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COMMON
Forest Trees
OF
GEORGIA



HOW TO KNOW THEM

Georgia State College of Agriculture

ANDREW M. SOULE, President

DIVISION OF EXTENSION

J. PHIL CAMPBELL, Director

In cooperation with the Forest Service, U. S. Dept. of Agriculture

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COMMON
FOREST TREES
—OF—
GEORGIA



HOW TO KNOW THEM.



A Pocket Manual

Prepared by

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— and —

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ATHENS, GA.
1923

FOREWORD

This handbook has been prepared in response to a growing demand for information regarding our common forest trees. These requests are largely the result of a widening appreciation that timber is a marketable commodity of increasing value, and that by rightly handling young timber it quickly grows into a merchantable product that will add yearly to the farm income as well as enhance the value of the farm, both as a salable property and as a comfortable and attractive home.

Georgia has a great variety of trees producing useful and valuable wood. Timber is the best crop to grow on certain soils and locations on the farm. Many farms have, for example, some hillsides, or worn-out gullied sandy or wet lands better adapted for growing timber than any other crop. To rightly utilize all the farm is a sign of good farm management.

It is natural for young people to be interested in trees. Many will become farm owners of the future, and a knowledge of the trees will add an interest in their lives and prove to be a very material asset. The County Agents, dealing as they do with both the present and future owners of timberland, will be aided by this manual in acquiring a better knowledge of the uses and value of our common forest trees. Altogether 78 trees are described, all of which are native to the State.

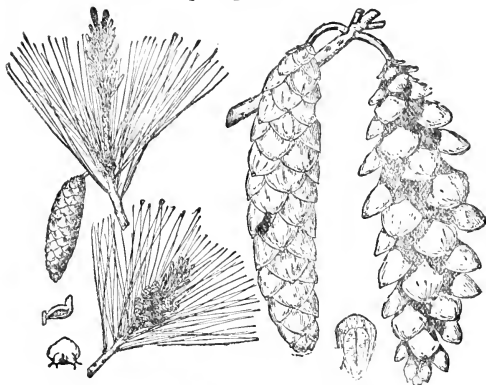
Grateful acknowledgment is hereby made to the State Foresters of Maryland, Virginia, Tennessee, and North Carolina for the use of portions of the text and for the loan of many of the cuts of the hardwoods, all of which are from original drawings by Mrs. A. E. Hoyle of the United States Forest Service, and to Houghton-Mifflin Company for permission to use cuts of conifers from Sargent's "Manual of the Trees of North America."

The rapidly increasing interest in outdoor life, stimulated perhaps by good roads, the automobile, the boys' club and scout movements, and the widened outlook resulting from the spread of education, encourages the rational treatment of our trees and forests. It is highly important that this be done in order that our forests may continue to furnish the material so essential to the maintenance of the industrial and social life of the State and Nation, to protect our farmsteads and mountain streams, and to provide places of pleasure and recreation for our people.

WHITE PINE

(Pinus strobus L.)

THE white pine occurs naturally throughout the mountains in the northern part of the State. It grows on high, dry, sandy and rocky ridges, but prefers the cooler or moister situations. Its straight stem, regular pyramidal shape and soft gray-green foliage make it universally appreciated as an ornamental tree. Its rapid growth and hardiness, and



WHITE PINE
One-third natural size.

the high quality of the wood make it one of the most desirable trees for forest planting.

The trunk is straight, and, when growing in the forest, clear of branches for many feet. The branches extend horizontally in whorls (i. e., arranged in a circle on the stem), marking the successive years of upward growth. The bark is thin and greenish, red on young trees, but thick, deeply furrowed and grayish brown on older trees. The tree commonly attains heights of 50 to 60 feet and diameters of 1 to 2 feet, though much larger specimens are still to be found.

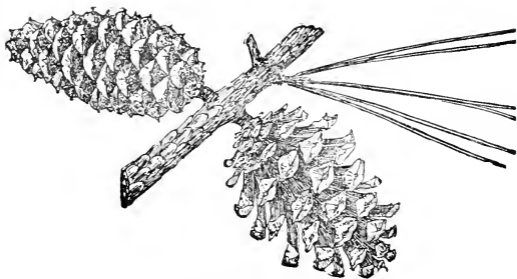
The leaves, or needles, are 3 to 5 inches in length, bluish green on the upper surface and whitish beneath, and occur in bundles of 5, which distinguishes it from all other eastern pines. The cone, or fruit, is 4 to 6 inches long, cylindrical, with thin, usually very gummy scales, containing small, winged seeds which require two years to mature.

The wood is light, soft, not strong, light brown in color, often tinged with red, and easily worked. The lumber is in large demand for construction purposes, box boards, matches and many other products.

SHORTLEAF PINE (Yellow Pine)

(*Pinus echinata* Mill.)

THE shortleaf pine, also known as yellow pine, rosemary pine, and old-field pine, is widely distributed throughout the South. In Georgia, it is the characteristic pine over the Piedmont and the south-facing slopes, where it occurs mixed with hardwoods and in pure second-growth stands. The young tree in the open has a straight and somewhat stout stem



SHORTLEAF PINE
One-half natural size.

with slightly ascending branches. In maturity the tree has a tall, straight stem and an oval crown, reaching a height of about 100 feet and a diameter of about $4\frac{1}{2}$ feet. The young tree, when cut or burned back, reproduces itself by sprouting from the stump.

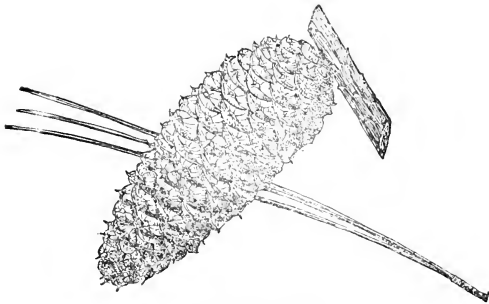
The **leaves** are in clusters of two or three, from 3 to 5 inches long, slender, flexible, and dark blue-green. The **cones**, or burrs, are the smallest of all our pines, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, oblong, with small sharp prickles, generally clustered, and often holding to the twigs for 3 or 4 years. The small seeds are mottled and have a wing, which is broadest near the center. The **bark** is brownish red, broken into rectangular plates; it is thinner and lighter-colored than that of loblolly pine. This is most readily identified by its leaves and cones.

The **wood** of old trees is rather heavy and hard, of yellow-brown or orange color, fine-grained and less resinous than that of the other important southern pines. It is used largely for interior and exterior finishing, general construction, veneers, paper pulp, excelsior, cooperage, mine props, and other purposes.

LOBLOLLY PINE

(Pinus taeda L.)

A fast-growing member of the yellow pine group, loblolly pine is a tree of the Coastal Plain, ranging southward in the United States from Delaware to Texas. It is variously known locally as shortleaf pine, fox-tail pine and old-field pine. As the last name implies, it seeds up abandoned fields rapidly, particularly in sandy soils where the



LOBLOLLY PINE
One-half natural size.

water is close to the surface. It is also frequent in clumps along the borders of swamps and as scattered specimens in the swamp hardwood forests. In Georgia, it is found in largest amounts over the lower Piedmont and upper Coastal Plain.

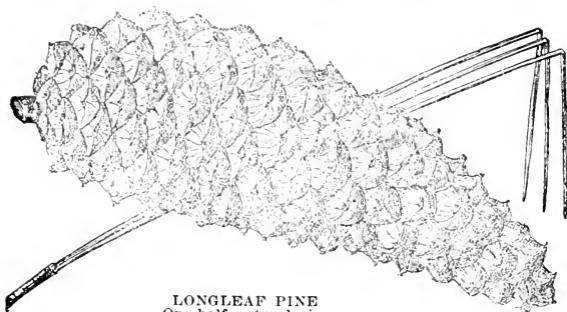
The **bark** is dark in color and deeply furrowed, and often attains a thickness of as much as 2 inches on large-sized trees. The **leaves**, or needles, 6 to 9 inches long, are borne three in a cluster, and, in the spring, bright green clumps of them at the ends of branches give a luxuriant appearance to the tree. The **fruit** is a cone, or burr, about 3 to 5 inches long, which ripens in the autumn of the second year, and, during fall and early winter, sheds many seeds which, by their inch-long wings, are widely distributed by the wind.

The resinous **wood** is coarse-grained, with marked contrast, as in the other yellow pines, between the bands of early and late wood. The wood of second-growth trees has a wide range of uses where durability is not a requisite, such as for building material, box shooks, barrel staves, basket veneers, pulpwood, lath, mine props, piling and fuel.

LONGLEAF PINE

(Pinus palustris Mill.)

THE young longleaf pine forms one of the most striking features of the southern forest. When 5 to 10 years of age, the single upright stem with its long, dark, shiny leaves, forms a handsome plume of sparkling green, while in later youth the stalwart, sparingly branched sapling, with its heavy twigs and gray bark, attracts immediate attention. The



LONGLEAF PINE
One-half natural size.

older trees have tall, straight trunks, 1 to 3 feet in diameter and open, irregular crowns, one-third to one-half the length of the tree.

Longleaf pine is confined to the Coastal Plain region. It has been extensively logged, bled for turpentine, repeatedly burned and ranged over by native "razor-back" hogs until in many sections it has been almost exterminated or replaced by other pines.

The **leaves** are from 10 to 15 inches long, in clusters of 3, and gathered toward the ends of the thick, scaly twigs. The **flowers**, appearing in early spring before the new leaves, are a deep rose-purple, the male in prominent, short, dense clusters and the female in inconspicuous groups of 2 to 4.

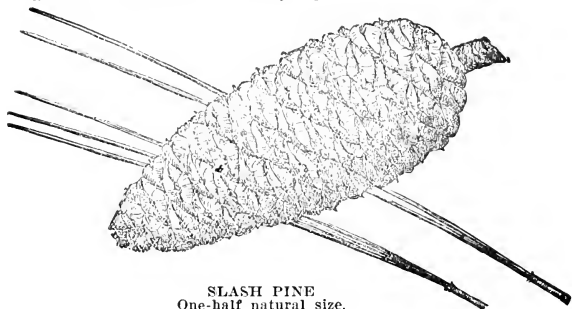
The **cones**, or burrs, are 6 to 10 inches long, slightly curved, the thick scales armed with small curved prickles. The cones usually fall soon after the seeds ripen, leaving their bases attached to the twigs.

The **wood** is heavy, hard, strong, tough and durable. As Georgia pine, pitch pine and southern pine, it has been, and still is, used for all kinds of building and other construction. Naval stores, consisting of tar, pitch, rosin and turpentine, are obtained almost exclusively from this tree and its close relative, the slash pine, by bleeding the trees for their raw gum.

SLASH PINE (Yellow Slash, Cuban Pine)

(*Pinus caribaea* Morelet.)

SLASH pine is a tree of the lower Coastal Plain. Because of its abundant seed production and rapid growth, it has naturally replaced longleaf pine over large areas. Second-growth stands are, however, either very young or scattered for the reason that slash pine produces crude gum in such large amounts and at such early ages that it has been for



SLASH PINE
One-half natural size.

the past 30 years heavily worked for turpentine in all sizes down to saplings. Large amounts of timber have thus been killed by being overworked with too many or too large faces. Because of its rapid growth, easy propagation and early yield of timber and crude turpentine, slash pine promises excellent returns when planted and grown as a crop. Experiments have shown that slash pine is capable of growing in clay soils at least 100 miles north, or above its natural range.

The **trunk** is straight, clears itself easily of branches, and is crowned with numerous small branches forming a round-topped head.

The **leaves** which occur in clusters of 2 or, more often, 3 in a sheath are from 8 to 12 inches long, dark green, shiny, and thickly-set on the branches, forming a dense head.

The **cones** are mostly 3 to 6 inches long, brown, and glossy or varnished, and the thin scales are armed with fine prickles. Slash may best be distinguished from all other pines by these characteristics of its leaves and cones.

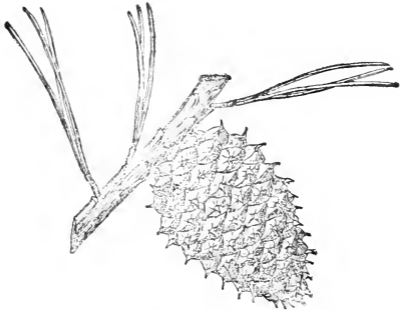
The **wood** is heavy, hard, strong, tough, durable and very resinous. It is sawed into lumber and sold without discrimination as longleaf pine, being used for general building and heavy construction purposes for which it brings good prices.

PITCH PINE

(Pinus rigida Mill.)

THE pitch pine grows on dry ridges and slopes and in cold swamps and bottoms in the mountains and outlying hilly regions. It occurs scattered, or in small groups with hardwoods or other pines.

It attains a height commonly 50 to 75 feet and a diameter of 1 to 2 feet. The trunk is erect, and



PITCH PINE
One-half natural size.

at heights of 20 to 30 feet branches into a close head made up of rather large branches and noticeably thick foliage. It has longer leaves and larger cones, or burrs, and generally a rougher and less straight trunk than the shortleaf pine with which it is often found.

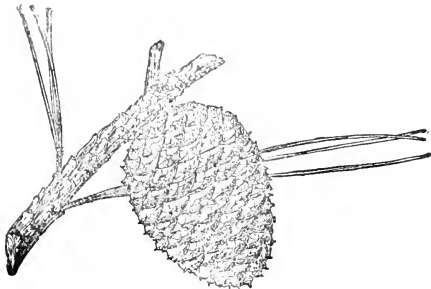
The **leaves**, which are found in clusters of 3 each, are 3 to 5 inches long, stiff, dark yellowish green in color and stand out straight from the twigs. They fall during the second year after forming. The **cones** are 1 to 3 inches long and light brown in color. They usually cling to the branches for several years, sometimes for 10 to 12 years. The **bark** on the stems and branches is rough. On mature trees it is dark gray or reddish brown, and irregularly divided into broad, flat, continuous ridges.

