issued by the United States Department of Agriculture, by the New York State Department of Agriculture, and by the various experiment stations throughout the States. "Studies on Trees," published by John Wiley & Sons, New York, as well as "Shade Trees in Towns and Cities," issued by the same publisher, are suitable books for you to read. "The Care of Trees in Lawn, Street and Park" is one of the best books you can read.

As to spacing trees on city streets, I would suggest that for most species a space of 30 to 35 feet should be allowed, and for the American Elm 60 feet is appropriate.

Q. Last June the greater number of the trees on my farm in New York seemed to be suffering from the attacks of one sort of insect, pest or another. The elms and young hickories seemed most affected. The oaks and maples showed leaves badly chewed.

G. R., *White Plains, N. Y.*

A. It is difficult to determine the exact cause without an examination of the insect or at least the affected leaf or twig. If the character of the injury is eating of the leaf, then the tree will have to be sprayed with arsenate of lead. The exact time for spraying will depend on the kind of insect. If the injury is due to a boring or sucking insect, the treatment will again be different and in each case will depend on the exact nature of the particular insect in question.

Q. Can you tell me about an efficient insecticide for fruit trees?

G. A. F., *Richmond, Va.*

A. As a result of extensive tests during 1912, 1913, and 1914 with different insecticides, the entomologists of the United States Department of Agriculture have found that calcium arsenate, a new insecticide, gives very promising results in the control of certain insects that do damage by chewing on fruit trees. Among the chewing insects against which the arsenate of calcium proved effective, in laboratory and field tests conducted at Benton Harbor, Mich., are the codling moth, the fall webworm, the tent caterpillar, and the tussock moth.

In these tests the effects of arsenate of calcium, both alone and combined with lime-sulphur solution, were tested in comparison with arsenate of lead alone and in combination with lime-sulphur. The arsenate of calcium, as was the arsenate of lead, was used at the rate of 2 pounds to each 50 gallons of water. In all the experiments the arsenate of calcium gave very satisfactory results in killing the larvae without burning the foliage. In a number of cases its killing action was somewhat slower than, but compared favorably with, the arsenate of lead. Since it can be produced more cheaply than the lead arsenate, it would appear to have distinct value, although it has not been sufficiently tested to permit recommending it unreservedly for general use. Where arsenate of calcium was combined with lime-sulphur it was, as a rule, even more effective as a poisoning agent than when used alone and did not lessen the value of the latter as a fungicide. When these compounds are combined, the amount of foliage consumed by the larvae is less than where the arsenate of calcium is used alone.

Q. Please mention a few shrubs and trees most suitable for underplanting in a bit of natural woodland in the vicinity of New York City.

L. P. R., *New York City.*

A. You should resort to native shrubs and trees of the following species:

Shrubs—Spice bush, viburnum acerifolium, juneberry, red-berried elder, viburnum prunifolium, New Jersey tea, viburnum cassinoides, sweet pepperbush, mountain laurel, rhododendron.

Trees—Hemlock, beech, dogwood.

Q. What is the best way to gather the eggs of the Tussock moth caterpillar?

P. C. C., *Waterbury, Conn.*

A. Collect them by hand picking wherever possible. Where the trunks of the trees are heavily covered with them and where there are many trees in question, place

a dark canvas cloth at the base of the trees and scrape off the egg masses by means of a wire brush. Then collect the egg masses from the canvas cover and burn them.

Q. When is the best time to plant my willow hedge and poplar screen, also tulip and sweet gum?

M. A. S., *Harrisburg, Pa.*

A. Willows and poplars can best be planted in the early spring. Tulip trees and sweet gum can be planted best in spring.

Q. When is the best time to set out evergreens?

J. P. E., *Baltimore, Md.*

A. Early spring is the best time, though the latter part of August is almost equally good.

Q. What shall I use to paint tree wounds?

A. L. L., *Chicago, Ill.*

A. Use refined coal tar, and if too thick, thin it down with creosote.

Q. I am much interested in the article referring to Common Sense Tree Labels in American Forestry. I wish to learn if these enameled labels may be purchased for private use and from whom.

H. M., *Boston, Mass.*

A. Such labels may be secured from E. George & Company, 194 Front St., New York City; Standard Sign Mfg. Co., Pittsburg, Pa.; New York Stencil Works, 100 Nassau St., New York City; and the Ingram Richardson Co., 100 William St., New York City.

ADVICE FOR DECEMBER

1. Fertilize, with well-rotted manure, all the weaker trees on the lawn and some of the shrubs that need encouragement. Apply the manure either as a top dressing or else dig in lightly with the soil. Apply to a radius equal in distance to the spread of the branches.

2. Insert bolts in trees that have a tendency to split. Most splitting occurs in January and February, and some species, like lindens and elms, have a greater tendency to split in the crotches than other species. Do not resort to bolting unless absolutely necessary, because a bolt generally detracts from the beauty of the tree.

3. Cut down all the marked trees and burn the infested wood.

4. Look over your spraying apparatus and tools and make all necessary repairs in preparation for the spring season.

NOTES

Many authorities believe that filling tree cavities with concrete is wrong, that such fillings are not permanent, that the concrete cannot be waterproofed and soon cracks and leaves a worse condition than no filler.

C. H. Hoyt, of Cleveland, O., writes that he has been several years perfecting a method of using the asphalt method and has solved the problem by making it easy to use and getting perfect protection at very small cost.

He has recently issued an illustrated folder on this method, which can be had for the asking.

On October 1, 1915, all the Boy Scouts of Mount Vernon, N. Y., assembled at the Presbyterian Church and heard a detailed account of the life history of the Tussock Moth, one of our worst shade tree leaf feeders. This insect overwinters in the egg stage and from fall till spring the eggs may be found in small white clusters firmly attached to the bark of trees and protected places along fence rails and under the house mouldings. Each troop was assigned a definite section of the city and each section was further subdivided for the individual Scouts, so that the entire city might be covered. For nearly three weeks the boys scouted around gathering the egg masses and then the territory of each troop was shifted so that the work might be checked up, triple credit being given for eggs collected during this checking period. Upwards of a quarter of a million eggs were collected by the scouts during the contest, and it would be difficult to state in dollars and cents the value of service so rendered to the city.

FOREST ITEMS FROM HAWAII

A FOREST and grass fire late in August burned over several hundred acres on the U. S. Military Reservation on the Island of Oahu, Territory of Hawaii, before it could be completely extinguished by 2,500 regular troops from Schofield Barracks who fought it with difficulty on the steep mountain slopes with wet bags.

In the work of reforesting with indigenous trees the open areas on the watershed back of the city of Honolulu, which was begun two years ago, the Division of Forestry of the Territory of Hawaii uses imperfect cans which are discarded by the hundred at the pineapple canneries and may be obtained free of cost. One seedling is raised in each can which first is split up the side and the bottom almost completely cut around. The can is held together with a wire. At the planting area, the wire is removed, the can opened up and the seedling taken out with a complete ball of earth around the roots. Superintendent of Forestry C. S. Judd reports that by this method almost perfect success is obtained from the planting. The cans can be used three or four times for this purpose.

The old royal Hawaiian palace in Honolulu, now used for the executive offices of the Territory, is receiving a new flooring of native ohia wood. This is logged and manufactured at Pahoia, Hawaii, by the Hawaii Hardwood Company, which operates the only sawmill in the Islands.

During 1914, a little short of one million trees were planted in different parts of the Hawaiian Islands for ornament, windbreaks, and fuel. Species of the Australian eucalyptus are used for the latter purpose and grow so rapidly that they can be cut six years after planting. Many of the species sprout readily from the stump.



MEDAL PRESENTED TO THE AMERICAN FORESTRY ASSOCIATION BY THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION AT SAN FRANCISCO ON AMERICAN FORESTRY ASSOCIATION DAY, WEDNESDAY, OCTOBER 20, 1915

Medal for the Association

DIRECTORS of the Panama-Pacific International Exposition at San Francisco presented a handsome bronze medal, reproduced here in actual size, to the American Forestry Association during its meeting there on American American Forestry Association Day, Wednesday, October 20. The presentation was made by Mr. C. S. Scott, representing President Charles C. Moore. Mr. Scott referred to the very important work the Association is doing in forest conservation and in educating the public in a love and knowledge of trees,

and the great value of such a public spirited work. He declared that in behalf of the Exposition he wished to present the medal as a token of the appreciation with which the people of the entire country view the efforts of the Association and in the hope that it would receive continued support.

The medal was received by Dr. Henry S. Drinker, president, who said the Association accepted it as an incentive to further efforts in the great national service which it is doing.

Three Resolutions

THE following resolutions were passed by the Western Forestry and Conservation Association during the recent Forestry Industry Week at the Panama-Pacific International Exposition in San Francisco:

ENDORSE AMERICAN FORESTRY ASSOCIATION

We desire to express our appreciation of the American Forestry Association, and the excellent work it is performing and particularly commend its participation in the proceedings of this conference through the presence of its officers and members. We urge upon all of our members the need for actively supporting the American Forestry Association to the end that a great national movement may go forward with every possibility of further material accomplishment.

WEEKS' LAW APPROPRIATION

We have found the allotment of funds under the Weeks' law for the protection of forested western watersheds outside the national forests to be perhaps the most practical and effective means not only of stimulating state effort, but also of cementing private, state and federal protective effort into a harmonious and efficient whole. Its value to the Government in these ways is immeasurably beyond its cost. We plead earnestly that it be considered an experiment no longer and that it be made a continual annual appropriation. We pledge our cooperation and support to insure its economical and advantageous expenditure.