The **wood** is light, soft and brittle. It is sawed into lumber for general construction and is used for fuel. This tree is able to grow on very poor soil and has the capacity, when young, of sprouting successfully from the base of the stump when burned or cut back.

POND PINE

(*Pinus serotina* Michx.)

THE pond pine, also known as pocosin pine, bay pine or black-bark pine, is found in small swamps and on flat, undrained, poor, sandy, or low, peaty soils of the Coastal Plain. It averages 40 to 70 feet in height and 1 to 2 feet in diameter. The trunk is often slightly crooked and somewhat rough with knots or bulges. The tree somewhat resembles lob-



POND PINE
One-half natural size.

lolly pine, but can be distinguished most easily by the broader and shorter cones, and its location generally on wet or very sour lands.

The **leaves** occur in clusters of 3, or occasionally 4, and range in length from 5 to 8 inches. They persist on the branches for 3 to 4 years. The **cones** or burrs, when open are noticeably globular in outline, somewhat flattened, 2 to 2½ inches long. Like all pines, they require two seasons for ripening, but remain closed for 1 to 2 years afterward, and persist on the branches for several years.

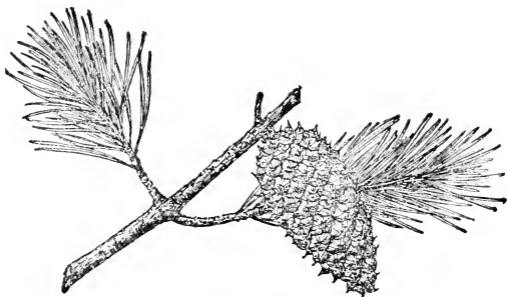
The **bark** is dark red-brown and irregularly divided by shallow furrows.

The **wood** is resinous, heavy, often coarse-grained, orange-colored, with pale yellowish, wide sapwood. It is sawed and sold without discrimination along with lumber of other southern pines. In the earlier days of lumbering this pine was not much used for lumber. It is one of the few species of pine which, following cutting or killing-back by fire, sprouts from the stumps of young vigorous saplings.

SCRUB PINE (Spruce Pine or Virginia Pine)

(Pinus virginiana Mill.)

THE scrub, spruce, black or Virginia pine, is found chiefly in the mountains in the northern part of the State. It occurs in pure stands in old fields and is very persistent in gullying, broken and very dry soils. It is one of our slower-growing pines. The side branches usually persist for many years, even after dying, thus giving a scrubby ap-



SCRUB PINE
One-half natural size.

pearance to the tree which is responsible for one of its common names.

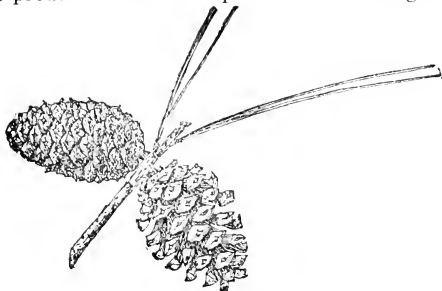
The twisted and spreading **leaves** are borne two in a cluster. They vary from $1\frac{1}{2}$ to 3 inches in length, are grayish green in color, and are shorter than those of any other pine native to the State. The **fruit** is a cone, or burr, averaging about 2 inches in length, narrow, and often slightly curved, with small prickles. Cones are produced almost every year, and, as they persist on the branches from 3 to 5 years, a tree top with many dry, open cones is characteristic of the species. The **bark** is thin, reddish brown, and broken into shallow plates. Even with age, the fissures in the bark are so shallow as to give a somewhat smooth appearance to the trunk of the tree.

Except in the occasional large-sized trees, the **wood** is very knotty because of the persistence of the side branches. It is light and soft, but fairly durable in contact with the soil, so that it is being used to some extent for posts, poles and piling. The lumber is increasingly used for rough construction, but it warps easily with alternate wetting and drying. It is much used for paper pulp and firewood.

SPRUCE PINE (Cedar Pine)

(*Pinus glabra* Walt.)

THE bottoms and river swamps in the southern part of the State are characterized by the presence of this pine which may be easily recognized by its dark almost smooth bark unlike that of any other kind of tree found within its range. It is nowhere abundant, but is scattered among the hardwoods that predominate in such places. It is a large tree



SPRUCE PINE
Two-thirds natural size.

for it reaches a height of 80 to 120 feet and a diameter of 2 to over 3 feet. It has comparatively small horizontal branches which form a narrow open crown. This pine resembles considerably the true white pine of the mountains for which it is not uncommonly mistaken.

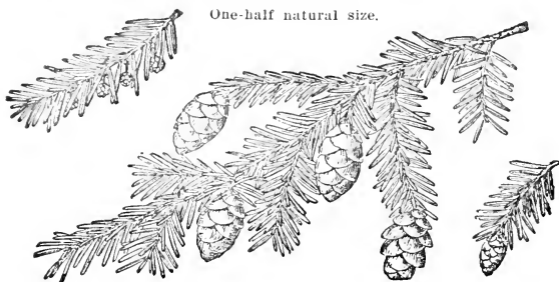
The **leaves** occur in clusters of two and are soft, slender, dark green and mostly from 2 to 3 inches long. They fall at the end of their second year. The **cones** are single or in clusters of 2 or 3 on short stout stalks. They are $\frac{1}{2}$ to 2 inches long, reddish brown in color and rather lustrous, with thin scales armed with small weak prickles. They soon open and shed their seeds but remain on the tree for several years. The **bark** on young trees and on the upper part of the trunks is smooth pale gray, becoming noticeably dark on the lower part of the older trees, and slightly and irregularly divided by shallow fissures into flat connected ridges.

The **wood** is light, soft, brittle, close-grained, and not very strong. When sawed into lumber, the wood warps easily. It is rarely used for any purpose except firewood, but is well adapted for use in making paper pulp. With the growing scarcity of timber and closer utilization of our forest trees, this pine will likely be of more value in the future because of its large size and easy accessibility.

HEMLOCK

(Tsuga canadensis Carr.)

THE hemlock, sometimes known as hemlock-spruce or spruce-pine, is a large timber tree, attaining a height of 60 to 100 feet and a diameter of 2 to 4 feet. It is common along streams and on cool slopes throughout the mountains. Its horizontal or ascending branches and drooping twigs, forming



HEMLOCK

a pyramidal crown, make it one of our handsomest and most desirable trees for shade and ornament.

The **leaves** are from one-third to two-thirds of an inch in length, oblong, dark green and lustrous on the upper surface and whitish beneath, and, although spirally arranged, appear to be 2-ranked on the stem; they fall during the third season. The **cones** are oblong, about three-fourths of an inch long, light brown in color. The cone scales are broadly ovate and about as wide as they are long. The seed is small and winged, maturing in the fall and dropping during the winter.

The **wood** is light, soft, not strong, brittle and splintery. It is used for coarse lumber and for paper pulp. The **bark** on old trunks is cinnamon-red or dark gray and divided into narrow, rounded ridges, and is one of our chief sources of tannin.

The Carolina hemlock (*Tsuga caroliniana* Engelm.) differs from the above by having its leaves not conspicuously 2-ranked on the twigs but pointing in all directions, giving the tree a rough appearance; while the cone scales are narrow oval, much longer than they are wide. It grows on dry, rocky ridges and cliffs along the Blue Ridge. It is a very desirable tree for ornamental planting.

CYPRESS

(*Taxodium distichum* Rich.)

THE cypress, or bald cypress, is a tree found exclusively in deep swamps which are usually flooded for long periods at a time, and on wet stream banks and bottomlands in the lower Atlantic Coastal Plain and westward. Its straight trunk with numerous ascending branches, and narrow conical outline makes the tree one of considerable beauty. In old



CYPRESS
One-half natural size.

age, the tree generally has a broad fluted or buttressed base, a smooth slowly tapering trunk and a broad, open, flat top of a few heavy branches and numerous small branchlets. The original-growth timber attained heights of 80 to 130 feet and diameters of 5 to 10 feet.

The **bark** is silvery to cinnamon-red and finely divided by numerous longitudinal fissures. The **leaves** are about one-half to three-fourths of an inch in length, arranged in feather-like fashion along two sides of small branchlets, which fall in the autumn with the leaves still attached; or they are scale-like and much shorter, light green, and sometimes silvery below.

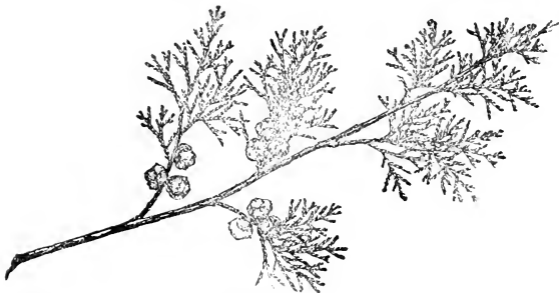
The **fruit** is a rounded cone, or "ball," about one inch in diameter, consisting of thick irregular scales.

The **wood** is light, soft, easily worked, varies in color from a light sapwood to dark-brown heartwood, and is particularly durable in contact with the soil. Hence it is in demand for exterior trim of buildings, greenhouse planking, boat and ship building, shingles, posts, poles and crossties.

WHITE CEDAR (Juniper)

(Chamaecyparis thyoides B. S. P.)

EXCLUSIVELY a tree of the Coastal Plain, it is found in year-round swamps from New England southward to Florida and Mississippi. It occurs with bald cypress and deep swamp hardwoods, but more often is found in pure stands called "glades," where the smooth, clean trunks are so closely set as to give the impression of "serried ranks." The



WHITE CEDAR
One-half natural size.

branches are very short and horizontal, so that even when grown in the open the tree has a long, narrow, conical shape.

The **leaves** are minute, scale-like, overlapping, 4-ranked, of a bluish green color, and entirely cover the ends of the slender, drooping twigs. The **fruit** is a rather inconspicuous, smooth cone, nearly round, about one-fourth inch in diameter, maturing in one year and containing from four to eight winged seeds.

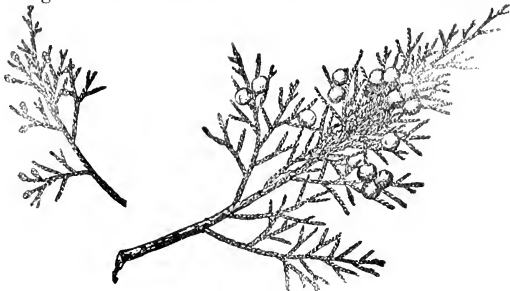
The **bark** is quite thin, varies in color from ashy gray to light reddish brown, and readily separates into loose plate-like scales, which easily peel off in long fibrous strips. The **wood** is light, soft, close-grained, slightly fragrant, especially in contact with water. These qualities make it in demand for boat and canoe building, cooperage, shingles and fence posts. It is being substituted for chestnut for telephone poles, as the supply of the latter species becomes scarcer. Because of the limited supply available, its lumber is not well known in the general markets.

RED CEDAR

(Juniperus virginiana L.)

A VERY valuable tree found in all classes and conditions of soils—from swamp to dry rocky ridges—seeming to thrive on barren soils where few other trees are found. It is scattered throughout the State except in the high mountains.

There are two kinds of **leaves**, usually both kinds being found on the same tree. The commoner kind



RED CEDAR
One-half natural size.

is dark green, minute and scale-like, clasping the stem in four ranks, so that the stems appear square. The other kind, usually appearing on young growth or vigorous shoots, is awl-shaped, quite sharp-pointed, spreading and whitened.

The two kinds of **flowers** are at the end of minute twigs on separate trees. Blooming in February or March, the male trees often assume a golden color from the small catkins, which, when shaken, shed clouds of yellow pollen. The **fruit**, which matures in one season, is pale blue, often with a white bloom, one-quarter of an inch in diameter, berry-like, enclosing one or two seeds in the sweet flesh. It is a favorite winter food for birds.

The **bark** is very thin, reddish brown, peeling off in long, shred-like strips. The tree is extremely irregular in its growth, so that the trunk is usually more or less grooved.

The heart **wood** is distinctly red, and the sapwood white, this color combination making very striking effects when finished as cedar chests, closets and interior woodwork. The wood is aromatic, soft, strong and of even texture, and these qualities make it most desirable for lead pencils. It is very durable in contact with the soil, and on that account is in great demand for posts, poles and rustic work.

WHITE WALNUT, OR BUTTERNUT

(*Juglans cinerea* L.)

THE white walnut, usually called butternut in the North, is a smaller tree than the black walnut, though it reaches a height of 70 feet and a diameter of 3 feet. It is found naturally only in the mountains, where it is a common tree. The trunk is usually forked or crooked, and this makes it less desirable for saw timber. The bark differs from that



Twig, one-half natural size.

Leaf, one-third natural size.

of the black walnut in being light gray on branches and on the trunk of small trees, becoming darker on large trees. This tree may also be distinguished from black walnut by the velvet collars just above the scars left by last year's leaves.

The compound leaves are 15 to 30 inches long, each with 11 to 17 sharp-pointed, oblong, finely toothed leaflets 2 to 3 inches long.

The flowers are of two kinds on the same tree, the male in long yellow-green drooping catkins, the female recognized by the rather conspicuous red-fringed stigmas. The fruit is a nut enclosed in an oblong, somewhat pointed, yellowish green husk, about 2 inches long, which is covered with short rusty, clammy, sticky hairs. The nut has a rough, grooved shell and an oily, edible kernel.

The wood is light, soft, not strong, coarse-grained, light brown, and takes a good polish. It is used for interior finish of houses and for furniture. A yellow or orange dye can be made from the husks of the nuts.

BLACK WALNUT*(Juglans nigra L.)*

THIS valuable forest tree occurs on rich bottom-lands and moist fertile hillsides, chiefly in the northern and middle parts of the State. In the forest, where it grows singly, it frequently attains a height of 100 feet with a straight stem, clear of branches for half its height. In open-grown trees the stem is short and the crown broad and spreading.



BLACK WALNUT
 Leaf, one-fifth natural size.
 Twig, three-quarters natural size.

The **leaves** are alternate, compound, 1 to 2 feet long, consisting of from 15 to 23 leaflets of a yellowish green color. The leaflets are about 3 inches long, extremely tapering at the end, and toothed along the margin. The **bark** is thick, dark brown in color, and divided by rather deep fissures into rounded ridges.

The **fruit** is a nut, borne singly or in pairs, and enclosed in a solid green husk which does not split open, even after the nut is ripe. The nut itself is black with a very hard, thick, finely ridged shell, enclosing a rich, oily kernel edible and highly nutritious.

The **heartwood** is of superior quality and value. It is heavy, hard and strong, and its rich chocolate-brown color, freedom from warping and checking, susceptibility to a high polish, and durability make it highly prized for a great variety of uses, including furniture and cabinet work, gun-stocks, and airplane propellers. Small trees are mostly sapwood, which is light colored and not durable. Walnut is easily propagated from the nuts and grows rapidly on good soil, where it should be planted and grown for timber and nuts.

PECAN

*(Hicoria pecan (Marsh.) Britton)**(Carya pecan Ashe and Gr.)*

THE pecan is found native in the State chiefly in the southern half, but has been widely planted for nuts, and from them has sometimes spread considerably. It makes an excellent shade tree, and for this purpose it has also been planted. The pecan is the largest of the hickories, attaining heights of over 100 feet and when grown in the open forming a



PECAN
One-quarter natural size.

large rounded top of symmetrical shape. The outer bark is rough, hard, tight, but broken into scales; on the limbs, it is smooth at first but later tends to scale or divide as the bark grows old.

The leaves resemble those of the other hickories and the black walnut. They are made up of 9 to 17 leaflets, each oblong, toothed and long-pointed, and 4 to 8 inches long by about 2 inches wide.

The flowers appear in early spring and hang in tassels from 2 to 3 inches long. The fruit is a nut, 4-winged or angled, pointed, from 1 to 2 inches long, and one-half to 1 inch in diameter, borne in a husk which divides along its grooved seams when the nut ripens in the fall. The nuts, which vary in size and in the thickness of the shell, have been greatly improved by selection and cultivation and are sold on the market in large quantities.

The wood is strong, tough, heavy and hard and is used occasionally in making handles and parts of vehicles, and for fuel.

BITTERNUT HICKORY

(*Hicoria minima* Britton)

(*Carya cordiformis* K. Koch)

THE bitternut hickory is a tall slender tree with broadly pyramidal crown, attaining a height of 100 feet and a diameter of 2 to 3 feet. It is found throughout the State on moist rich soils, but is nowhere very abundant.

The **bark** on the trunk is granite-gray, faintly tinged with yellow and less rough than in most of



BITTERNUT HICKORY
 Twig, one-half
 natural size.
 Leaf, one-third natural size.

hickories, yet broken into thin, plate-like scales. The winter buds are compressed, scurfy, bright yellow, quite different from those of its relatives.

The **leaves** are alternate, compound, from 6 to 10 inches long, and composed of from 7 to 11 leaflets. The individual leaflets are smaller and more slender than those of the other hickories.

The **flowers** are of two kinds on the same tree. The **fruit** is about 1 inch long and thin-husked, while the nut is usually thin-shelled and brittle, and the kernel very bitter.

The **wood** is hard, strong and heavy, reddish brown in color. From this last fact it gets its local name of red hickory. It is said to be somewhat inferior to the other hickories, but is used for the same purposes.

SCALY-BARK OR SHELL-BARK HICKORY

(*Hicoria ovata* Britton) (*Carya ovata* K. Koch)

THE scaly-bark hickory is known by every child of the community because of its sweet and delicious nuts. It is a large commercial tree, averaging 60 to 100 feet high and 1 to 2 feet in diameter. It thrives best on rich, damp soil and is found along streams and on moist hillsides throughout the State.

Leaf, one-third natural size. Twig, one-half natural size.



SCALY-BARK HICKORY

The **bark** of the trunk is rougher than on other hickories, light gray and separating into thick plates which are only slightly attached to the tree. The terminal winter buds are egg-shaped, the outer bud-scales having narrow tips.

The **leaves** are alternate, compound, from 8 to 15 inches long and composed of 5, rarely 7 obvate to ovate leaflets. The twigs are smooth or clothed with short hairs.

The **fruit** is borne singly or in pairs, and is globular. The husk is thick and deeply grooved at the seams. The nut is much compressed and pale, the shell thin, and the kernel sweet. The **flowers** are of two kinds, opening after the leaves have attained nearly their full size.

The **wood** is heavy, hard, tough and very strong. It is used largely in the manufacture of agricultural implements and tool handles, and in the building of carriages and wagons. For fuel the hickories are the most satisfactory of our native trees.

WHITEHEART OR WHITE HICKORY
(Mockernut Hickory)

(*Hicoria alba* Britton)

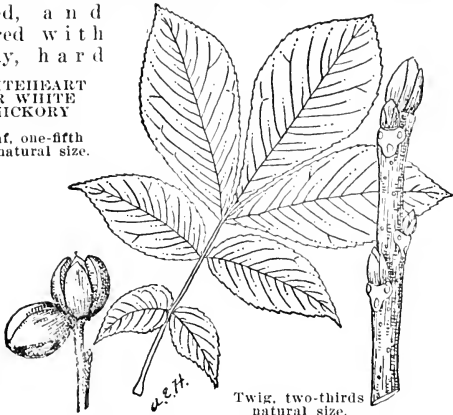
(*Carya alba* K. Koch)

THE white hickory, whiteheart, mockernut, or big-bud hickory is common on well-drained soils throughout the State. It is a tall, short-limbed tree averaging 60 feet high and 1 to 2 feet in diameter.

The **bark** is dark gray, hard, close and deeply furrowed, often apparently cross-furrowed or netted. The winter buds are large, round or broadly egg-shaped, and covered with downy, hard

**WHITEHEART
OR WHITE
HICKORY**

Leaf, one-fifth
natural size.



seales. The recent shoots are short, stout and more or less covered with a downy growth.

The **leaves** are large, strong-scented and hairy, composed of 7 to 9 obovate to oblong, pointed leaflets which turn a beautiful yellow in the fall.

The **flowers**, like those of all other hickories, are of two kinds on the same tree; the male in three-branched catkins, the female in clusters of 2 to 5. The **fruit** is oval, nearly round or slightly pear-shaped with a very thick, strong-scented husk which splits nearly to the base when ripe. The nut is of various forms, but is sometimes 4 to 6 ridged, light brown, and has a very thick shell and small, sweet kernel.

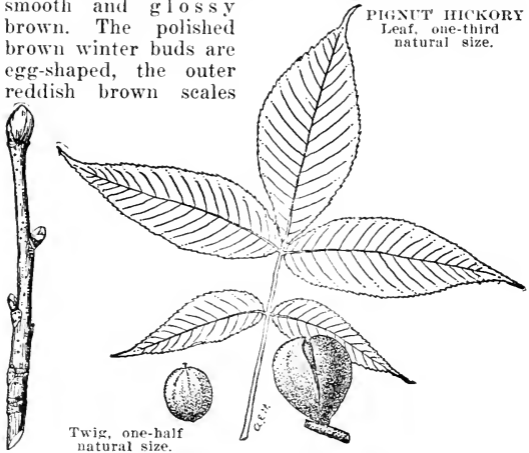
The **wood** is heavy, hard, tough and strong; it is white excepting the comparatively small, dark-brown heart, hence the name white hickory. It is used for vehicle parts, handles and picker-sticks. It furnishes the best of fuel. This and the other hickories are very desirable both for forest and shade trees.

PIGNET HICKORY

(*Hiccoria glabra* Britton) (*Carya glabra* Sweet)

THE pignut hickory is a medium to large upland tree, occurring plentifully on poor soil in the middle section and less frequently in the other parts of the State. It has a tapering trunk and a narrow oval head.

The **bark** is close ridged and grayish, but occasionally rough and flaky. The twigs are thin, smooth and glossy brown. The polished brown winter buds are egg-shaped, the outer reddish brown scales



PIGNET HICKORY
Leaf, one-third
natural size.

Twig, one-half
natural size.

falling in autumn.

The **leaves** are smooth, 8 to 12 inches long and composed of 5 to 7 leaflets. The individual leaflets are rather small and narrow.

The **fruit** is pear-shaped or rounded, usually with a neck at the base, very thin husks splitting only half way to the base or not at all. The nut is smooth, light brown in color, rather thick-shelled, and has an edible kernel.

The **wood** is heavy, hard, strong, tough and flexible. Its uses are the same as those of the other hickories.

The small-fruited hickory (*Carya microcarpa* Nutt.), by some considered a variety of the pignut hickory, differs from it in having a round fruit and a bark which frequently separates into narrow plates.

The pale-leaved hickory (*Carya pallida* Ashe) is found scatteringly in the upland woods. It has pale, delicate foliage. The leaves are woolly or hairy underneath, and when young are covered with silvery scales. The husks are thicker than those of the pignut.

BLACK WILLOW

(*Salix nigra* Marsh.)

THE black willow is common along streams throughout the State. It rarely comes to be over 50 feet in height and is frequently found growing singly or in clumps along the water courses. In winter the easily separable, bright reddish-brown or golden, naked twigs are quite conspicuous.

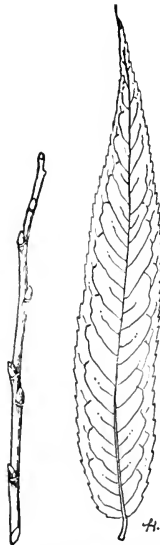
The **leaves** are from 3 to 6 inches long and less than one-half an inch wide; the tips are very much tapered and the entire margins finely toothed. The leaves are bright green on both sides, turning pale yellow in the early autumn.

The **flowers** are in catkins, the male and female on separate trees.

The **fruit** is a pod bearing numerous minute seeds which are furnished with long silky down, enabling them to be blown long distances.

The **bark** is deeply divided into broad, flat ridges which separate into thick plate-like scales. On old trees it becomes very shaggy. In color it varies from light brown tinged with orange to dark brown or nearly black.

The **wood** is soft, light and not strong. A high grade of charcoal,



BLACK WILLOW
Two-thirds
natural size.

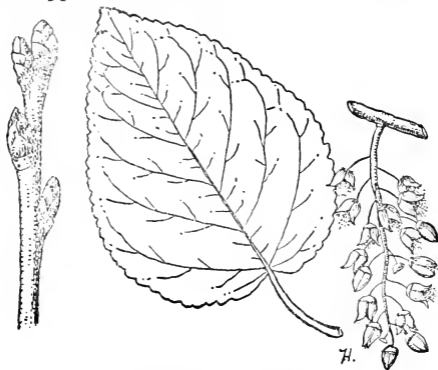
used in the manufacture of gun-powder, is obtained from willow wood, and it is the chief wood used in manufacture of artificial limbs.

There are many species, or kinds, of willows not easily distinguished. They are of high value in checking soil erosion and waste along stream banks, for which purpose they should be more extensively grown.

SWAMP COTTONWOOD

(*Populus heterophylla* L.)

THIS is a tree of low, wet swamps and the borders of rivers, in the Atlantic coastal and Mississippi Valley regions. The seeds are carried far by winds and germinate on wet sandy soils. The tree attains a height of 70 to 90 feet and a diameter of 3 feet. The branches are usually short, forming a narrow, round-topped head, and the buds are resinous.



SWAMP COTTONWOOD
 Twig, three-quarters natural size.
 Leaf, one-half natural size.

The **leaves** are broadly ovate, 3 to 6 inches wide and 4 to 7 inches long, gradually narrowed at the tip and slightly rounded toward the base, usually finely toothed along the edges, dark green above, pale and smooth below; on rounded leaf-stems from 2 to 3 inches long.

The **flowers**, which bloom in early spring, are in catkins, the female catkins few-flowered. The **fruit**, containing the tiny seeds supported by "cotton," is borne on female, or pistillate, trees, and the male, or staminate, flowers occur separately on other trees. The fruit ripens before the leaves are fully grown.

The **wood** is light and soft and, as lumber, requires special attention in drying to prevent its warping badly. It makes excellent paper pulp for printing half-tone illustrations.

The European white poplar (*Populus alba* L.) with light-gray bark and leaves, white wooly beneath, is often found near old houses and along roadsides. The Lombardy poplar, a tall narrow form of the European black poplar (*Populus nigra* var. *italica* Du Roi) is often planted and is a striking tree for the roadside.

CAROLINA POPLAR (Cottonwood)

(Populus deltoides Marsh.)

THE cottonwood, or Carolina poplar, is scattered widely but nowhere occurs in great abundance; it does not grow naturally in the mountains. The tree is easily propagated by cuttings and grows rapidly, hence it has been widely planted to get shade quickly. For this purpose, however, the tree is unsatisfactory, because it begins to shed the leaves



CAROLINA POPLAR

Leaf, one-half natural size.

Twig, one-third natural size.

by midsummer, the "cotton" from the female, or seed-bearing, tree is often a nuisance, the soft wood is easily broken by winds, and the rank growth of the roots often results in stopping drain pipes and cracking and lifting sidewalks.