We endorse the recommendation of the Secretary of Agriculture that further appropriation be made for the purchase of additional lands at the headwaters of navigable streams in

the White Mountains and the southern Appalachian Mountain and instruct the secretary of this association to request our members to urge the senators and representatives from their several districts to support this measure.

COMMEND FOREST SERVICE

We commend the excellent work of the Forest Service in protecting the national forests as far as its funds permit and especially in developing progressive methods as a contribution to the modern science of fire prevention. We not only speak for the entire forest interests of the west in urging upon Congress to provide liberally for national forest protection, but also believe we are competent to testify as experts to the country at large that greater expenditure for this purpose is necessary to safeguard its forest resources properly.

Children's Department

Devoted to imparting information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.

BY BRISTOW ADAMS

THREE TREES

ONCE upon a time, a long while ago—for that is just the way that all Christmas stories begin—three trees stood fairly near together in the forest. But before we begin, let me make it clear that this is a fable. It is true, with variations.

The three trees were blood brothers, and they had grown for a number of years; but because of the conditions under which they had started, each one had developed a different character; one might almost say that each had developed a soul.

One of them—the tallest—had started in good ground. Straight above him there was an opening in the crowns of the tallest trees around. Just at noon a shaft of sunlight came down through this opening in the leaf canopy and the tree lifted its head up toward the life-giving light, and grew straight, tall, and slender, with a long space between each annual whorl of branches.

The second tree had a much harder time of it. It was more crowded by the other trees, and it had to start in a rocky place. So it grew twisted, and knotty, and cross-grained; it had no decided aspirations and it therefore did not get any place in particular.

The third tree, the smallest of all, started in rocky ground, but there was more than enough sunshine, because of a big opening all around it in the forest. This little tree rejoiced in the light; it spread out all of its arms to welcome the brightness, and was indeed able to develop new arms, or branches, because it had so much sun.

AT the time this story begins, it was nearly Christmas and the branches of the three trees were laden with snow. The slender limbs of the tallest tree did not afford much of a resting place for the snowflakes, so that even in winter it was not in much danger of being broken down. The gnarly tree held some snow on one side, which made it even more twisted and bore some of its limbs down to the ground. The little tree was covered all over evenly, and its sturdy little branches readily held up the white mantle.

Two small boys came trudging through the woods looking carefully from side to side as if they were searching for something. They came first to the tallest tree, and the smaller lad suggested that they cut that one. But the larger boy thought otherwise, and explained that when it was brought in to the house to be used as a Christmas tree there would not be enough close branches to bear the ornaments and to hold the candles. You have guessed by now that these two boys were looking for a Christmas

tree. You have also guessed that they could not take the gnarly tree, because it was crooked, and that their eyes alighted on the little tree with glee, for it was just the kind they wanted.

So the little tree was borne away and made a whole household happy with its greenness and its sturdiness and its exact fitness for the purpose for which it was intended. It stood in the midst of the living-room, and the children danced around it with shouts of joy. And upon the walls there were festoons of what is variously called crow's-foot, or running cedar, or ground pine, or lycopodium. There were wreaths of holly in the windows, and at night a candle burned above each wreath and lighted the snow outside the house. There were colored prints from Christmas editions of the illustrated London papers, and over the fireplace the father of the household had lettered a motto intertwined with yule-tide designs in green, red, and gold:

"God blesse ye mastre of thys house,
And eke ye mistresse too,
And all ye litel childrenne
Thatte rounds ye table goe."

The little tree was glad because it had given service where it was best able to serve. If it had thought into the future it would have known that it could not serve mankind by being made into lumber for his needs, for each one of the many limbs would have meant a knot in a board.

AND what became of the other trees? They grew on for many years, and the crooked tree grew crookeder because it had got into the habit of doing so, and it became more gnarled, knotted, and cross-grained. Because it was crowded and elbowed by its neighbors, and because it had lost the power to reach up and hold itself straight, it finally gave up in despair and became a decayed, unsightly object in the forest.

The tall tree kept growing, and reached up for its spot of light. It knew as well as a tree can know, that if it did not reach that opening above it before the larger trees had closed in that it might as well give up, too, then and there. Finally some lumbermen and foresters went through the woods selecting the trees which should be cut, and those which deserved to be left to continue growing. The tall, straight, slender tree was growing so well that they left it and made use of some of the older ones around, taking care when they felled the others that they should not injure the slender one. When they had taken out the trees which they thought should be cut, and

cleared away all of the waste material in the woods, including the poor gnarled tree, the slender one found that it had all sorts of room and light to grow in, and it set itself lustily to the task of growing. It continued to grow tall and straight, but it began to lay on thickness and to increase its strength and girth.

Some years after that it was time for some more of the trees to serve man's needs, and this time they took the tall straight tree. It was so tall, so straight, so smooth-grained and strong that they selected it for a special purpose. It went to the shipyard and there was made into a round, towering mast. It sailed over all the seven seas, helping to bring delightful things from one part of the world to those who wanted them in another part.

It helped to carry gifts to the old home where the little Christmas tree had stood, sugar, and fruits, and cocoanuts from the tropics, coffee from Brazil to the "master" of the house, and tea from Ceylon to the "mistress," and from China a big lamp for the table, 'round which the "children" used to "goe." From Italy had come a little bronze statuette of a Greek athlete, who was on one side of the mantel, where the Christmas motto had been. He was straining to throw a discus as far as he could. On the other side, from Japan, a little fat, calm, bronze Buddha sat with his feet crossed under him, and his hands held passively in his lap. From Occident and Orient, each according to its spirit, the tall tree had helped to bring them.

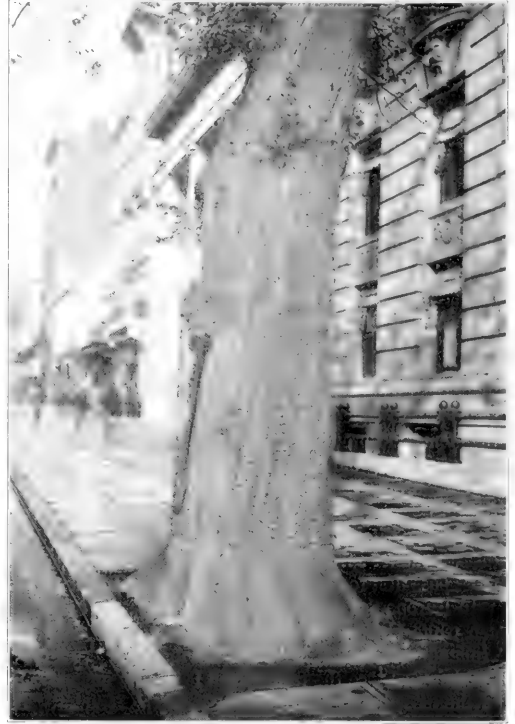
You can believe this story or not, just as you choose; but the forest part of it is true at least. If it sets you to thinking that every life can be made useful, each in its own way, if one will only try, no harm has been done.

FAMOUS TREE SURROUNDED BY PAVEMENT

IT IS always an amazing sight to see a great tree growing out of a crack in a rock, especially if it may have split off a boulder of granite which the strength of a dozen men could not budge. There is in fact eternal warfare between the mineral and the vegetable kingdoms. Rocks and boulders may appear grim and immovable, but their cracks and crevices are eternally being searched by the pliant growth of plants and trees and in the end they always succumb to the attacks of their weaker enemies. For all time this continual battle has been going on, each generation of the plant world doing its share, apparently serene in the knowledge that when it dies its place will be taken by another plant which will continue the conflict.

While the ability of trees to grow and thrive in rock soil, or perhaps in rocks where no soil is visible, has probably been noticed by most everyone, there is perhaps no more striking evidence of this than can be seen in most any large city where the streets are paved with concrete or asphaltum. The city of Washington, for instance, has dozens of large and thrifty trees which are growing in little plots of soil not much larger than flower pots. Illustrating this is the photograph of a large elm tree which has stood in front of the Willard Hotel on Pennsylvania Avenue since long before Civil War times.

When the tree was first planted the street was paved with cobble stones and the sidewalk was of ordinary porous brick, so that with a plentiful supply of moisture soaking through on all sides the tree might have been expected to thrive. But for the last 30 years the street has been paved with impervious asphaltum and for the last 18 or 20 years the sidewalk has been paved with equally water-



HOW DOES IT GET WATER?

This elm in front of the New Willard Hotel at Washington, D. C., is on a street paved with asphalt and a sidewalk of concrete. It thrives despite the fact that apparently it gets very little moisture.

tight concrete, through neither of which a drop of moisture can penetrate. All the moisture that this great tree can get must come via the small square of earth which its trunk nearly fills, and which would seem hardly sufficient to nourish a good sized shrub.

This old tree has witnessed many famous historical scenes. It has seen the marshaling of the Federal hosts at the first call to war in '61; the passing of the proud columns of McClellan toward the battlefield of Bull Run and their sorry return, and finally, when the great conflict was ended, the Grand Review of the battle-scarred veterans of Grant, Sherman, and Sheridan, and very recently the veteran remnant of that great army. It has seen many Presidents of the United States pass to and from the White House on their way to the Capitol to take the oath of office and to surrender the reins of government and, judging from its sturdy appearance today, it will see many more.