The **leaves** are simple, alternate, broadly ovate or triangular, pointed, square at the base, and coarsely toothed on the edges, 3 to 5 inches across each way, covered with soft white hairs on the under side, supported by flattened slender stems, 2 to 3 inches long. The winter buds are covered with chestnut-brown, resinous scales. The **flowers** are in catkins of two kinds, male and female, and appear before the leaves. The **fruit** containing the seed has a cluster of white silky hairs, which carries it for long distances.

The **wood** is soft, light-weight, warps easily upon drying, but is used for many purposes, sometimes as a substitute for yellow poplar and linden. It makes the highest grade of gloss magazine paper for the printing of half-tone illustrations.

RIVER BIRCH (Red Birch)

(Betula nigra L.)

THIS is the only native birch found at low elevations in the South. It is at home, as the name implies, along water courses, and inhabits the deep, rich soils along the borders of streams, ponds, lakes, and swamps which are sometimes inundated for weeks at a time.

The **bark** provides a ready means of distinguishing this tree. It varies from reddish brown to cinna-



RIVER BIRCH
One-third natural size.

mon-red in color, and peels back in tough papery layers. These layers persist on the trunk, presenting a very ragged and quite distinctive appearance. Unlike the bark of our other birches, the thin papery layers are usually covered with a gray powder. On older trunks, the bark on the main trunk becomes thick, deeply furrowed, and of a reddish-brown color.

The **leaves** are simple, alternate, 2 to 3 inches long, more or less oval in shape, with double-toothed edges. The upper surface is dark green and the lower a pale yellowish green.

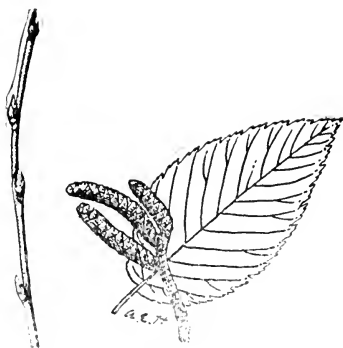
The **flowers** are in catkins, the two kinds growing on the same tree. The **fruit** is cone-shaped about 1 inch long, and densely crowded with little winged nutlets that ripen from May to June.

The **wood** is strong and fairly close-grained. It has been to some extent used in the manufacture of woodenware, in turnery and for wagon hubs. Since, however, this tree is scattered in its distribution and mostly confined to the banks of streams, it does not figure largely in commercial lumbering, but is cut chiefly for firewood.

BLACK BIRCH

(Betula lenta L.)

THE black birch, also known as sweet birch or cherry birch, occurs only in the highlands and mountain sections. It attains its best development in the mountain coves and on rich slopes where it reaches an average height of 70 feet and a diameter of 2 to 3 feet. The tree is moderately slow growing, but is of value for its products and protection to the soil in the high mountains.



BLACK BIRCH

Twig, one-half natural size. Leaf, one-third natural size.

The **bark** of the trunk is dark brown, almost black, dull and broken into large irregular, but not papery, plates. The small branches and twigs, also dark in color but lustrous and very aromatic, are frequently cut and distilled for the production of birch oil, much used as wintergreen flavoring.

The **leaves** are simple, alternate, oval or approaching oblong, 3 to 4 inches long, finely toothed and dark green, dull on the upper surface.

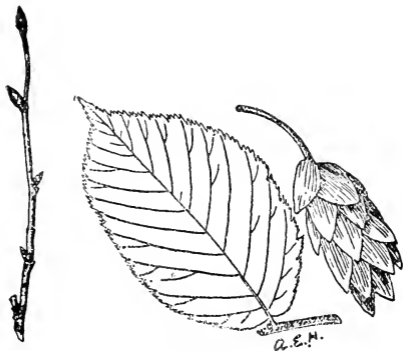
The **flowers** are of two kinds; the male catkins, usually 3 to 4 on a shoot, forming in the summer and blooming the following spring when the female catkins or "cones" open from the winter buds. The seeds ripen in late summer or autumn and fall with the loosened scales of the "cone."

The **wood** is heavy, very strong, hard and compact. The dark-brown color of the wood has given rise to the common local name of mahogany, or mountain mahogany. It is used for furniture, often being sold as "mahogany," and for flooring and interior trimming; locally it is prized as firewood.

IRONWOOD (Hop Hornbeam)

(Ostrya virginiana K. Koch.)

THE tree gets its common names from the qualities of its wood and the hop-like fruit. It is a small, slender, generally round-topped tree, from 20 to 30 feet high and 7 to 10 inches in diameter. The top consists of long slender branches, commonly drooping toward the ends. It is found mostly on rather dry soils throughout the upland and mountain regions.



IRONWOOD

Twig, one-half natural size.

Leaf, one-third natural size.

The **bark** is mostly light brown or reddish brown, and finely divided into thin scales by which the tree, after a little acquaintance, can be easily recognized.

The **leaves** are simple, alternate, generally oblong with narrowed tips, sharply toothed along the margin, sometimes doubly toothed, from 2 to 3 inches long.

The **flowers** are of two kinds on the same tree; the male, in drooping catkins which form the previous summer, the female, in erect catkins on the newly formed twigs. The **fruit**, which resembles that of the common hop vine, consists of a branch of leafy bracts 1 to 2 inches long containing a number of flattened ribbed nutlets.

The **wood** is strong, hard, durable, light brown to white, with thick pale sapwood. It is often used for fence posts, handles of tools, mallets and other small articles.

HORNBEAM

(*Carpinus caroliniana* Walt.)

THE hornbeam, also known as ironwood, blue beech and occasionally as water beech, is a small, slow-growing, bushy tree with a spreading top of slender, crooked, or drooping branches. It is found along streams and in low ground throughout the State. Its height is usually from 20 to 30 feet and its diameter 4 to 8 inches, although it sometimes grows larger.

The trunk is fluted with irregular ridges extend-



Twig, one-half natural size.

Leaf, one-third natural size.
Twig, one-half natural size.

ing up and down the tree. The **bark** is light brownish gray to dark bluish gray in color, sometimes marked with dark bands extending horizontally on the trunk.

The **leaves** are simple, alternate, oval, long-pointed, doubly toothed along the margin, 2 or 3 inches in length. They resemble those of the black or sweet birch, but are smaller.

The **flowers** are borne in catkins separately on the same tree; the male catkin about 1½ inches long, the female about three-fourths of an inch, with small, leaf-like, 3-lobed green scales. The **fruit** is a nutlet about one-third of an inch long. It falls, attached to the leaf-like scale which acts as a wing in aiding its distribution by the wind.

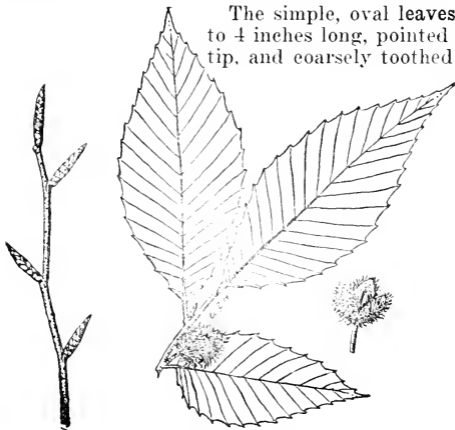
The **wood** is tough, close-grained, heavy and strong. It is sometimes selected for use for levers, tool handles, wooden cogs, mallets, wedges, etc. The tree is of little commercial importance and often occupies space in the woods that should be utilized by more valuable kinds.

BEECH

(*Fagus grandifolia* Ehrh.)

THE beech occurs throughout the State. It makes its best growth, however, in the moist coves in the mountains. It is widely found scattered with oaks and hickories on rich, well-drained bottoms, and in the mountains sometimes occurs in unmixed, dense stands. It is one of the most beautiful of all trees, either in summer or winter.

The simple, oval leaves are 3 to 4 inches long, pointed at the tip, and coarsely toothed along



BEECH
One-half natural size.

the margin. When mature, they are almost leathery in texture. The beech produces a dense shade. The winter buds are long, slender and pointed.

The **bark** is, perhaps, the most distinctive characteristic, as it maintains an unbroken, light gray surface throughout its life. So tempting is this smooth expanse to the owner of a jackknife that the beech has been well designated the "initial tree."

The little, brown, three-sided beech **nuts** are almost as well known as chestnuts. They form usually in pairs in a prickly burr. The kernel is sweet and edible, but so small as to offer insufficient reward for the pains of biting open the thin-shelled husk.

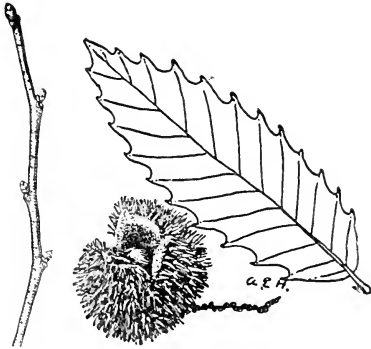
The **wood** of the beech is very hard, strong, and tough, though it will not last long on exposure to weather or in the soil. The tree is of no great economic importance as a lumber tree, though the wood is used to some extent for furniture, flooring, carpenters' tools, and novelty wares.

CHESTNUT

(Castanea dentata Borkh.)

IN the Southern States the chestnut is native to the hilly and mountain sections. It is one of our most useful trees and as such, has been called the "farmer's best friend."

The long-pointed **leaves** with their coarse teeth, each bearing a slender spine, are quite distinctive. They are simple, alternate, average 5 to 10 inches in



CHESTNUT
 Twig, one-half natural size.
 Leaf, one-third natural size.

length, and are dark green in color. The **flowers** are of two kinds on the same tree, the long, slender, whitish catkins opening in midsummer. The **fruit** is a prickly burr, which opens at the first frost, or earlier, and drops 2 or 3 shiny, brown, sweet, edible nuts.

The **bark** becomes broken into light-gray, broad, flat ridges, which often have a tendency toward a spiral course around the trunk.

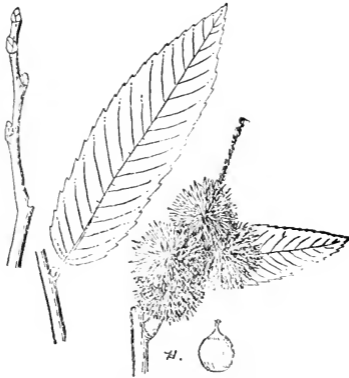
The **wood** is light, soft, not strong, coarse-grained, and very durable in contact with the soil—qualities which make it particularly valuable for posts, poles, crossties, as well as for light building construction. The wood is rich in tannin, and in the southern Appalachians it is extensively cut and used for the extraction of this valuable commercial product.

A bark disease, known as the chestnut blight, is proving fatal to the chestnut, and has already practically exterminated the tree over much of north-eastern United States. It has already reached portions of Virginia and North Carolina.

CHINQUAPIN

(Castanea pumila Mill.)

THIS small tree occurs at rare intervals throughout the northern half of the State on both lowlands and dry uplands, but is most frequently found in the higher mountains. It is usually under 10 inches in diameter and less than 30 feet high. The trunk is short and straight and bears a rounded head made up of slender, spreading branches. Sometimes the small trees, less than 10 feet in height, form dense thickets.



CHINQUAPIN

Twig, one-third natural size.

Leaf, one-half natural size.

The **leaves**, **bark** and **fruit** resemble those of the common chestnut, and the fruit ripens in the late summer or fall. The nut, however, is borne singly in a burr that measures commonly only a little more than an inch in diameter. The nut is rounded, dark chestnut-brown, shiny, and the thin coat, lined inside with fine whitish hairs, contains a sweet kernel, which is prized for food.

The **wood** is light, hard, strong, coarse-grained; it is suitable for fence posts, crossties, and fuel; but, because of its small size and comparative scarcity, it is of little economic importance.

WHITE OAK

(Quercus alba L.)

WITHIN its natural range, which includes practically the entire eastern half of the United States, the white oak is one of the most important timber trees. It commonly reaches a height of 60 to 100 feet and a diameter of 2 to 3 feet; sometimes it becomes much larger. It is found in a wide variety of soils. When grown in a dense stand it has a



WHITE OAK
 Twig, one-half natural size. Leaf, one-quarter natural size.

straight continuous trunk, free of side branches for over half its height. In the open, however, the tree develops a broad crown with far-reaching limbs. Well-grown specimens are strikingly beautiful.

The **leaves** are alternate, simple, 5 to 9 inches long and about half as broad. They are deeply divided into 5 to 9 rounded, finger-like lobes. The young leaves are a soft silvery gray or yellow or red while unfolding, becoming later bright green above and much paler below. The **fruit** is an acorn maturing the first year. The nut is three-quarters to one inch long, light brown, about one-quarter enclosed in the warty cup. It is relished by hogs and other live stock. The **bark** is thin, light ashy gray and covered with loose scales or broad plates.

The **wood** is useful and valuable. It is heavy, strong, hard, tough, close-grained, durable, and light brown in color. The uses are many, including construction, shipbuilding, tight cooperage, furniture, wagons, implements, interior finish, flooring, and fuel. Notwithstanding its rather slow growth, white oak is valuable for forest, highway and ornamental planting.

POST OAK

(*Quercus stellata* Wang., formerly *Q. minor* Sarg.)

THE post oak is often a medium-sized tree, with a rounded crown, commonly reaching a height of 50 to 80 feet and a diameter of 1 to 2 feet, but sometimes attains large size. It occurs throughout most of the State, ascending in the mountains to 2,500 feet; it is most abundant on the poorer soils of the middle districts, and least abundant in the southern portions.



POST OAK
One-third natural size.

The **bark** is rougher and darker than the white oak and broken into smaller scales. The stout young twigs and the leaves are coated at first with a thick light-colored fuzz which soon becomes darker and later drops away entirely.

The **leaves** are usually 4 to 5 inches long and nearly as broad, deeply 5-lobed with broad rounded divisions, the lobes broadest at the ends. They are thick and somewhat leathery, dark green and shiny on the upper surface, lighter green and rough hairy beneath.

The **flowers**, like those of the other oaks, are of two kinds on the same tree, the male in drooping, clustered catkins, the female inconspicuous. The **fruit** is an oval acorn, one-half to 1 inch long, set in a rather small cup which may or may not be stalked.

The **wood** is very heavy, hard, close-grained, light to dark brown, durable in contact with the soil. It is used for crossties and fence posts, and along with other oaks of the white oak class for furniture and other purposes.

OVERCUP OAK

(*Quercus lyrata* Walt.)

THE overcup oak, sometimes known as swamp post oak, is a large tree with small, often pendulous branches rarely reaching a height of 100 feet and a diameter of 3 feet. It occurs in river bottoms and rich low grounds of the Coastal Plain and the Mississippi basin, but is nowhere very abundant.

The **leaves** are 7 to 9 inches long, 1 to 4 inches broad, oblong, wider towards the point, narrowed at the base, dark green above, whitish beneath, with 7 to 9 distinct, deep, pointed lobes. They frequently turn to a bright scarlet or to scarlet and orange in the fall. The **bark** is rough, flaky, gray tinged with red.

The **flowers**



OVERCUP OAK
Leaf, one-third natural size.
Twig, two-thirds natural size.

open in April with the unfolding of the leaves. The acorn, or **fruit**, ripens the first year. It is thoroughly characteristic of the species. The large rounded or somewhat flattened acorn, one-half to 1 inch long, is nearly covered by the ovate or nearly spherical cup, which is thickened at the base but gradually grows thinner to the thin, often irregularly split, margin of the cup. The name of the tree comes from this characteristic.

The **wood** is heavy, hard, strong and durable and is used for the same purposes as that of white oak.

CHESTNUT OAK

(*Quercus montana* Willd., formerly *Q. prinus* L.)

CHESTNUT oak, also known as mountain oak and rock oak, has acquired these names from its leaf, which resembles that of the chestnut, and from its fondness for rocky or mountain ridges. It is found widely distributed throughout the mountains on dry gravelly and rocky slopes, ridges and stream banks.



CHESTNUT OAK
One-third natural size.

It is noticeably a spreading tree of medium height; at 15 to 20 feet, the trunk frequently divides into several large, angular limbs, making an open, irregular-shaped head. The **bark** is dark reddish brown, thick, deeply divided into broad, rounded ridges, and is of high commercial value for the extraction of tannic acid.

The **leaves** are simple, alternate, oblong, often rounded at the point, irregularly scalloped or wavy on the edge (not sharp-toothed as in chestnut), 5 to 9 inches long, and shiny yellowish green above, lighter and slightly fuzzy beneath. The **fruit** is an acorn about an inch long, oval, shiny brown, and enclosed up to half its length in a cup. It ripens in one season, and, like the acorn of the white oak, sprouts in the autumn soon after falling to the ground.

The **wood** is generally similar to that of the other upland white oaks, heavy, hard, strong, and durable in contact with the soil. It is extensively cut into crossties and heavy timbers for bridge, railroad, and other rough construction, and used for fence posts and fuel.

SWAMP CHESTNUT OAK

(Basket Oak, or Cow Oak)

(Quercus prinus L., formerly *Q. michauxii* Nutt.)

THIS tree occurs in the bottomlands of the State, but is rather sparsely distributed. In the appearance of its bark and branches it closely resembles the ordinary white oak, but may be distinguished by means of the leaf and acorn. The tree attains heights of about 100 feet and diameters of about 4 feet.

The **leaves** are oval, broader towards the point and notched on the edge somewhat like the chestnut oak. They vary from 4 to 8 inches in length, are downy beneath and turn a rich crimson in the fall. The **bark** is a very light gray, and on old trees is broken into broad flakes or divided into strips.



SWAMP CHESTNUT OAK
Leaf, one-third natural size.
Twig, one-half natural size.

The **acorn**, or **fruit**, attains a diameter of more than an inch and a length of $1\frac{1}{2}$ inches. The acorn, which is a bright shiny brown and set in a rather shallow cup, is considerably larger than that of the white oak. It is frequently eaten by cows and this fact gives the tree one of its common names.

The **wood** is heavy, hard, tough, strong, and takes an excellent polish. It is used in manufacturing lumber, veneer, boards (shakes), tight cooperage; for fuel and fence posts; and extensively for making baskets.

LIVE OAK

(*Quercus virginiana* Mill.)

THE live oak extends from southeastern Virginia through the lower Coastal Plain of North Carolina and southward. It is a tree of striking character from its wide-spreading habit; sometimes reaching more than 100 feet in spread; with a short, stout trunk, 3 to 4 feet in diameter, dividing in several large limbs with nearly horizontal branches,



LIVE OAK
Two-thirds natural size.

forming a low, dense, round-topped head. Its height is commonly from 40 to 50 feet. The **bark** on the trunk and large branches is dark brown tinged with red, and slightly furrowed. It grows to largest size on the rich hammocks and low ridges near the coast and only a few feet above the water level. It is one of the most desirable trees for roadside and ornamental planting in the Coastal Plain. It

is of moderately slow growth but long-lived and handsome.

The **leaves** are simple, evergreen, thick, leathery, oblong, smooth above, pale and silvery white beneath; from 2 to 4 inches in length and 1 to 2 inches in breadth.

The **fruit** is an acorn about an inch long and one-third inch wide, borne on a long stem or peduncle; it is oblong, dark brown and lustrous, and set in a top-shaped, downy cup of a light reddish-brown color.

The **wood** is very heavy, hard, strong and tough, light brown or yellow, with nearly white, thin sapwood. It was formerly largely used, and still is occasionally, for ships' knees in building wooden ships.

RED OAK (Southern Red Oak)

(*Quercus rubra* Linn., formerly *Q. digitata* Sudw.)

THE southern red oak, commonly known as red oak and referred to in books as Spanish oak, usually grows to a height of 70 to 80 feet and a diameter of 2 to 3 feet, though larger trees are not infrequently found. It is one of the most common southern upland oaks. Its large spreading branches form a broad, round, open top. The **bark** is rough,

though not deeply furrowed, and varies from light gray on younger trees to dark gray or almost black on older ones.

The **leaves** are of two different types: (1) irregular-shaped lobes, mostly narrow, bristle-tipped, the central lobe



SOUTHERN RED OAK
Leaf, one-third natural size.
Twig, one-half natural size.

often the longest; or (2) pear-shaped with 3 rounded lobes at the outer end. They are dark lustrous green above and gray downy beneath, the contrast being strikingly seen in a wind or rain storm.

The **flowers** appear in April while the leaves are unfolding. The **fruit** ripens the second years. The small rounded acorn, about half an inch long, is set in a thin saucer-shaped cup which tapers to a short stem.

The **wood** is heavy, hard, strong, coarse-grained, and is less subject to defects than most other red oaks. It is used for rough lumber and for furniture, chairs, tables, etc. It is a desirable timber tree, especially on the poorer, drier soils. The bark is rich in tannin.

The freedom of this tree from disease, its thrifty growth, large handsome form and long life make it very desirable for shade or ornamental use.

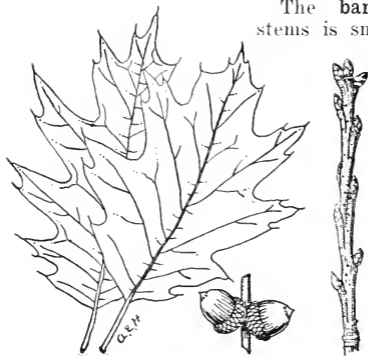
NORTHERN RED OAK

(*Quercus borealis maxima* Ashe,
formerly *Q. rubra* L.)

THE northern red oak occurs throughout the State, but is most common and of best quality in the higher mountains. It is not found in swamps. It usually attains a height of about 70 feet and a diameter ranging from 2 to 3 feet, but is sometimes much larger. The forest-grown tree is tall and straight with a clear trunk and narrow crown.

The **bark** on young stems is smooth, gray to brown on older trees thick and broken by shallow fissures into regular, flat, smooth-surfaced plates.

The **leaves** are simple, alternate, 5 to 9 inches long and 4 to 6 inches wide, broader toward the tip, divided into



NORTHERN RED OAK
Leaf, one-third natural size.
Twig, one-half natural size.

7 to 9 lobes, each lobe being somewhat coarsely toothed and bristle-tipped, and firm, dull green above, paler below, often turning a brilliant red after frost. The **flowers**, as in all the oaks, are of two kinds on the same tree, the male in long, drooping, clustered catkins, opening with the leaves, the female solitary or slightly clustered. The **fruit** is a large acorn maturing the second year. The nut is from three-fourths to 1¾ inches long, blunt-topped, flat at base, with only its base enclosed in the very shallow dark-brown cup.

The **wood** is hard, strong, coarse-grained, with light reddish-brown heartwood and thin lighter-colored sapwood. It is used for cooperage, interior finish, construction, furniture, and crossties. Because of its average rapid growth, high-grade wood, and general freedom from insect and fungus attack, it is widely planted in the higher portions of the State for timber production and as a shade tree.

BLACK OAK

(*Quercus velutina* Lam.)

THE black oak, sometimes farther north called yellow oak or yellow-barked oak, usually grows to be about 80 feet in height and 1 to 3 feet in diameter. It is found commonly throughout the State on dry plains and ridges, but seldom on rich ground. The crown is irregularly shaped and wide, with a clear trunk for 20 feet or more on large trees. The

bark on the very young trunks is smooth and dark brown but soon becomes thick and black, with deep furrows and rough broken ridges. The bright-yellow color and



Twig, one-half natural size.



BLACK OAK
Leaf, one-third natural size.

bitter taste of the inner bark; due to tannic acid, are distinguishing characteristics.

The **leaves** are alternate, simple, 5 to 10 inches long and 3 to 8 inches wide, shallow or deeply lobed, the shape varying greatly. When mature, the leaves are dark green and shiny on the upper surface, pale on the lower, more or less covered with down, and with conspicuous rusty brown hairs in the forks of the veins.

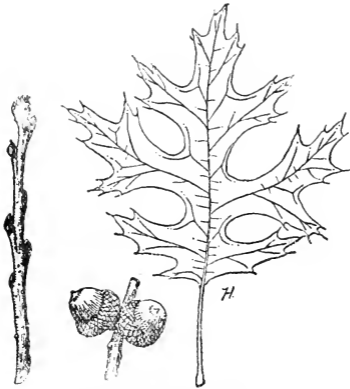
The **fruit** matures the second season. The light-brown nut is from one-half to 1 inch long, more or less hemispherical in shape, and from one-half to three-quarters enclosed in the thin, dark-brown, scaly cup. The kernel is yellow and extremely bitter.

The **wood** is hard, heavy, strong, coarse-grained and checks easily. It is a bright red-brown with a thin outer edge of paler sapwood. It is used for the same purposes as red oak, under which name it is put on the market. Its growth is rather slow.

SCARLET OAK

(*Quercus coccinea* Muench.)

SCARLET OAK, also known as pin, Spanish or spotted oak, occurs usually on dry, rocky, or sandy soils, but is nowhere very abundant or of first importance. It usually reaches a height of 60 or 80 feet, with a trunk diameter of 2 or 3 feet, and is sometimes larger. The branches droop at the end



SCARLET OAK
 Leaf, one-third natural size.
 Twig, one-half natural size.

and form a narrow, open crown and the trunk tapers rapidly. The bark on young stems is smooth and light brown. On old trunks it is divided into ridges not so rough as those of the black oak and not so flat-topped as those of the northern red oak. The bark is often mottled or

spotted with gray. The inner bark is reddish.

The leaves are simple, alternate, somewhat oblong or oval, 3 to 6 inches long, 2½ to 4 inches wide, usually 7-lobed, the lobes bristle-pointed and separated by rounded openings extending at least two-thirds of the distance to the midrib, giving the leaves a very deeply "cut" appearance. The leaves turn a brilliant scarlet in the autumn before falling. The flowers are of two kinds on the same tree and appear when the leaves are two thirds or one-half grown. The fruit takes 2 years to mature. The acorn is one-half to 1 inch long, reddish brown, often striped, and about half-enclosed in the cup.

The wood is heavy, hard, strong and coarse-grained. The lumber is sold as red oak and has the same uses. It is usually somewhat inferior in quality and sometimes known as pin oak. Scarlet oak is used considerably in ornamental planting.

TURKEY OAK

(*Quercus catesbaei* Michx.)

THE turkey oak is one of the characteristic trees of the Coastal Plain region, being most abundant and reaching its largest size on dry barren sandy ridges and sandy bluffs and hammocks close to the coast. It is usually 20 or 30 feet high, but rarely reaches a height of 60 feet, with a trunk a foot and a half to 2 feet in diameter. Its branches are stout spreading and more or less contorted, forming an open irregular but generally round-topped crown.



TURKEY OAK
 Leaf, one-third natural size. Twig, two-thirds natural size.

The **leaves** are deeply divided into 3 or 5, or rarely 7 lobes, spreading and tapering from the base, and average about 5 inches long as well as wide. They are thick and rigid, bright yellow-green and lustrous above, paler and somewhat downy on the under surface. They are very characteristic and should not be confused with those of any other tree.

The **acorn** is short-stalked, dull, light brown in color, an inch long and three-fourths of an inch broad. It is oval in shape, full and rounded at both ends, and is enclosed for about a third of its length in a thin light red-brown cup covered by rounded scales that extend above the rim of the cup and down over part of the inner surface.

The **wood** is heavy, hard, strong, rather close-grained and light brown in color, tinged with red. It is used largely for fuel, but is cut to some extent for lumber and used for general construction.

BLACK JACK OAK

(*Quercus marilandica* Muench.)