WHITE PINE THREATENED

FOUR recent serious outbreaks of the white pine blister rust on currant bushes in Massachusetts and New York have called attention sharply to the alarming character of this disease and the economic loss which it threatens in the northeastern and western United States unless it can be brought under control within the next two years. This disease has been known for some years, having been introduced at many points on white pine nursery stock imported mainly from Germany. The disease first established itself at Geneva, N. Y., in 1906. In 1909 extensive importations of diseased white pine nursery stock were located and destroyed in New York and other eastern states and warnings issued broadcast against further importation of white pine from Europe. In spite of these warnings importation continued even from the particular nursery in Germany which was definitely known to be the main source of disease, until finally in 1912 all such importation was stopped by Federal law. Whether this law was passed too late remains to be seen, as it depends on whether the disease already established in the United States can be stamped out.

The white pine blister rust affects the eastern white pine, the western white pine, the sugar pine and, indeed, all of the so-called five-leaf pines, producing cankers on the stems and branches, killing young trees and maiming and disfiguring old ones. It also produces a leaf disease of currant and gooseberry bushes. The fungus causing the disease must live for a part of its life on pine trees and part of its life on currants and gooseberries. The disease cannot spread from one pine tree to another, but must pass first to currant bushes and then back to pine.

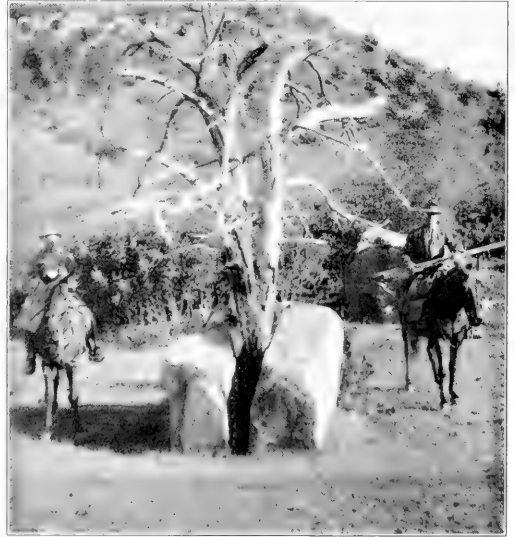
In Europe the disease has made the culture of American white pine impracticable in England, Denmark, and Holland, and has seriously handicapped its cultivation in Germany. Since the trees which it attacks include three of the most important timber trees of the United States, the loss which this disease will produce if unchecked is uncalculable. Fortunately, the disease is not now known to be present west of Buffalo, N. Y., but its ultimate spread to the vast forests of the Rocky Mountains and the Pacific Coast is certain if it is not checked in the eastern states. The disease now occurs in three localities in New Hampshire, two in Vermont, two in Connecticut, five in New York, one in Pennsylvania, and three in Ontario, Canada. At one point in Ontario, two in New York, two in New Hampshire and two in Massachusetts, the disease is present on currants in sufficient quantity to be serious.

The disease is controllable at this stage by the destruction of the diseased white pines or the complete destruction of all currant and gooseberry bushes in the vicinity. Whether or not this simple action can be accomplished depends upon the legal authority possessed by the various

state horticultural inspectors concerned. If the inspector is not armed with authority to destroy either currant bushes or the few diseased white pines with or without the consent of the owner, all efforts at control will be unavailing, as a single person, by permitting diseased pines or currants to remain on his place can nullify the work of an entire well-disposed community. The immediate issue, then, is whether the several states will see that their inspectors have sufficient authority or whether still another imported disease shall be added to the already long list of undesirable fungus and insect immigrants, and the white pines of the United States be reduced from their present high standing to that of inferior trees.

PINON TREE SPLITS LARGE ROCK

THE great rock-splitting force of a growing tree is shown in the photograph of a piñon tree in the Mesa Verde National Park, of the State of Colorado, at the head of Prater Canyon. The tree is dead



ROCK SPLIT BY A TREE

The force of a growing tree is illustrated by this picture of a piñon tree. The rock is deeply imbedded in the earth, yet it was split by the growing tree.

now, but this is due to old age, not to any squeezing of the stone. The tree made a full and healthy growth, bearing doubtless many bushels of piñon nuts, and gradually widening the crack in the rock as its trunk required more and more space. The power exerted by the tree is all the more remarkable as it is evident that the sandstone boulder is embedded in the earth to a considerable depth.

Wood Preserving Department

BY E. A. STERLING

Wood Preserving Experts to Meet Next Month

THE twelfth annual meeting of the American Wood Preservers' Association will be held at the Hotel Sherman, Chicago, January 18, 19, 20, 1916. The program will be devoted largely to the reports of standing committees on Preservatives, Specifications for the Purchase and Preservation of Treatable Timber, Wood Block Paving, Plant Operation, and Service Tests, the latter under the three divisions of cross ties, wood block paving and bridge and structural timber. In addition to the committee reports, addresses and papers will be presented on pertinent subjects. Full information and advance copies of committee reports may be obtained before the meeting from F. J. Angier, Secretary-Treasurer, Baltimore, Md.

In addition to the many activities in the way of establishing standard practice in the use of preservatives and treating processes, and in keeping the industry informed of progress and developments, the American Wood Preservers' Association publishes a house organ, *Wood Preserving*. This is edited by C. C. Schnatterbeck and is issued quarterly under the direction of the Executive Committee. It contains much of interest to all who are interested in any phase of wood preservation, the subscription price being only \$1 per year.

As an indication of the growing general recognition of wood-preserving possibilities outside of the fully established fields of railroad ties, bridge timbers, marine work and wood-block paving and flooring, the question of its application to retail uses was thoroughly discussed at a recent meeting of the Southern Pine Association and Retail Lumber Association Secretaries. While many difficulties arise in attempting to distribute pressure-treated lumber in retail yards, it was the opinion that at least a start should be made by promoting the local use of suitable preservatives for brush treatment, and by the installation of open-tank facilities in connection with retail yards. With this, of course, would have to be proper education of the consumer as to why treatment is advisable and how to apply it to best advantage.

From the standpoint of the average consumer, really more has been expected of wood and less done to help it serve a great variety of uses than almost any other building material. It is a comparatively modern conception that proper preservative treatment is practical and economical on the farm and around the home. Good paint is a good friend of lumber, and while not usually con-

sidered in that light, is the one protection against the natural progress of decay which has been universally used. Yet the well painted house has unprotected floor beams in moist walls, door steps on wet ground, and many inside surfaces and timbers which are continually exposed to conditions favorable to decay. The wonderful service which wood has given during all the years, with meagre or no thought to the factors which destroy, brings into greater prominence the possibilities of preservative treatment under the present day desire for permanence and elimination of waste. No one expects unprotected steel to do anything but rust, concrete is waterproofed and its surface protected from abrasion and disintegration, fabrics are shielded from the elements, while wood has largely been left to shift for itself. The application of wood preserving methods to the every day uses of lumber, where it needs protection from decay, is in keeping with modern ideas.

Closely related to preservative treatment against decay is the development of fire retardant materials and processes, particularly for shingles. While only 27 per cent of all fires spread to adjoining buildings, and individual carelessness and character of contents, rather than the material of which buildings are built, are responsible for most fires, it is an additional measure of safety to have fire retardant shingle roofs. Dr. Herman von Schrenk, who has for several years been testing all available materials, recently announced that the long search for a satisfactory fire retardant was practically ended. Materials have now been found which effectively protect shingle roofs from sparks and brands, and prevent the spread of a fire on such fire-proofed wood. Almost simultaneously the Forest Service announced the development of a fire-proofing chemical. These same materials, in most cases, act to prevent decay as well as fire.

DOMESTIC WILLOW CULTURE

In view of the present war in Europe and a consequent cessation of most of the hitherto imported supply, domestic willow culture has within a year assumed an importance which it has not had before. Planting already done in Maryland points to willow culture as a successful enterprise, of which a study and report are at this time being made. The study should result in better methods for the grower, and it is the aim of the report to give such information and encouragement to both present and prospective planters in this State as may induce them to take advantage of existing opportunities in osier culture.

Editorial

THE BUSINESS SIDE OF FORESTRY

FORESTRY means different things to different persons. Each individual is interested most directly in the things which in some way add to his personal enjoyment or income. The forest contributes to our welfare in three distinct ways: first, as trees and woods to be enjoyed by the eye and as breathing spaces for recreation and escape from civic confinement; second, as a great protective mantle to preserve our mountain slopes, regulate the flow of streams and ameliorate the climate; third, as a source of wood for the many and complex needs of our modern civilization.

At first glance, this last object is utterly opposed to the first two. Instead of forest preservation, it calls for forest destruction—for how else can wood be obtained than by felling the forest? The strong appeal which sentiment makes to the town-dweller thus tends to array him against the economic use of wood and in favor of exclusive devotion of the woodland areas to the single purposes of recreation and protection. Yet if this theoretical conception should be practically applied, resulting in the cessation of the use of wood, an industry occupying second rank in value of output in the United States and representing an investment of over six billion dollars would be paralyzed, 700,000 men forced to seek other employment, and untold suffering and privation caused to millions of our people. So extensive and intimate is our dependence upon wood products that there is not a man, woman or child whose comfort and well-being would not be directly and materially injured by such a calamity.

When the facts are faced, no one can honestly oppose the felling and utilization of the forest as an abstract proposition. But short-sighted and zealous nature lovers, putting their personal feelings before their common sense, actually and whole-heartedly believe that forest "destruction" is an unmixed evil and that every acre consecrated to perpetual "preservation" free from the ax is so much clear gain for human welfare. So we have the spectacle of a great state devoting 1,800,000 acres of wild and largely inaccessible land to perpetual wilderness, and by constitutional restrictions preventing the utilization of the timber.