THE occurrence of black jack oak is said to indicate poor soil. It is certain that it often occurs on dry or poorly drained gravel clay, or sandy upland soils where few other forest trees thrive. This perhaps accounts chiefly for its slow rate of growth. It is found in all parts of the State. The tree sometimes reaches a height of 50 or 60 feet and a diam-



BLACK JACK OAK

Twig, two-thirds natural size.

Leaf, one-third natural size.

eter of 16 inches, but it is usually much smaller. Its hard, stiff, drooping branches form a dense crown which usually contains many persistent dead twigs. The **bark** is rough, very dark, often nearly black, and broken into small, hard scales or flakes.

The **leaves** are of leathery texture, dark green on the upper surface, lighter underneath, broadly wedge-shaped, 4 to 10 inches long and about the same in width. The **fruit** is an acorn about three-quarters of an inch long, yellow-brown and often striped, inclosed for half its length or more in a thick light-brown cup.

The **wood** is heavy, hard and strong; when used at all, it is used mostly as firewood.

WATER OAK

(*Quercus nigra* L.)

THE water oak is found native along the borders of swamps and streams and on rich bottomlands, over the Coastal Plain region and somewhat further inland. It has been widely planted in the Southern States along streets and in parks as a shade tree. When fully grown this tree reaches a height of about 80 feet and a diameter of from 1 to over 3 feet. The

trunk is shapely. The bark is smooth, light brown winged with red, and has many smooth thin scales over the surface. The water oak can be most readily distinguished from the willow oak—a close associate, but longer-lived—



WATER OAK

Leaf, one-third natural size.
Twig, one-half natural size.

by the differences in the general shape and size of the leaves.

The **leaves** are simple, quite variable in shape, mostly oblong, broader near the point, and narrower at the base, giving a wedge-shaped effect. They are usually slightly 3-lobed at the outer end, thin, and of a dull bluish-green color, paler below than above; mostly smooth, and usually 2 to 3 inches long and 1 to 2 inches wide; they remain green for some time and gradually fall from the tree during the winter.

The **flowers** appear in April when the leaves are beginning to unfold. The **fruit**, or acorn, matures at the end of the second season. The acorn is from one-half to two-thirds of an inch in length and nearly as broad, light brown or yellowish brown and often striped, enclosed at the base only in a thin saucer-shaped cup.

The **wood** is heavy, hard, and strong, light brown in color, with lighter-colored sapwood. It is not used to a great extent as lumber, but the trees are cut and utilized for piling, crossties and fuel.

WILLOW OAK

(*Quercus phellos* L.)

THE willow oak, often called water oak, occurs generally over the State, except in the mountains in the northern section. It is most often found in lowlands and along the borders of rivers and swamps, but often also on rich sandy uplands. It is a beautiful and long-lived tree, and desirable for roadside, lawns and parks, for which it has been widely planted.

The slender willow-like leaves, on a tree whose habit of growth is manifestly that of an oak, make



WILLOW OAK
 Twig,
 one-half natural size.
 Leaf,
 one-third natural size.

the tree easy to identify in the forest. The leaves are 2 to 4 inches long and one-half to 1 inch wide, with smooth or slightly wavy margin, bristle-pointed, smooth, light green and shiny above, but dull and usually smooth below; alternate in arrangement on the twig and borne on a short stout stem.

The bark is generally smooth and of a reddish brown color; with age, the bark becomes slightly roughened and divided by narrow ridges.

The small acorns, closely set along the stem, mature at the end of the second year. The nut is a light-brown hemisphere, about one-half an inch in diameter, its base scarcely enclosed in the shallow, reddish-brown cup. The nuts are eaten as food by bluejays, grackles ("black birds"), and several other species of birds, as well as by rodents.

The wood is not separated commercially from other species in the red oak group. It is heavy, strong, rather coarse-grained, light brown tinged with red, and not durable when exposed to the weather. It is used locally for crossties, bridge planks, barn sills, and general construction.

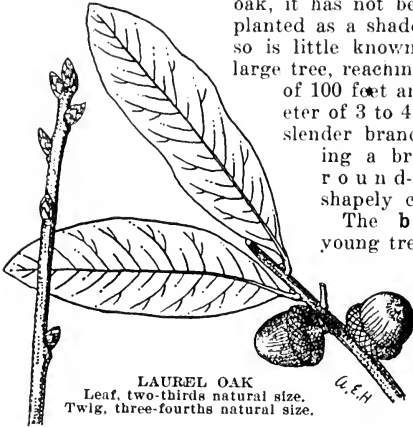
LAUREL OAK

(*Quercus laurifolia* Michx.)

THE laurel oak is nowhere abundant in the State, but is generally distributed through the lower coast region on the banks of streams and in or near swamps and rich hammocks.

Unlike either the water oak or the willow oak, it has not been widely planted as a shade tree and so is little known. It is a large tree, reaching a height of 100 feet and a diameter of 3 to 4 feet, with slender branches forming a broad dense round-topped shapely crown.

The bark of young trees is dark



LAUREL OAK
 Leaf, two-thirds natural size.
 Twig, three-fourths natural size.

brown, more or less tinged with red, roughened by small close scales, becoming on older trees nearly black and broken into broad flat ridges.

The leaves are from 3 to 4 inches long and $\frac{3}{4}$ to over an inch wide. They bear the same general resemblance to the laurel that the willow oak does to the willow, and should not be confused with this latter tree because of their greater width in proportion to their length. They are thin and very shiny above, lighter green below and with less gloss. They fall during the early part of the spring and for a few weeks the trees are bare. The tree may be distinguished from the live oak, which it somewhat resembles, by the absence of gray down or fuzz on the under side of the leaves.

The flowers which appear early are distinctly red.

The acorn, which matures at the end of the second year, is dark brown in color and about half an inch long. It is enclosed for about a fourth of its length by a thin saucer-shaped cup covered by thin light red-brown scales.

The wood is heavy, hard, and coarse-grained. It checks in drying and is used only for fuel.

WHITE ELM (American Elm)

(*Ulmus americana* L.)

THE famous shade tree of New England, whose range, however, extends to the Rocky Mountains and southward to Texas. In this State, however, it is rather sparsely distributed and nowhere common. It reaches an average height of 60 to 70 feet and a diameter of 4 to 5 feet. The **bark** is dark gray, divided into irregular, flat-topped, thick ridges, and



WHITE ELM
 Twig, one half
 natural size.
 Leaf, one-third natural size.



is generally firm, though on old trees it tends to come off in flakes. An incision into the inner bark will show alternate layers of brown and white.

Because of its spreading fan-shaped form, graceful pendulous branches, and long life, the white elm justly holds its place as one of the most desirable shade trees.

The **leaves** are alternate, simple, 4 to 6 inches long, rather thick, somewhat one-sided, doubly toothed on the margin, and generally smooth above and downy below. The leaf veins are very pronounced and run in parallel lines from the midrib to leaf-edge.

The **flowers** are small, perfect, greenish, on slender stalks sometimes an inch long, appearing before the leaves in very early spring. The **fruit** is a light green, oval shaped samara (winged fruit) with the seed portion in the center and surrounded entirely by a wing. A deep notch in the end of the wing is distinctive of the species. The seed ripens in the spring and by its wing is widely disseminated by the wind.

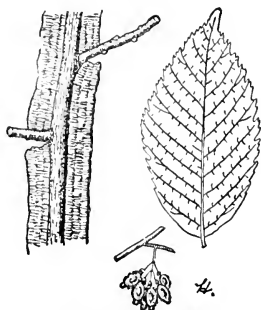
The **wood** is heavy, hard, strong, tough, and difficult to split. It is used for hubs of wheels, saddle trees, boats and ships, barrel hoops, and veneer for baskets and crates.

WINGED ELM

(*Ulmus alata* Michx.)

THE winged elm gets its common name from the thin corky growth, or "wings," usually found on the smaller branches. It occurs scattered generally over the State except in the mountains, usually on dry, gravelly uplands, but often in moist soils and in waste places. It grows rapidly in moist situations, and at the same time is one of the best trees

for planting along roadsides in dry poor locations. It is comparatively free from disease, though not notably long-lived. This elm is a medium-sized tree of 40 to 50 feet in height and rarely as large as 2 feet in diameter. It forms a rather open, round-topped head. The bark is light brown, tinged with red, and divided into irregular flat ridges and fissures.



WINGED ELM
Two-thirds natural size.

The leaves are simple, alternate, 2 to 4 inches long and 1 to 2 inches broad, coarsely double-toothed, thick, dark green and smooth above, and pale and softly downy below. They are smaller than those of any other elm native in the State. The flowers appear in early spring, long before the leaves unfold. The fruit ripens in the spring about the time the leaves appear; it is winged, tipped with 2 small incurved awns, or beaks, oblong, reddish brown, about one-third of an inch long, with a long slender stalk at the base, and covered with white hairs.

The wood is very similar to that of the other elms—heavy, hard, strong and difficult to split. It is occasionally used for hubs and mauls. Formerly, rope made of the inner bark was used for binding the covers to cotton bales.

SLIPPERY ELM (Red Elm)

(*Ulmus fulva* Michx.)

THE slippery elm, or red elm, occurs sparingly in the northern part of the State. It is found principally on the banks of streams and on low hillsides in rich soil. It is a tree of small to moderate size, but noticeably wide-spreading. It is usually less than 40 feet in height and 6 inches in diameter, although trees of larger dimensions are occasionally found.

The **bark** on the trunk is frequently 1 inch thick,



SLIPPERY ELM
 Twig, one-half natural size.
 Leaf, one-third natural size.

dark grayish brown, and broken by shallow fissures into flat ridges. The inner bark is used to some extent for medicinal purposes, as it is fragrant and, when chewed, affords a slippery, mucilaginous substance, whence the tree gets its name.

The **leaves** are simple, alternate on the stem, 4 to 6 inches in length, sharp-pointed, their bases unsymmetrical, doubly-toothed on the edges, thick, dark green, and rough on both sides.

The **fruit** consists of a seed surrounded by a thin, broad, greenish wing, about one-half an inch in diameter; the flowers appear in early spring and the fruit ripens when the leaves are about half-grown.

The **wood** is close-grained, tough, strong, heavy, hard, moderately durable in contact with the soil. It is used for fence-posts, crossties, agricultural implements, ribs for small boats and for some other purposes.

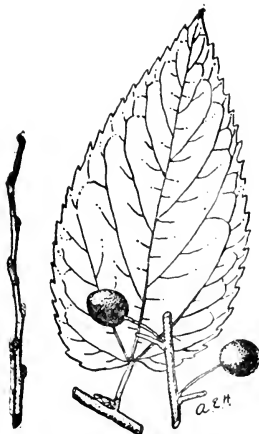
HACKBERRY

(*Celtis occidentalis* L.)

THE hackberry is found sparsely throughout the State, except in the high mountains. It occurs most abundantly and of greatest size in the rich alluvial lands in the eastern part of the State, but thrives, however, on various types of soil, from the poorest to the richest. It is usually a small or medium-sized tree from 30 to 50 feet high and 10 to 20 inches in diameter. Its limbs are often crooked and angular and bear a head made of slender pendant branches or short, bristly, stubby twigs. In the open the crown is generally very symmetrical. It makes an excellent shade tree.

The bark is grayish and generally rough with scale-like or warty projections of dead bark. In some instances the bark is smooth enough on the limbs to resemble that of the beech.

The leaves are simple, ovate, alternate, one-sided, 2 to 4 inches long, the edges toothed



HACKBERRY

Leaf, one-third natural size.
Twig, one-half natural size.

toward the long point.

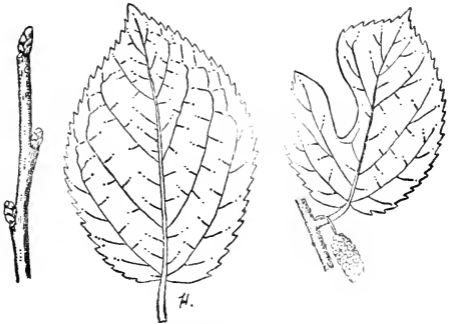
The flowers are inconspicuous, and the two kinds are borne on the same tree. They appear in April or May, and are of a creamy greenish color. The fruit is a round, somewhat oblong drupe, or berry, from one-quarter to one-third of an inch in diameter. It has a thin, purplish skin, and sweet, yellowish flesh. From this characteristic it is sometimes called sugarberry. The berries frequently hang on the tree most of the winter.

The wood is heavy, rather soft, weak, and decays readily when exposed. It is used chiefly for fuel, but occasionally for lumber.

RED MULBERRY

(*Morus rubra* L.)

THE red mulberry occurs throughout the State. It prefers rich soils and is nowhere abundant. It is commonly called mulberry as there are no other native species. The white mulberry and paper mulberry, which are sometimes found in waste places, are introduced species which have to some extent become naturalized. The red mulberry is a small



RED MULBERRY
 Twig, two-thirds natural size. Leaf, one-third natural size.

tree, rarely 50 feet high and 2 feet in diameter, often growing in the shade of larger trees.

The **bark** is rather thin, dark grayish brown, peeling off in long narrow flakes.

The **leaves** are alternate, thin, rounded or somewhat heart-shaped, toothed, pointed, 3 to 5 inches long, rough hairy above and soft hairy beneath. Often some of the leaves, especially on young trees and thrifty shoots, are mitten-shaped or variously lobed.

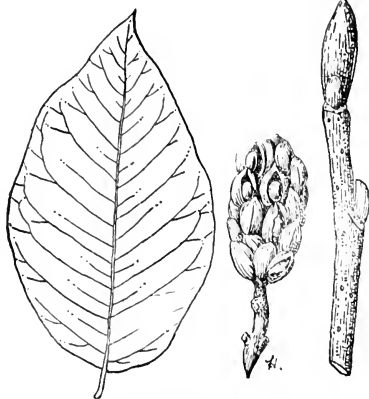
The **flowers** are of two kinds, on the same or different trees, in long drooping catkins, the female catkins shorter, appearing with the leaves. The **fruit** is dark red or black, and resembles a blackberry; however, a stalk extends through it centrally, and it is longer and narrower. The fruit is sweet and edible and greatly relished by birds and various animals.

The **wood** is rather light, soft, not strong, light orange-yellow, and very durable in contact with the soil. It is chiefly used for fence posts. The tree might be planted for this purpose and to furnish food for birds.

CUCUMBER TREE

(*Magnolia acuminata* L.)

THE cucumber tree attains an average height of 60 to 80 feet and a diameter of 2 to 4 feet. It occurs singly among other hardwood trees throughout the richer, cooler slopes and coves of our mountains, and extends somewhat into the nearby regions. This is the only one of our magnolias which has rough bark and a small leaf.



CUCUMBER TREE
 Leaf, one-third natural size.
 Twig, two-thirds natural size.

The bark is aromatic and bitter; that of the young twigs is a lustrous red-brown, while the bark of the trunk is rather thin, dark brown, furrowed and broken into thin scales.

The leaves are alternate, oblong, short-pointed, rounded at the base, silky hairy when unfolding, later smooth or slightly silky, 6 to 10 inches long, 4 to 6 inches wide, often with wavy edges, dark green above, lighter beneath.

The flowers are single, large—though smaller than those of the other magnolias— $2\frac{1}{2}$ to 3 inches long. The 6 upright petals are whitish green, tinged with yellow. The fruit is a smooth, dark-red, often crooked “cone,” $2\frac{1}{2}$ to 3 inches long, somewhat resembling a small cucumber. The seeds are one-half inch long, and covered with a pulpy scarlet coat, which attracts the birds, particularly as the seeds hang by thin cords from the opening “cones.”

The wood is light, soft, close-grained, durable, of a light yellow-brown color. It is cut and used extensively along with yellow poplar for cabinet and carriage making, and other similar uses. Besides being a valuable timber tree, it is quite desirable for roadside and ornamental planting.

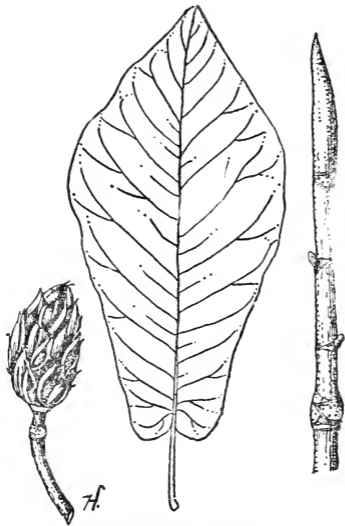
MOUNTAIN MAGNOLIA

(*Magnolia fraseri* Walt.)

THE mountain magnolia, sometimes locally known as wahoo, is a small tree, 30 to 40 feet high, with a straight, leaning, or divided trunk, 9 to 18 inches in diameter and has wide-spreading, rather brittle branches. It is found in the rich coves and on the cool slopes of the southern Appalachian Mountains at elevations from 2,000 to 4,000 feet.

The bark is usually smooth and grayish brown. The terminal winter buds are smooth, purple, 1½ to 2 inches long.

The leaves are distinctive, being oblong, with the lower end narrowed and "auricled" (i. e., having lobes like ears) at the base. They are smooth, 10 to 12 inches long, crowded at the ends of the twigs, and drop off in the autumn. The flowers are white, fragrant,



MOUNTAIN MAGNOLIA
Leaf, one-third natural size.
Twig, two-thirds natural size.

8 to 10 inches wide, and "perfect" (i. e., having stamens and pistils in the same flower.)

The fruit at maturity is red and shaped like a cucumber, 4 to 5 inches long, bearing many scarlet seeds, each in a carpel, or cell, on which is a long stiff point.

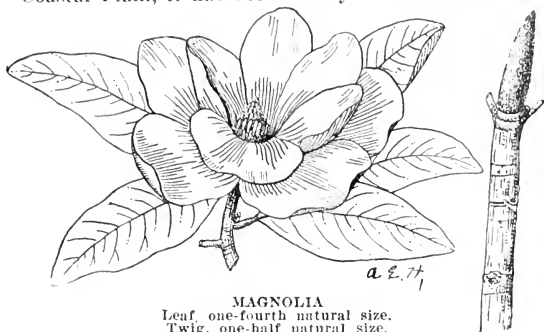
The wood is light, soft, weak and easily worked. It is only occasionally used for lumber or pulpwood, in places where practically all species are being cut.

The tree is occasionally planted for ornamental purposes, but it is said to be less hardy than the other magnolias.

MAGNOLIA (Evergreen Magnolia)

(*Magnolia grandiflora* L.)

THE magnolia or evergreen magnolia is one of the best-known trees in the State. No other tree in our forest excells it in the combined beauty of the leaves and the flowers. Occurring naturally in the rich moist soil on the borders of river swamps and pine-barren ponds and near-by uplands in the Coastal Plain, it has been widely cultivated for its



MAGNOLIA
 Leaf, one-fourth natural size.
 Twig, one-half natural size.

ornamental value. In its natural habitat, it attains heights generally of 60 to 80 feet and diameters of the trunk up to 4 feet. The dense pyramidal head, or crown, is made up of numerous small spreading branches and branchlets.

The **bark** is gray to light brown. The **leaves** are evergreen, thick, leathery, elliptical or oval, dark green and shiny above, rusty or silvery beneath, and mostly from 5 to 8 inches long and 2 to 3 inches wide, with prominent midribs. They remain on the tree for about 2 years.

The large handsome **flowers** appear at intervals during the summer. They are very attractive with their large pure white petals surrounding a splash of bright purple in the center (from the stamens) and their pleasing fragrance. The "sweet magnolia" of the South well deserves the place given it in story and song.

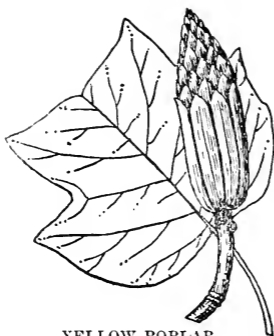
The **fruit** consists of a rounded or oval head from 3 to 4 inches long containing many seeds, each enclosed in a sheath. These open in the fall and display the bright red "berries" dangling on slender threads.

The **wood** is moderately heavy and hard, and of a creamy color. It is used somewhat for ornamental purposes, and considerably as firewood.

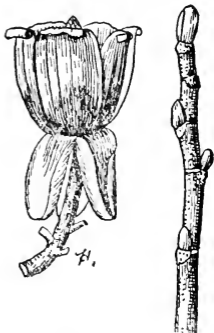
YELLOW POPLAR, OR TULIP TREE

(*Liriodendron tulipifera* L.)

YELLOW POPLAR, or tulip tree, received its names from the yellow color of its heartwood and its attractive tulip-like flowers. It is one of the largest and most valuable hardwood trees of the United States. It occurs commonly throughout the State, but reaches its largest size in the deep moist soils along streams and in the lower moun-



YELLOW POPLAR
Leaf, one-third natural size.



Twig, two-thirds
natural size.

tain coves. As more commonly seen, it has a height of 60 to 100 feet and a diameter of 3 to 4 feet. Original-growth trees, however, attain heights of 150 to 190 feet and diameters up to 10 feet. Growing with a straight central trunk like the pines, and often clear of limbs for 30 to 50 feet, it has a narrow pyramidal head which in older age becomes more spreading. The tree has been extensively cut, but is reproducing rapidly and remains one of the most abundant and valuable trees in our young second-growth forests. It has been planted as an ornamental and shade tree.

The **leaves** are simple, 4 to 6 inches in length and breadth, 4-lobed, dark green in summer, turning to a clear yellow in the fall.

The greenish-yellow tulip-shaped **flowers** appear in April. The **fruit** is a narrow light-brown, upright cone, 2 to 3 inches long, made up of seeds, each enclosed in a hard bony coat and provided with a wing which makes it easily carried by the wind.

The **wood** is light, soft, easily worked, light yellow or brown, with wide cream-colored sapwood. It is extensively cut into lumber for interior and exterior trim, vehicle bodies, veneers, turnery and other high-grade uses.

SASSAFRAS

(*Sassafras officinale* N. and E.)

THE sassafras is a small, aromatic tree, usually not over 40 feet in height or a foot in diameter. It is common throughout the State on dry soils, except in the higher mountains, and is one of the first broad-leaf trees to come up on abandoned fields, where the seeds are dropped by birds. It is closely related to the camphor tree of Japan. The bark of



Twig, one-half natural size.

Leaf, one-third natural size.

the trunk is thick, red-brown and deeply furrowed and that of the twigs is bright green.

The leaves are very characteristic. It is one of the few trees having leaves of widely different shape on the same tree, or even on the same twig. Some are oval and entire, 4 to 6 inches long; others have one lobe, resembling the thumb on a mitten; while still others are divided at the outer end into 3 distinct lobes. The young leaves and twigs are quite mucilaginous.

The flowers are clustered, greenish, yellow, and open with the first unfolding of the leaves. The male and female flowers are usually on different trees. The fruit is an oblong, dark blue or black, lustrous berry, containing one seed and surrounded at the base by what appears to be a small orange-red or scarlet cup at the end of a scarlet stalk.

The wood is light, soft, weak, brittle, and durable in the soil; the heartwood is dull orange-brown. It is used for posts, rails, boat-building, cooperage and for ox-yokes. The bark of the roots yields the very aromatic oil of sassafras much used for flavoring candies and various commercial products.

SWEET GUM (Red Gum)

(*Liquidambar styraciflua* L.)

THE sweet gum is a large valuable forest tree. It occurs on rich river bottoms and in swamps subject to frequent overflow, as well as on drier uplands throughout the middle and lower parts of the State. It is usually abundant in second growth on old fields and in cut-over woods. The **bark** is a light gray, roughened by corky scales, later becoming deeply furrowed. After the second year the twigs often develop 2 to 4 corky projections of the bark, which



SWEET GUM
 Leaf, one-third natural size.
 Twig, two-thirds natural size.

gives them a winged appearance.

The simple, alternate star-shaped leaf, with its 5 to 7 points or lobes, is 5 to 7 inches across and very aromatic. In the fall its coloring is brilliant, ranging from

pale yellow through orange and red to a deep bronze.

The **flowers** are of two kinds on the same tree, unfolding with the leaves. The **fruit** at first glance reminds one of the balls of the sycamore, but on closer inspection proves to be a head. It measures an inch or more in diameter and is made up of many capsules with projecting spines. It frequently hangs on the tree by its long swinging stem late into the winter.

The **wood** is heavy, moderately hard, close-grained, and not durable on exposure. The reddish brown heartwood, which suggests the name red gum, is not present to any appreciable extent in logs under 16 inches in diameter. The wood is extensively used for flooring, interior finish, paper pulp and veneers for baskets of all kinds. Veneers of the heartwood are largely used in furniture, sometimes as imitation mahogany or circassian walnut. This tree should be more widely planted for ornamental use.

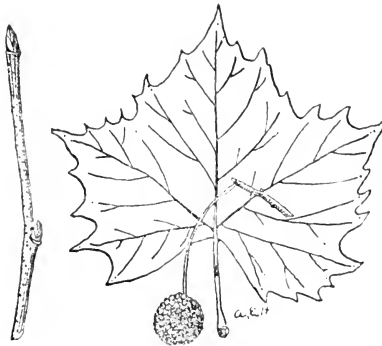
SYCAMORE

(*Platanus occidentalis* L.)

THE sycamore, also called buttonwood, is considered the largest hardwood tree in North America. It occurs throughout the State but is most abundant and reaches its largest size along streams and on rich bottomlands. It is one of the more rapid-growing trees. In maturity it occasionally attains a height of 140 to 170 feet and a diameter of 10

to 11 feet. It often forks into several large secondary trunks, and the massive spreading limbs form an open head sometimes 100 feet across.

The bark



SYCAMORE

Twig, one-half natural size.

Leaf, one-third natural size.

of the sycamore is a characteristic feature. On the younger trunk and large limbs it is very smooth, greenish gray in color. The outer bark yearly flakes off in large patches and exposes the nearly white bark. Near the base of old trees the bark becomes thick, dark brown and divided by deep furrows.

The leaves are simple, alternate, 4 to 7 inches long and about as broad, light green and smooth above, and paler below. The base of the leafstalk is hollow and in falling off exposes the winter bud. The fruit is a ball about 1 inch in diameter, conspicuous throughout the winter as it hangs on its flexible stem, which is 3 to 5 inches long. During early spring the fruit ball breaks up, and the small seeds are widely scattered by the wind.

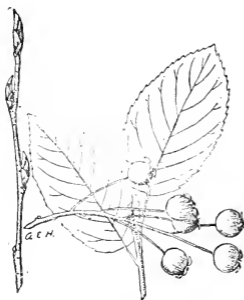
The wood is hard and moderately strong, but decays rapidly in the ground. It is used for butchers' blocks, tobacco boxes, furniture and interior finish.

The European sycamore, or planetree, is less subject to disease than our species and has been widely planted in this country for ornament and shade.

SERVICE-BERRY, OR SERVICE-TREE

(*Amelanchier canadensis* Medic.)

THE service-tree, also known as service-berry and locally as "sarvis," is found throughout the State but attains its best development on the mountain slopes. It is a small tree, 20 to 50 feet high and 6 to 18 inches in diameter, with a rather narrow, rounded top, but is often little more than a shrub. The **bark** is thin, ashy gray, smooth on the branches and upper part of the stem, and breaking into shallow fissures on the short trunk.