But this sentiment is not altogether blind. The public have for generations witnessed the effects of lumbering on privately owned lands, by men whose acknowledged object was to strip the land of all forest values and then abandon it to fire or taxes. "Destructive" lumbering had for its sole purpose the conversion of the raw material, trees, into products for the many uses and needs of our expanding civilization, at a cost which would leave a living profit. The conception of commercial forestry, the actual growing of trees to replace those removed, was looked on by these practical men as fantastically impossi-

ble. This conviction, although based on the soundest of business reasons, reacted to strengthen the sentiment of others in favor of preserving the standing timber from similar destruction, and furnished a psychological explanation of the outbursts of hostility to the lumber business which have tended to create an atmosphere of strain and resentment. Lumbermen feel that they are in most cases doing all they can afford to do for the forest. Their service to the public does not consist in growing the timber, but in bringing it to market in the form of useful commodities.

It is the misfortune of the lumbermen that in most cases they have been forced by necessity to acquire and own timber stumpage. The care of timber lands is a business in itself. Public welfare demands that these lands be kept productive—that timber crops succeed the present virgin forests. This the lumberman is ill-equipped to do. His investment, his training, his business, lie along wholly different lines. In most cases he can see nothing but financial loss in expending large sums upon tree planting, thinnings and other measures of forest production. We should not blame him; but we do. The sooner we realize our error, the better it will be for all concerned. *Forest production is a business in itself.* And it is *not* the business of the lumberman, unless he voluntarily chooses to undertake it. The growing of commercial forests is fundamentally a business for landowners, large or small, who intend to hold the land in perpetuity. If lumbermen could be guaranteed a sufficiently large and permanent supply of timber, they would be far better off if they did not own an acre of timberland, but purchased their raw material as they needed it, from the producers. This startling truth is just being realized in part by the lumbermen of the west coast today, who are being slowly crushed beneath the burden of carrying charges on vast volumes of stumpage, once eagerly acquired, and now hanging like mill stones about their necks.

We cannot escape the conclusion that the business of growing timber and of owning timber lands is one in which the public must be directly and largely interested and that one solution is offered by the existence and creation of national and state forests. The *American Forestry Association* stands primarily for forestry, which means the business of producing forests upon forest land, and any rational measures, public or private, which will further this economic result, will receive our unqualified support.

But economic forestry, or commercial timber growing, will never be profitable unless wood continues to be regarded as indispensable and the demand for forest products is maintained. The business of forestry is de-

pendent for its success upon the continuation of the great wood-using industries in just as real a sense as they in turn will depend upon forestry in the future to produce their raw material. Two paths are open: conservation through diminished use of wood, the encouragement of substitutes, and the resultant condemning to perpetual waste of all forest lands whose timber crop has been

cut or destroyed; or conservation through wider use of wood, the retention of wood as a primal necessity of commerce and civilization, and energetic measures to create and maintain the business of forest production to provide the wood for the future. The latter course means true forestry and to the accomplishment of these aims the Association will direct its efforts.

"Looking Squarely at the Waterpower Problem"

BY HENRY J. PIERCE

Reviewed by Henry Sturgis Drinker, President of Lehigh University

THIS treatise admirably and succinctly summarizes from the standpoint of the engineer and business man the waterpower problem in the West.

Mr. Pierce in this work has presented in a condensed yet very interesting and readable form—and with great fairness—the present status of the waterpower discussion in the West, speaking from the standpoint of the investor and development engineer. The book opens with the following foreword:

"Our refusal to develop our wasting waterpowers constitutes the strangest feature of our national conduct. For the greater part our waterpowers are idly wasting their energy. The reason is that we have not yet been persuaded to enact laws under which money may confidently be invested in them. Until we do this our waterpowers will be as useless to us as though situated on another planet."

This is followed by an address to the members of Congress and others in authority, in the course of which the author says:

"It is inevitable that the waterpower question must soon be dealt with by Congress. Unless that dealing is wise and business-like, the effort will be useless. As will later be shown, the waterpower business involves a multitude of investment risks. There are nearly 5,000 standard investment securities for sale in the open market. The waterpower business must compete for money with all of these other standard investments. It ought to be apparent that any waterpower law under which an invested dollar is inevitably doomed to depreciation will not encourage waterpower development.

"If, in considering legislation, our lawmakers, while protecting fully the public interests, will at the same time apply the homely and familiar rules of honest business and will searchingly test each section of a legislative bill by determining whether, under the terms proposed, they would be willing to invest their own money, or were they executors of an estate, the money held by them in trust, the path to power development and all its manifold benefits will be greatly smoothed."

The author has an enlightening discussion on the topic of "How the Nation Is Concerned" with this great question—followed by a further study of "The Practical Side of the Question," in which he summarizes the available water horsepower of the country, and its possible application when developed to many markets and uses, among them "The Electric Furnace," and "Transportation."

The eminently valuable, wholly original, and practical nature of this work by Mr. Pierce, centers mainly in his discussion of the pregnant question, "What are We Quarreling About?"—pages 25 to 34, which opens with this paragraph:

"More than one man who has, with open mind, investigated this national waterpower controversy, has closed his review by asking, 'What are they quarreling about?' Here is a controversy of about eight years' standing, which has prevented economic development in the United States to the extent of hundreds of millions of dollars. It has caused and is causing sectional discontent and suspicion where nothing but harmony and industrial cooperation should prevail. Some entire States feel that they are harshly and inconsiderately treated by the Federal Government—that they are being strangled by the hand of might. There is a widespread contention that the western waterpower States are being denied the sovereignty to which they are entitled under the Federal Constitution, and are having their growth impeded and are being impoverished because such large proportions of the lands in such States are withdrawn by the Federal Government for waterpower purposes. Such lands are not subject to local taxation, although the communities and States are burdened with the maintenance of the law on those withdrawn lands. There is bitter complaint that although those lands were withdrawn from sale or entry under the pretext that they would thereby be rendered readily available for power purposes and thus their use for such purposes would be facilitated and encouraged, yet present laws make it impossible to use them—laws of fulsome promise but of deadly effect.

"Such are the consequences. Yet strangely enough, the real differences between the contending parties are so small that it seems as if an hour's consideration by full-grown men ought to remove all cause of controversy. Therefore, is it not time that the leaders on both sides pause for a while and reason a little? Perhaps it will be found that some are continuing the quarrel merely from force of habit. Well, then, what are we quarreling about?"

This is followed by a series of questions by "Theory" and answers by "Practice," which should appeal to all true conservationists as a most fair-minded presentation of the whole matter, and as showing, as indeed was developed in Congress last year in the hearings on the Ferris bill, that there is today no great conflict of opinion on these matters, but only an apparent inability to get together frankly and with a mutual desire to end an unnecessary difference.

"Theory—You waterpower people can't have any more perpetual permits to build and operate dams on navigable streams, nor can you have any more fee titles to public lands which involve waterpower sites.

"Practice—All right; we gave up expecting such things long ago and have planned accordingly in our calculations for the future. We had supposed the policy was all settled; why do you keep on making speeches about it?

"Theory—Waterpowers must be developed under a permit or some form of term grant running, say fifty years, after which the people must have the right to take over the property.

"Practice—Are you going to pay us for the property when you take it over?

"Theory—Certainly, we shall pay the fair value.

"Practice—Good scheme—we're all agreed.

"Theory—But we are going to pay you only for the fair value of the property, and for no blue-sky stuff, like capitalized value of the permit and the Government lands occupied, goodwill, profits that you expect to get from contracts, nor anything that is not actually put into the property as a hard-cash investment or its equivalent.

"Practice—All right again—don't want to be paid for any blue-sky stuff.

"Theory—And we want you to make prompt development of the properties under permit and not to hold them unused for speculative purposes.

"Practice—Of course, we agree; and even if we didn't, the fact would still remain that money is too scarce and too valuable to throw around and leave idle in such a manner, even for speculative purposes.

"Theory—There shall be no artificial manipulation of things, nor any jockeying to the end that the consumers' rates shall be raised or that service be deficient or discriminatory.

"Practice—No; such things shall not be. Under modern practice the power business must be conducted on the large-volume and small-profit plan, which necessitates low rates and equal service. But even if this were not so, public regulation through commissions now established in nearly every State of the Union will prevent high rates and discriminatory service.

"Theory—Your consumers' rates should be as low as commensurate with a reasonable return to the capital actually invested, irrespective of stock issued.

"Practice—Certainly; just a reasonable return on the actual cash value of the property. The stock issued has nothing to do with the case, and is to be disregarded entirely, no matter whether it be represented by actual face value in the plant, or be watered to a million times that amount. This 'reasonable return on a fair value' idea, regardless of stocks or bonds, is universally an established principle in public utility regulation. A reasonable return has been well defined as the lowest return that will induce investors to purchase the securities of any particular investment. A larger return is unreasonable, and a smaller return will fail to get the investment capital. The only complaint that we have is that some of you people have selected public-land and navigable-stream power plants as subjects for strict regulation by the Federal Government, but do not propose to exercise such regulation over plants that happen to be located on private lands. Regulation is a great and necessary institution; it should be exercised indiscriminately and not concentrated on projects that happen to be located on sites either owned or controlled by the Federal Government. Private-land plants and Government-land plants should operate under exactly the same burdens and same laws."

Space cannot be taken here to quote the remainder of these questions and answers—nor those of "Practice" later addressed to "Theory"—but their study will be a good investment of time by those interested. The effect of this treatise is to enforce the lesson that the Government and those desiring to put money into waterpower

development are so nearly in actual accord that it would seem to be a comparatively easy task for a clear-headed business-like congressional committee to be able in the coming session of Congress to devise and recommend legislation fairly covering the situation. Nothing better emphasizes this than Mr. Pierce's words under his heading, "Who Pays for Unfair and Restrictive Legislation?" when he says:

"Who pays? No one but the consuming public. Well-meaning speakers and writers blessed with patriotic regard for the public welfare have thoughtlessly advocated many things, the effect of which would be to impede the progress of the waterpower developer, restrict his operations or prevent his exercising skill, enterprise or other goodly quality in the interest of his business. It will not be practicable to enumerate and discuss all such instances here, but everyone familiar with this subject will recall one or more. Those who propose such things do not need to take the word of anyone; let them get right down to fundamentals, use some good old-fashioned arithmetic, and they may prove to their own satisfaction that the consuming public pays and pays right well."

"The Waterpower Business and Its Risks" are well discussed by Mr. Pierce in a succeeding chapter, and in discussing the viewpoint of the banker financing a waterpower project, Mr. Pierce says—

"He must look beyond the fact of a paper offered as security for a loan. He must be satisfied that the maker of that security is able to sustain the obligations entered upon. He notes the waterpower hazards above discussed and he rightfully demands that if his clients must sustain these hazards they must, on the other hand, have a good title, a fair chance for an assured return of principal and reasonable interest and that the terms and conditions written into the franchise shall be definite and without unnecessary financial peril—that the occupation of the land is a matter of right and not of grace."

The chapter on "Waterpower Ownership and Control" and its intelligent discussion of the charges of oppressive monopoly—and that on "Waterpower Legislation" are illuminating and of great interest—and the author's final "Conclusion" is an admirable summary of the situation as it exists today. What could be said more plainly and in good, plain, common-people's English than the following—the concluding paragraphs of Mr. Pierce's treatise:

"Confidence in waterpower investments cannot be restored by mudslinging speeches and writings. We cannot hasten the day of waterpower development by calling each other fools or rogues, or by inciting class against class or by promoting prejudices. The man who is skillful enough to build and operate a waterpower and the man who is brave enough to finance it are surely deserving of reward, and they are not, by such acts, necessarily made over into thieves and oppressors as some would have us believe. On the other hand, the man who stands fast for a fair and righteous deal to the public is not a charlatan and a seeker for cheap notoriety, as others would have us believe.

"As has already been remarked, all parties are very close together. Some of the remaining differences are mere matters of terminology. Instead of 'lawling out' a proposal merely because it is advanced by a waterpower man, would it not be better to get beneath the surface and judge it upon its merits? Instead of scoffing at another proposal merely because a 'conservationist' without waterpower experience, expresses it, let us see whether it does not have that estimable advantage of perspective. We want waterpower development as soon as possible, and it makes not a shade of difference who, in the controversy

of the past eight years, has been right and who has been wrong. The cause is bigger than any man or group of men. Let us forget the past and start new.

"We are sure of a few things:

"1. That it is not safe nor ultimately profitable to conduct an industry in a wrongful manner; this is one of the axioms of modern business and the successful waterpower business rests absolutely upon it.

"2. That the waterpower men do not expect to get from the Government more than is fair, and they do not expect to conduct their business in a wrongful manner. If they had other expectations or intentions, Congress would see to the one and public service commissions to the other.

"3. That there will be no waterpower development commensurate with the resources of the country unless congressional legislation will so safeguard development as to encourage investors to put their savings into waterpower enterprises and thus permit waterpower companies to obtain ample capital at reasonable rates.

"4. That Congress and the various State legislatures can control waterpower companies engaging in public service business—can control their rates and service—and it is not necessary to impose conditions hindering or restricting development and the acquisition of capital in order to insure fair treatment of the consumer.

"5. That every petty burden and every irritating limitation placed on a waterpower development for the purpose of 'protecting the public' is and must be paid for by the public. Therefore, in setting up these things for the public good, it is always well to ascertain whether or not some of the many obstructions really are for the public good and whether in each case the good derived is commensurate with the cost. It is only when the benefits equal or exceed the cost that such things are wise.

"6. Finally and most important—waterpowers on the public lands and on the navigable streams will always be commercially inferior to and will lag behind those developed on non-navigable streams and on private lands unless the conditions and stipulations governing the former are at least as favorable as those governing the latter."

The work closes with appendixes giving full reports and analyses of the national legislation considered by Congress at its last session—the Adamson Bill and the Adamson-Shields Bill, the Ferris Bill, the Jones Bill and the Works Bill.

YOSEMITE PARK IMPROVEMENTS

SECRETARY OF THE INTERIOR LANE has completed plans and signed contracts for hotel and camp and transportation concessions in the Yosemite National Park which insure its future along lines of development commensurate with its scenic and recreational value and in response to the new attitude of appreciation on the part of the American public toward their National Parks possessions. It is expected that half a million dollars will be spent in the Yosemite during the coming year in realizing these purposes.

Concessions have been granted to the Curry Camping Company for Camp Curry, to William M. Sell, Sr.; for Camp Ahwahnee, to William M. Sell, Jr.; for Camp Lost Arrow and to the Desmond Commissary Company, which operated a successful camp in the Valley last summer, for its continued operation and for other developments

from which results of interest and importance are expected.

In accordance with these concessions the Desmond Commissary Company will build a new and thoroughly modern hotel on the floor of the Yosemite Valley which will cost approximately \$150,000. Operations to this end will begin immediately, and, until completion, these concessions will operate the old Sentinel Hotel. The new hotel will inaugurate General Superintendent Daniels' plan for a new Yosemite Village to gradually replace the present village with one of beauty, unity of design and fitness to its environment. The same company will also build a hotel at Glacier Point which will cost approximately \$35,000. This point commands one of the noblest views in America, but so far has been accessible principally as a side trip to and from the Valley. This hotel will probably be ready for patrons during the coming season.

Four comfortable chalets will also be built for next season's use. Two of these will be located on the old Tioga Road which the Department of the Interior acquired and improved last summer and which Secretary Lane purposes to fully develop during the coming year. It crosses the Yosemite National Park north of the Valley forming a new highway over the Sierra and making access with cheapness and comfort to the hitherto inaccessible scenic beauty of the northern part of the park. These chalets will afford convenient stopping places for motorists and other visitors, thus enabling tourists to enjoy a part of the park which would involve prohibitive cost were these accommodations not made available. Another chalet will be built at Lake Merced and a fourth in the Little Yosemite. All four will have a thoroughly modern equipment and will be run in connection with the two new hotels.

Work on all will begin as soon as weather conditions permit. Additional chalets will be built as rapidly as the demand for this class of service requires and the northern part of the park becomes accessible. Transportation facilities provided for in the new concessions promise results of corresponding importance. It is contemplated that the Desmond Commissary Company will take over the concessions now operated between El Portal and the Yosemite Valley by arrangement with the present concessioner and will operate a motor service. This concessioner will also operate a motor service between Crocker and the Valley over the Big Oak Flat Road recently turned over to the Government, and another over the Tioga Road. A. B. Davis will continue his auto stage line between El Portal and the Valley by way of the Tuolumne Grove of Big Trees, and the Yosemite Stage and Turnpike Company will continue its line between the Valley and Wawona and the Mariposa Grove. All these undertakings will be under strict Government supervision as regards rates. One of the Department's most cherished objects is to make the Yosemite available for the use and enjoyment of people of moderate income, and the rates will be kept as low as it consistent with good service and a reasonable return on the investments of the various concessioners.

The Appalachian Park Association

By GEORGE S. POWELL, *Secretary*

THE mission of the Appalachian Park Association is to make known more generally the advantages and attractions of the Southern Appalachian Mountains as a pleasure and recreation resort, to cooperate with the National Government in protecting and conserving the forests and streams of these mountains, and aid in developing and encouraging the tourist business.

We now have an opportunity to greatly further this work by showing the people of the South the importance of getting prompt and favorable action from Congress upon the recommendation of the National Forest Reservation Commission, for a further appropriation, providing for continued purchases of lands under the Weeks law, until 1920, at the current rate of \$2,000,000 a year.

The general condition of the National Forests of the South at this time as to areas and contiguity, is not such as to warrant the hope for much practical development along the lines of pleasure and recreation, until these conditions are bettered by additional purchases, making larger contiguous areas, and thereby affording opportunity for development along broader and more economical lines.

Good roads must, of necessity, be a prime factor in promoting the tourist business in these mountains, and while the expectation of good road construction has aided in securing public endorsement of our purposes, we realize that anything like a connecting system of roads through the National Forests at this time, is not feasible. We should, therefore, direct our efforts for the present, to additional purchases, and making better known the attractions of this region in climate, scenery, water, fishing, hunting, trails, etc.

Secretary Lane, of the Interior Department, estimates that \$100,000,000, which, under ordinary circumstances would be spent by American tourists in Europe, this year will be held in the United States. When we take into consideration the magnitude of the tourist business, the large profits derived from it, and the opportunity made by the war in Europe for the United States to secure for at least many years a large part of this business that has heretofore gone abroad, we can understand why our people are urging greater use of the National Parks and Forests for pleasure purposes.

If the Southern Appalachian Mountains were made as accessible by good roads, as the mountains of Switzerland, or even as some of the National Parks of the West, the tourist business would bring more clear profit to the six States bordering on these mountains, namely: Virginia, Tennessee, Alabama, Georgia, South Carolina and North Carolina, than probably any crops produced in these States, excepting cotton and corn.

With these opportunities for developing so profitable a business at a small cost, it is hoped the newspapers and business organizations of the South will begin an active campaign to secure from Congress favorable action upon the recommendation of the Commission, so that purchases under the Weeks law, may be completed and a comprehensive plan of development begun providing for greater use of these forests for pleasure and recreation.

WORK NOW AGAINST GIPSY AND BROWN-TAIL MOTHS

IN THE areas infested by the gipsy moth or the brown-tail moth, much effective work can be done in the fall to reduce the damage that these insects are likely to cause the following year, according to entomologists of the United States Department of Agriculture. The which remains on the tips of the twigs and branches during the winter. These webs should be cut and burned so that injury will not be caused by the caterpillars the following summer. Particular attention should be given to webs of this insect on trees which grow around dwellings or in orchards.

The apple, pear, cherry, oak and willow are among the plants which are favored as food by the brown-tail moth caterpillars. In order to minimize the damage which is likely to result, as much time as possible should be devoted to cutting and burning worthless or seedling apple trees and wild cherry trees and brush. If this is done along the roadways and fences, the appearance of the region will be greatly improved. Care should be taken to protect pine and other coniferous trees, and hickory and ash should not be cut, as they are not favored for food either by the caterpillars of the gipsy moth or by those of the brown-tail moth. The oak is a favored food of the brown-tail moth and of the gipsy moth, and wherever it is possible to eliminate oaks less annoyance from these pests will be experienced.

FEW FOREST FIRES

DURING the present year there have been but 14 forest fires on the Black Hills National Forest. The total area burned over is about 13½ acres. Both records have never before been equaled in this region. The absence of fires is of course primarily due to the excess of moisture and it may indeed be a surprise to think that conditions have at any time been such as to even make a forest fire possible.

Although weather conditions have been very favorable the vigilance of the Forest Officers is not permitted to lag, for danger is ever present and is not finally removed until there is a good mantle of snow throughout the Hills.

Forest Notes

Georgia State Forest School

A bulletin of the Georgia State College of Agriculture gives considerable space to the forest school department which is making such excellent progress under the direction of Prof. James B. Berry. A four-year course is given in technical forestry and allied subjects to those who desire forestry as a profession, short practical courses for those students in agriculture who desire general knowledge as to the management of small tracts of timberland, direct assistance to residents of the state in the management of forest property, and general research along the line of problems now confronting the state.

In the four-year professional course, opportunity is given to specialize in certain main lines and provision is made for six hours of elective work throughout the Junior and Senior years. For those students desiring to specialize in City Forestry an opportunity is offered for the election of Landscape Gardening and allied subjects; for those desiring to specialize in technical forestry, with the object of entering the federal or state service, the election of advanced courses in Botany and Forestry; for those desiring to specialize in Lumber Salesmanship and Mill Superintendency, the election of courses in Economics and Business Administration; for those desiring to specialize in Dendro-pathology, the election of advanced courses in Botany.

North Carolina's Meeting

The North Carolina Forestry Association will hold its sixth annual forestry convention in Newbern, North Carolina, on Tuesday and Wednesday, January 18 and 19, 1916. This is the first time the Association has been called to meet in the eastern part of the state, and it is expected that this departure will be amply justified by the increased attendance. The Coastal Plain region of the state is the seat of the North Carolina pine industry and is the greatest lumbering region northeast of Louisiana. A large lumbering concern has kindly tendered the convention an excursion over one of its operations. This trip will be arranged for the second day of the meeting. In this way the delegates will have an unequalled opportunity of learning of some of North Carolina's most pressing forestry problems at first hand.

Forester Appointed

Henry B. Steer, a graduate in forestry, class of 1914, has just received an appointment for forest work in the Indian Office, United States Department of the Interior. He will work on the eastern Cherokee lands in western North Carolina. Where for-

ested areas exist in connection with Indian reservations, it is the aim of the Indian Service to give these resources their fullest possible use by harvesting the timber under proper forest management. The Indian office has a regular corps of foresters and resident forest officers on most of the reservations where timber is growing.

Short Forestry Course

Prof. Hugo Winkenwerder, Dean of the Department of Forestry at the University of Washington, Seattle, announces that a short course in forestry and lumbering is to be given at the University this winter from January 3 to March 28. These short courses are offered for the benefit of persons engaged in some phase of the timber industry and who desire to increase their efficiency, but who cannot take the time required for a broader course. In outlining the courses a special effort has been made to have them simple, concise and thoroughly practical. The work is given by means of lectures, quizzes, laboratory and field practice. Although the time is only of twelve weeks' duration, the location of the University and equipment makes it possible to do thorough work in the subjects given. A high school training is not necessary for entrance, but students should be at least 20 years old. Three distinct courses are offered: Forestry, Logging, and Lumber and Its Uses.

Lecture Course on Lumber

The University of Wisconsin, through its Extension Division, will shortly begin an evening lecture course on Lumber and Its Uses, in order to give the makers or users of wood a greater knowledge of the structure of the material with which they deal. The plan has won the instant approval of the Lumber Dealers' Association, the Milwaukee Chapter of the American Institute of Architects, and the Mill Workers' Association, and a number of their members, nearly all of them heads of firms, will attend the classes. The work, however, is not intended only for builders and manufacturers, but is adapted to meet the needs of draftsmen, painters, furniture and cabinet makers, and men of other industries which deal in wood.

Books on Forestry

The Extension Service of the New York State College of Forestry is arranging a number of sets of books on Forestry and related subjects, to be used as small circulating libraries throughout the State. The list will include a number of important State and National bulletins as well as

some fifteen standard books. The Extension Service hopes to have these circulated widely among study clubs, schools and debating teams in the State.

Directory of Wood Users

The Department of Wood Utilization in the New York State College of Forestry is maintaining an ever-increasing directory of active users and producers of forest products throughout the State of New York. A series of Wood Utilization service bulletins are published each month containing a list of the needs or offerings of the Department's correspondents. It is encouraging to know that the Service has been of tangible value and that a large number of profitable sales have been brought about through it. In a number of instances manufacturers who have thrown away a certain class of waste heretofore have been brought into direct contact with some concern which could utilize just this sort of waste material.

Trees Dynamited to Stop Fires

Out in the forest near Mount Baldy, Los Angeles, California, a fierce forest fire was raging recently. After it had blazed for several days it was brought under control. The next day a fresh wind started the fire again and it threatened destruction to the entire forest. After all other methods had been tried, dynamite was secured. Hundreds of trees were dynamited to make the fire break, and it was soon put out. The dynamiting was in charge of Ranger Fritz, of Camp Baldy Station, and three forest patrols.

Berks County Work

During the past six years it was noticed that the water supply was failing in Berks County, Pa., and the chestnut trees were dying, owing to the blight. The cause of the failing water supply was not so easily explained. An investigation proved it was due to careless lumbering and frequent forest fires which had ruined the forest floor almost over the entire county. Lack of water power had closed up grist mill after mill until barely a half dozen out of hundreds that were once operated were now able to drive their wheels even for two days in succession.

What to do to remedy this matter was a question. Daily during the summer months the press was filled with items about wells going dry on the farms. Next Burgesses curtailed the use of water in the towns, stating that the supply was low. This condition inspired S. L. Parkes to form the Berks County Conservation Association, and this was done a year ago.

The organization immediately became active and during the year, the work ac-

complished by it has thoroughly aroused the community to the needs of such a body.

The first thing that was undertaken was the reforestation of bare and unsightly spots on the Reading Mountains by planting 3,000 seedling pines. A paid forest fire patrol of fourteen men was placed on duty, as well as a mounted patrol of six men composed of two details of State police. Fire wardens were appointed by the State Commissioner of Forestry. Two model forestry stations were established at two orphans' homes in the county, where the trees were planted and cared for by the orphans under the supervision of Mr. Parkes. Seven thousand seedling pines were planted by 125 members of the 1916 class of the Boys' High School, on Mt. Penn, Reading, and the following day Mr. Parkes took 431 pupils of the Girls' High School out on the Antietam watershed, where they planted 8,000 seedlings.

Several boroughs were also interested in planting trees on their watersheds, this planting being done by school children. One idea that Mr. Parkes is proving is that school children as well as individual woodlot owners should be interested in reforestation. The city of Reading, at the suggestion of Mr. Parkes, was induced to start a municipal nursery. Fifteen thousand seedlings are growing nicely. Over 50,000 seedlings have been planted in the county so far.

New York's Steel Look-out Tower

According to the report of District Forest Ranger Todd made to the Conservation Commission at Albany, an all steel mountain observation station in the forest fire service has just been completed. The tower is on Balsam Lake mountain in Ulster county, is forty feet high, and was constructed at a cost of \$135. Twenty-five dollars of this amount was donated by George J. Gould of New York City, who owns considerable forest land within the range of the station. The erection was done almost entirely by the forest rangers. The value of steel towers on mountain stations has long been appreciated by the commission and as soon as the necessary money is available, steel towers will be substituted for the unsteady wooden structures now in use.

Alaska Forests Reserved

Upon the recommendation of the Secretary of the Interior and of the chairman of the Alaskan Engineering Commission, the President, in accordance with the Alaskan railway act, has signed an order establishing an extensive timber reserve, approximately 200 miles in length and from 5 to 10 miles in width, in that territory, to be known as "Alaskan timber reserve No. 1."

The reserved timber is on the public lands north of the Chugach National Forest. The purpose of the reservation is to prevent the timber needed for the construction of the Government railroad and its branches in Alaska from falling into the possession of individuals or corporations, in which event it would be necessary for the Government to purchase timber which it once owned. It is not the intention of the Government, however, to make any unnecessary restrictions which will tend to retard the development of the territory of Alaska along the line of the railroad or its branches, and in the withdrawal order the interests of the public have been conserved. Only the timber on the land, not the land itself, has been reserved.

Report on Street Trees of New York City

Prof. Laurie D. Cox, Landscape Engineer of the College of Forestry at Syracuse, has just completed a report made as a result of three months study of street tree conditions in New York City. This study was made upon invitation of Hon. Cabot Ward of the Park Department of New York City and was carried out with the funds given by John D. Rockefeller, Jr. New York City has made no systematic effort to plant its streets with trees and the report of Professor Cox will outline a practical system of street tree planting, based not only upon the studies of the past summer but upon careful investigation of street tree work in such cities as Buffalo, Rochester, Newark, New Haven and Boston.

Pitch Moth Damages Douglas Fir

Nine-tenths of the defects in Douglas fir timber, which are locally known as pitch seams, gum check, windshake, etc., are due to the work of the Douglas fir pitch moth, according to a recent investigation conducted by entomologists of the United States Department of Agriculture. This moth, it is estimated, causes a loss in the total output of Douglas fir of from 7½ to 15 per cent, and in one mill, where the loss was lower than the average it amounted in money to \$18,900 for that season's cut alone. This money, says Bulletin No. 255, which the department has just published on this subject, would be sufficient to keep the area on which the timber was cut clear from the moth for a period of 15 years.

The only way in which an infestation of the pitch moth can be reduced is to destroy the larvae, the presence of which is always made known by the protruding pitch tube. When this tube is located, it should be separated from the tree and the larvae thus exposed killed. The wound may then be smoothed with a knife or small ax, and painted with creosote to prevent reinfestation by insects or fungi.

Forests and Farmers

The national forests, says an article in the Year Book of the Department of Agriculture, just issued, besides being the American farmer's most valuable source of wood which is the chief building material for rural purposes, are also his most valuable source of water, both for irrigation and domestic use. In the West, they afford him a protected grazing range for his stock; they are the best insurance against flood damage to his fields, his buildings, his bridges, his roads, and the fertility of his soil. The national forests cover the higher portions of the Rocky Mountain ranges, the Cascades, the Pacific Coast ranges, and a large part of the forested coast and islands of Alaska; some of the hilly regions in Montana and in the Dakotas, Oklahoma, and Arkansas, and limited areas in Minnesota, Michigan, Florida and Porto Rico. In addition, land is now being purchased for national forests in the White Mountains of New England and in the southern Appalachians. In regions so widely scattered, agricultural and forest conditions must necessarily differ to a great degree, bringing about corresponding differences in the effect of the national forests on the agricultural interests of the various localities. Wherever agriculture can be practiced, however, the farmer is directly benefited by the existence of national forests and by their proper management.

Wood Pulp in Argentina

As the result of experiments carried out by a Swedish paper expert, it has been ascertained that Argentina produces a tree in abundance which provides excellent raw material, better even in quality than that usually employed in making paper pulp in both Europe and the United States. This tree is the *Arucaria imbricata*, a picture of which may be seen in AMERICAN FORESTRY for August, page 850.

With a view to confirming independently the report of the Swedish expert, the Minister of Agriculture commissioned two Government engineers to investigate and report upon the properties of the *Arucaria imbricata*. These gentlemen recently presented their report, from which it appears that in the Territory of Neuquen this tree is found over an area of more than 1,000,000 hectares (2,470,000 acres). Three and one-half average trees suffice to produce one ton of pulp. Where news print paper is concerned, two and one-half trees will provide one ton of pulp.

Philippine Lumber for China

The Director of the Philippine Bureau of Forestry, who has recently returned from a trip to China in the interests of Philippine lumber, reports that there is a market in China for all the lumber produced in the islands if the proper connec-

They Like American Forestry

tions can be made between the producer and consumer. The Chinese dealers want a guarantee of a constant supply. They are not willing to accept one consignment, but demand that they be assured of continuous supply, even though it be small. An American formerly in the service of the Philippine Government, now in business in Shanghai, reports that there is a demand there for Philippine lumber, but there is not a constant supply, and the purchaser is never sure of getting enough of the same class to complete his particular job.

Book Reviews

The Zimmerman Pine Moth, By Josef Brunner. U. S. Dept. Agri. Bull. 295. 12 pp. XI pls. Washington, D. C., Oct. 28, 1915.

For years this insect was known as an enemy of pine in the east. More recently it was found by the forest entomologists to be a rather serious enemy of second-growth pine, especially yellow pine, also in the west. While of secondary importance economically, it is largely a primary insect physiologically as regards the trees it attacks. From the standpoint of pure science the life history of any insect is capable of yielding facts that may shed light on hitherto obscure points in one or more phases of general biology. From the economic standpoint we have had repeated occasion to be impressed with the importance of knowing everything possible about the seasonal and life history of all insects having an economic bearing, however small this rôle may be, as the only means of discovering available opportunities for combating them if they are injurious or utilizing their services if they are beneficial. The paper before us is another illustration pointing to the emphasis to be laid on as nearly complete a knowledge as possible of the habits of an injurious insect. The Zimmerman pine moth, the author demonstrates, is most injurious to second growth on which we would apparently be utterly helpless in combating it under forest conditions where the use of insecticides is out of the question. But his careful two-year study of the insect showed that it inhabits dominantly also some old lightning-struck or gnarly branched trees left standing in the midst of old clearings. These trees serve the moth largely as "brood trees," as the author calls them, and thus to stock the area with it. It becomes perfectly patent, therefore, that the removal of such brood trees should practically eliminate the insect as a serious pest. The actual experiment cited shows this conclusion to be operative in practice, and the recommendation is made accordingly.—J. K.

"I have just had an opportunity to look over the numbers of AMERICAN FORESTRY which have been issued during my absence in Alaska. I write this to tell you how delighted I am with the new form of AMERICAN FORESTRY, and to offer you my congratulations. The new magazine is exceedingly attractive, far more so than the old form; it is dignified, and offers a far better opportunity than previously to reach the reading public. Every member of the Association should be proud of the magazine, and there is due to you great commendation and credit for the way you are handling it."

HENRY S. GRAVES, *Chief Forester,*
Washington, D. C.

"May I heartily congratulate you on the magazine's new dress. It is most motish and intensely interesting and a joy to the eye."

STANLEY CLISBY ARTHUR,
Ornithologist,
New Orleans, La.

"Congratulations upon the new form of publication. Fine!" JOHN T. HARRIS,
Washington, D. C.

"I certainly wish to congratulate you on the excellent new form and appearance of AMERICAN FORESTRY." E. G. GRIGGS,
Tacoma, Washington.

"The enlarged edition of AMERICAN FORESTRY to hand. Allow me to congratulate you on the new issue. I sincerely trust it may increase in circulation and recompense you for your efforts to place before the public such instructive and excellent literature. Wishing you every success, I am"

SISTER MARY ALOYSIUS, *Directress,*
Convent of Mercy, Plymouth, Pa.

"I cannot refrain from expressing my admiration for AMERICAN FORESTRY in its new form—the magazine is a gem—and I have no doubt that the great educational work in which you are engaged, and which has already accomplished so much, will receive a greater stimulus from now on."

WILLARD FRACKER,
Washington, D. C.

"Congratulations on the new form of AMERICAN FORESTRY. This new number is mighty fine and I am sure will not only please the present subscribers but will mean large additions to your subscription list. As my brother, Ray Stannard Baker, has had a good deal to do with the making of the *American Magazine*, I have followed with a great deal of interest the development of some of the magazines of the country. Your change is in line with the changes which the *American Magazine* made earlier and which *McClure's*, *Heavst's* and others have made more recently. With lots of good wishes for the *new* magazine as it really is,—"

HUGH P. BAKER,
Dean, New York State College of Forestry,
Syracuse, N. Y.

"Kindly allow me to congratulate you on the August issue of AMERICAN FORESTRY. It is a credit to you and to your associates, and I hope that the time will come when you can boast of a much larger circulation. You are particularly fortunate in being able to start a Wood Preserving Department and more especially in being able to have Mr. Sterling handle it."

C. M. TAYLOR,
Superintendent, Port Reading Creakoting Plant, Port Reading, N. J.

"I was very much interested in the August number of the AMERICAN FORESTRY, and congratulate you upon the excellent article that you have prepared on the Yellow Poplar Tree."

W. H. WELLER,
Secretary, Hardwood Mfrs. Assn. of the U. S., Cincinnati, Ohio.

"Have received AMERICAN FORESTRY for August, containing the article relative to 'How Switzerland Cultivates Her Forests,' and take this opportunity of complimenting you upon the splendid manner in which you have published this contribution."

M. DOSSENBACH,
New York City.

"I am sure you are getting a great many letters of congratulation upon the fine appearance and excellent quality of the August number of AMERICAN FORESTRY. I hope there are many applications for membership in the Association coming also. Permit me to add my little word of praise and appreciation, and to say that I have noted the steady improvement in AMERICAN FORESTRY for many months, but look upon the new departure as a kangaroo leap forward for conservation."

W. R. FISHER,
Secretary, Pocono Protective Fire Association, Swiftwater, Pa.

"We are just in receipt of the August issue of AMERICAN FORESTRY and would tender you our congratulations on the improved size, form and make-up."

H. A. GATCHEL,
Philadelphia, Pa.

"Glad to see the change in the August issue. It is fine, and most interesting throughout."

S. C. CROMELIN,
Berkeley Springs, W. Va.

"The cover on the August number, which just made its appearance, is simply great."

PROF. J. S. ILLICK,
State Forest Academy, Mont Alto, Pa.

"The August issue is just at hand. There should be increased interest in the magazine now that you are able to give better illustrations. The Department idea is good."

PROF. RALPH S. HOSMER,
Forestry Department, N. Y. State College of Agriculture at Cornell University, Ithaca, N. Y.

"The publication seems to me admirable and many of the articles are of great value."

HON. R. GRIGG,
Commissioner of Commerce, Ottawa, Canada.

Canadian Department

ELLWOOD WILSON

Secretary Canadian Society Forest Engineers

The Canadian Forestry Association has just moved into new and commodious quarters in the Booth Building, Ottawa, and will now have every facility for carrying on the excellent campaign for the proper use of our timber resources so well started by the Secretary, Mr. Robson Black.

Mr. Black's investigation of the "fake settler" question in Quebec has aroused general interest and will do a great deal to finally stop this abuse and hold up the hands of the Minister of Lands and Forests, Mr. Allard, who has found this one of the difficult questions of his administration and has done his best to stop it.

Mr. R. R. Bradley, Forester for the New Brunswick Railway Company, will establish a forest nursery in the spring and commence the reforestation of lands owned by that Company.

A very interesting forest is to be seen at Oka, Quebec, where is situated the Trappist Monastery which is famed for its cheese. Twenty-six years ago the drifting sands of that neighborhood commenced to threaten the village, Father Lefebvre engaged children and Indians to go to the woods and bring out pine seedlings for which he paid two to five sous. Sixty-five thousand were planted out and of these it is estimated not more than five thousand died. Today the trees in this forest are twenty-five to thirty feet high. The sands were checked and a great asset given to this section. This forest is an added attraction to anyone visiting the monastery and reflects great credit on the grave priest who had imagination enough to look into the future.

A forest expert after a trip through a certain section of northern Canada estimates the loss of timber from forest fires in the last thirty years at 16,000,000,000 feet which at fifty cents per thousand would mean a loss of eight million dollars.

Mr. Albert Grigg, M. P. for Algoma, has been appointed Deputy Minister of Lands and Forests for Ontario, to succeed the late Aubrey White. Mr. Grigg was born in Ontario in 1873 and was Mayor of Bruce Mines and a pioneer of the Algoma District where he held many positions of public trust. He was first elected to the Ontario Legislature in 1908 and again in 1911 and 1914 and is a forceful and interesting speaker and is regarded as one of the most promising members of his party. He is progressive in spirit and is well acquainted with the conditions in the forest

districts of his Province. Wake up, Ontario.

Mr. J. R. Booth, the pioneer lumberman of Ottawa, has caused to be piled ready for burning at a safe time, inflammable debris on a narrow strip of his limits parallel to a portion of the Canadian Northern Railroad east of North Bay. This is a progressive step and it is hoped that it will soon be followed by other limit holders.

The last issue of *Conservation*, the organ of the Commission of Conservation of the Dominion Government, makes the statement that during the construction of the Hudson Bay Railway five hundred thousand acres of timberland have been burnt due to defective equipment used by the contractors and to carelessness on their part. This is the history of all railway construction in Canada, but with this difference: During the construction of the National Transcontinental through Quebec a part of the line was patrolled by the limit holders in cooperation with the contractors and with the Department of Railways and Canals and the Quebec government, and very little was burnt on this section and an example set for future work. This work was called to the attention of the Hon. Minister of Railways and Canals. It is little short of criminal for such a thing to happen; to have it happen through the fault of a private corporation is bad enough, but to have it happen on work under the authority and supervision of a Government Department is still worse. What can be said to private corporations and persons about preventing forest fires when the Dominion Government itself is guilty of such negligence as this? Why attempt to protect the Government lands from fire, why prosecute a few settlers, when a Government Department burns up Government lands itself? Have any body of men, chosen to care for the people's interests, the right to be so negligent, so careless, and so entirely without regard for the property of the public. It is high time that the ever-patient public speak with no uncertain voice and put a stop to such negligence.

Messrs. B. Guerin, Geo. H. Boisvert, and Ernest Menard, graduates of the Laval Forestry School and now of the Quebec Forest Service, have been elected to active membership in the Canadian Society of Forest Engineers. These gentlemen have done much in the way of exploration work in the northern part of the Province and have made some very interesting reports

and studies. They all hold the rank of District Inspector.

On September 29 a get-together meeting of the Coast Rangers of the Dominion Forest Service was held at New Westminster, B. C., and men from all parts of the Dominion were present. The consensus of opinion of the meeting was that the burden of proof should rest on the man who owned the land on which a fire started to prove that it was not set by him. The meeting was a very enjoyable one and much valuable information was brought out and exchanged.

British Columbia Notes

According to the timber returns for the month of September issued by the Minister of Lands, the total output of sawlogs for the Province, as shown by the scaling figures, amounted to 92,080,493 feet board measure, while 361,911 lineal feet of poles, piles, and props, together with 29,312 cords of railway ties, fence posts, shingle bolts, etc., were also scaled for royalty during the month under review. The figures for the Vancouver district were 53,001,924 feet board measure sawlogs, 14,394 lineal feet piles, etc., and 16,204 cords, ties, bolts, etc., the Island district contributing 5,307,218 feet sawlogs, in addition to 2,520 lineal feet piles. In the Prince Rupert district there were scaled 954,135 feet sawlogs, while the totals under the same heading for the Cranbrook, Nelson and Vernon districts were respectively 21,595,575 feet, 7,135,290 feet, and 3,349,603 feet. Poles, piles and props to the total of 328,304 lineal feet were scaled in the Nelson district, and in the Cranbrook division to the total of 15,013 lineal feet.

Timber sales recorded during September cover an estimated total of 7,338,000 feet sawlogs, and 3,030 cords of shingle bolts, estimated to produce a total revenue of \$12,876.

The Hon. W. R. Ross is advised by the Department of Trade and Commerce at Ottawa, that the exhibits of British Columbia lumber recently sent to Australia are being shown at the Royal Exchange, Sydney, and will afterwards be featured at an approaching architectural exhibition. The Canadian Trade Commissioner at Melbourne, to whom the exhibits were consigned, is arranging for timber importers, builders, and others who are interested to view them, and reports that the varied and beautiful finish which British Columbia Douglas fir takes has been the subject of considerable comment. It will be remembered that a number of these exhibits were sent abroad earlier in the year, and, as in the case of the Sydney display, have attracted much attention in the important trade centers at which they have been placed.

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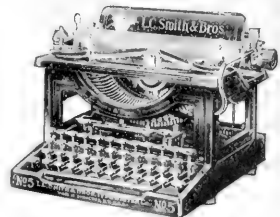
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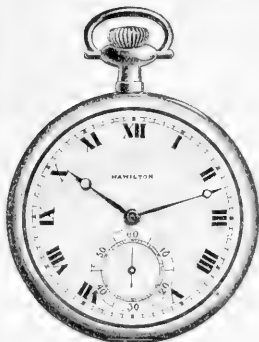
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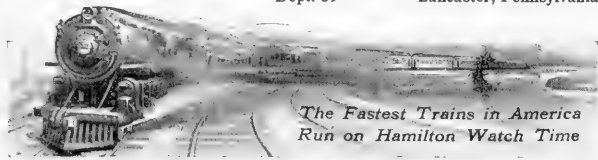
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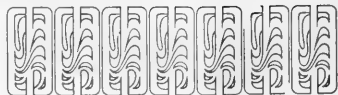
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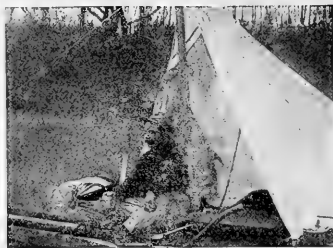
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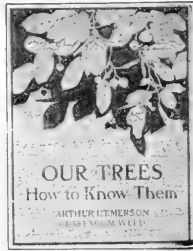
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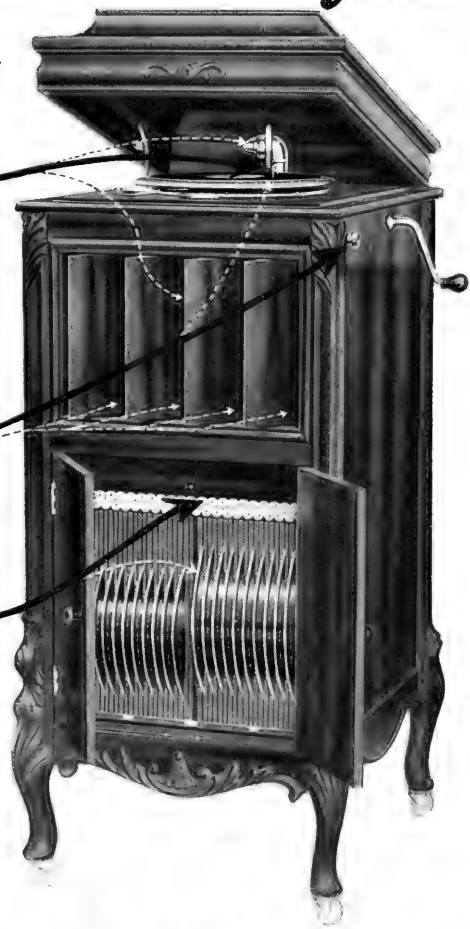
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