SERVICE-BERRY, OR
SERVICE-TREE
One-half natural size.

The **leaves** are alternate, slender-stalked, ovate, pointed, finely toothed, 2 to 4 inches long, purplish brown until nearly mature, then becoming a light green, and early covered with scattered silky hairs.

The white **flowers** appear in erect or drooping clusters in early spring, before or with

the leaves, making the tree quite conspicuous in the leafless or budding forest.

The **fruit** is sweet, edible, rounded, dark purple when ripe, one-third to one-half an inch in diameter, ripening early in June. Birds and other denizens of the forest are very fond of the fruit, and men have been known to cut down and destroy the trees to gather one good crop of fruit.

The **wood** is heavy, exceedingly hard, strong, close-grained and dark brown. It is occasionally used for handles. This is a desirable ornamental tree and should be planted for this purpose and to encourage the birds.

**HAWTHORN (Haw, White Haw, Red Haw,
Thorn Bush)**

(*Crataegus* species)

THE hawthorn, as here treated, represents a considerable number of different species and varieties distributed throughout the State. Members of the group occur on the poorest and richest soils, on the shallowest and deepest, and on the limestone hills as well as on the rich bottom and swamp land. Most of the forms have a common likeness



HAWTHORN
Two-thirds natural size.

in possessing thorns and bearing white blossoms and red or yellow fruit. Some species are planted as ornamental trees, but otherwise the group is of little commercial value.

The **bark** is generally thin, gray in color, and on the old stems broken up into thin, narrow scales.

The **leaves** are simple, alternate, mostly oval or wedge-shaped, notched on the edges, and usually from 2 to 3 inches long.

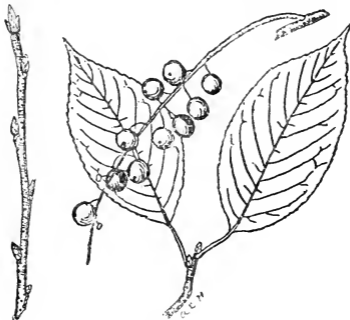
The **flowers** are white, some fragrant and others with a slightly unpleasant odor; they appear in early spring. The **fruit** varies from globular to oblong, from one-fourth to three-fourths inch in diameter; some when ripe have a pulpy, sweet, edible flesh, surrounding from 1 to 5 bony seeds. The fruit of most species ripens in the fall, and one or two varieties yield a fruit highly prized for making jelly.

The **wood** is strong, tough, heavy, hard, but rarely used for any purpose.

BLACK CHERRY (Wild Cherry)

(*Prunus serotina* Erh.)

A medium-sized tree, up to about 70 feet high and 1 to 3 feet in diameter, black cherry as a tree is at its best in the high mountains. The forest-grown trees have long clear trunks with little taper; open-grown trees have short trunks with many branches and irregular spreading crowns. The **bark** on branches and young trunks is smooth and bright



BLACK CHERRY
 Twig, two-thirds natural size.
 Leaf, one-third natural size.

reddish brown, marked by conspicuous, narrow, white, horizontal lines, and has a bitter-almond taste. On the older trunks the bark becomes rough and broken into thick, irregular plates.

The **leaves** are alternate, simple, oval to lance-like in shape, with edges broken by many fine incurved teeth, thick and shiny above, and paler beneath.

The **fruit** is dull purplish black, about as large as a pea, and is borne in long hanging clusters. It ripens in late summer, and is edible, although it has a slightly bitter taste.

The **wood** is reddish brown with yellowish sapwood, moderately heavy, hard, strong, fine-grained, and does not warp or split in seasoning. It is valuable for its lustre and color and is used for furniture, interior finish, tools, and implement handles. With the exception of black walnut, the cherry lumber has a greater unit value than any other hardwood of the eastern United States.

HONEY LOCUST

(*Gleditsia triacanthos* L.)

THE honey locust occurs scattered throughout the State except high in the mountains. It grows under a wide variety of soil and moisture conditions. It sometimes occurs in the forest, but more commonly in corners and waste places beside roads and fields. It reaches a diameter of 30 inches and a height of 75 feet. The **bark** on old trees is dark

gray and is divided into thin tight scales. The **strong thorns**—straight, brown, branched, sharp and shiny which grow on the 1-year-old wood and remain for many years—a re sufficient to identify the honey locust.



HONEY LOCUST
 Twlg, three-quarters natural size.
 Leaf, one-quarter natural size.

The **leaf** is pinnate, or feather-like,

with 18 to 28 leaflets; or it is twice-pinnate, consisting of 4 to 7 pairs of pinnate or secondary leaflets, each 6 to 8 inches long and somewhat resembling the leaf of the black locust.

The **fruit** is a pod, 10 to 18 inches long, often twisted, 1 to 1½ inches wide, flat, dark brown or black when ripe and containing yellow sweetish pulp and seeds. The seeds are very hard and each is separated from the others by the pulp. The pods are eaten by many animals, and as the seeds are hard to digest, many are thus widely scattered from the parent tree.

The **wood** is coarse-grained, hard, strong and moderately durable in contact with the ground. It is used for fence posts and crossties. It should not be confused with the very durable wood of the black locust.

BLACK LOCUST (Yellow Locust)

(*Robinia pseudacacia* L.)

THE black locust occurs throughout the northern half of the State and in all soils and conditions of moisture except in swamps. It is found as a forest tree only in the mountains, where it attains a height of 80 to 100 feet and a diameter of 30 inches. Throughout the other sections of the State it occurs generally in thickets on clay banks or waste places,

or singly along fence rows. The twigs and branchlets are armed with straight or slightly curved sharp, strong spines, sometimes as much as 1 inch in length which remain attached to the outer bark for many years. The bark is dark brown and divides into strips as the tree grows older.

The leaves are pinnate, or feather-like, from 6 to 10 inches in length, consisting of from 7 to 19 oblong thin leaflets.

The flowers are fragrant, white or cream-colored, and appear in early spring in graceful pendent racemes.

The fruit is a pod



BLACK LOCUST

Leaf, one-third natural size.
Twig, two-thirds natural size.

from 3 to 5 inches long containing 4 to 8 small hard seeds which ripen late in the fall. The pod splits open during the winter, discharging the seeds. Some seeds usually remain attached to each half of the pod, and this acts as a wing upon which the seeds are borne to considerable distances before the strong spring winds.

The wood is yellow in color, coarse-grained, very heavy, very hard, strong, and very durable in contact with the soil. It is used extensively for fence posts, poles, tree nails, insulator pins and occasionally for lumber and fuel.

HOLLY

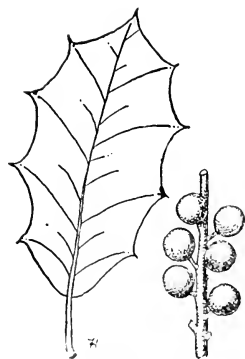
(Ilex opaca Ait.)

THE holly occurs sparingly scattered throughout the State. It prefers a rich moist soil, but is also found on the higher and drier situations. It is much less abundant now than formerly, due to the large amount gathered and shipped to the cities for Christmas decorations.

It is a small evergreen tree, seldom exceeding 30 feet in height and 12 inches in diameter. The

bark is light gray and roughened by wart-like growths. The numerous short, slender branches form a dense, narrow pyramidal head of striking dark-green color effect, especially when well laden with the conspicuous red berries.

The leaves are simple, alternate, oval, thick and leathery, 2 to 4 inches long, and armed with spiny teeth; they persist on the branches for about three years, then they drop off in the spring.



HOLLY
Two-thirds natural size.

The flowers are small, whitish and inconspicuous; the male and female flowers are usually borne on separate trees.

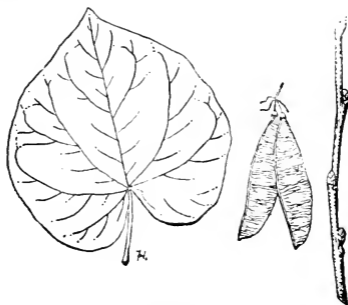
The fruit, which ripens late in the fall and persists on the branches over the winter, is a dull red or sometimes yellow, nearly round berry, about one-quarter of an inch in diameter containing 4 to 6 ribbed nutlets.

The wood is light, tough, not strong, and nearly white. It is valued and much used for cabinet work and wood-turning. For this purpose many of the larger, finer trees have been cut and marketed.

REDBUD

(*Cercis canadensis* L.)

THE redbud, sometimes called Judas-tree from its oriental relative of that name, is a small tree occurring under taller trees or on the borders of fields on hillsides, and in valleys throughout the State. It ordinarily attains a height of 25 to 50 feet and a diameter of six to twelve inches. Its stout branches usually form a wide flat head.



REDBUD
 Leaf, one-fifth natural size.
 Twig, two-thirds natural size.

The **bark** is bright red-brown, the long narrow plates separating into thin scales.

The **leaves** are alternate, heart-shaped, entire, 3 to 5 inches long and wide, glossy green turning in autumn to a bright clear yellow.

The conspicuous, bright purplish red, pea-shaped **flowers** are in numerous clusters along the twigs and small branches and appear before or with the leaves in early spring. With the redbud in its full glory, a drive through the country is likely to be one long remembered.

The **fruit** is an oblong, flattened, many-seeded pod, 2 to 4 inches long, reddish during the summer, and often hanging on the tree most of the winter.

The **wood** is heavy, hard, not strong, rich dark brown in color, and of little commercial importance. The redbud is cultivated as an ornamental tree and for that purpose might be planted more generally in this State.

WHITEBARK MAPLE

(*Acer leucoderme* Small.)

THE whitebark maple is a common tree of the Piedmont section of Georgia. It occurs along banks of streams, in rocky gorges, and in thick moist woods, where it does well under the shade of the larger trees. It generally attains a height of 20 to 25 feet and a diameter of one foot, but exceptional

trees may reach a height of 40 feet and a diameter of 18 to 20 inches. The branches are short and slender, forming a rather compact rounded crown. This maple is planted to some extent as a tree in the



WHITEBARK MAPLE
One-half natural size.

northern part of the State.

The **bark** on young trees and on the branches is close and light gray, near the base of old trees becoming dark brown and broken by deep furrows.

The **leaves** are mostly from 2 to 3 inches across, more or less deeply divided into 3 to 5 pointed, coarsely-toothed lobes. They are thin and dark yellow-green above, and lighter and slightly downy on the under surface. In the autumn they frequently turn bright scarlet before they fall.

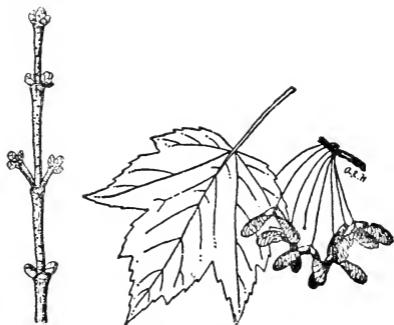
The **flowers** are yellow and are borne on long thread-like stalks. They do not appear until late in the spring when the trees are in full leaf. The **fruit** ripens late in the fall and, like the other maples, is a two-winged "samara" or "key," the wings wide-spreading and each from one-half to three-fourths of an inch long. The seeds are enclosed at the base of the wing and are smooth and reddish brown.

A close relative of the sugar maple, the **wood** resembles that of the latter tree very closely and is hard, strong, close-grained and tough. Because of the small size of the tree it is used mostly for fuel.

RED MAPLE

(Acer rubrum L.)

THE red maple, or swamp maple, is widely distributed throughout the State. It is usually a medium-sized tree, quick-growing and relatively short-lived. It is used as a shade tree, though much inferior for this purpose to the other maples, especially the sugar maple. The **bark** is smooth and light gray on young stems, and dark gray and rough on the limbs and trunk.



RED MAPLE
Leaf, one-third natural size.
twig, one-half natural size.

The **leaves** are 2 to 5 inches long and have from 3 to 5 pointed, saw-toothed lobes, which are separated by sharp angular sinuses or openings. The upper surface when mature is light green and the lower surface whitish and partly covered with pale down. In autumn the leaves turn to brilliant shades of red, orange and yellow.

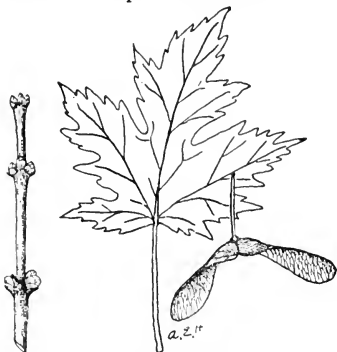
The **red flowers** in dense clusters appear in early spring before the leaves, the buds turning a deep red sometimes before they open. The winter buds are small, red and round or blunt-pointed. The **fruit** ripens in late spring or early summer. It consists of pairs of winged seeds, or keys, one-half to 1 inch in length, on long drooping stems, red, reddish brown or yellow in color.

The **wood**, which is commercially known as soft maple, is heavy, close-grained, rather weak and of a light-brown color. It is used in the manufacture of furniture, and for turnery, woodenware, and also for fuel.

SILVER MAPLE

(*Acer saccharinum* L.)

THE silver or soft maple occurs rarely except on moist land and along streams. It attains heights of 100 feet or more and diameters of 3 feet or over. It usually has a short trunk which divides into a number of large ascending limbs. These again subdivide, and the small branches droop but turn upward at the tips. The **bark** on the old stems



SILVER MAPLE

Twig, one-half natural size.

Leaf, one-third natural size.

is dark gray and broken into long flakes or scales; on the young shoots, it is smooth and varies in color from reddish to a yellowish gray. The silver maple grows rapidly and has been much planted as a shade tree, but is less desirable than many other trees because of its brittleness and susceptibility to insects and fungous diseases.

The **leaves** are opposite on the stem, have from 3 to 5 lobes ending in long points with toothed edges and are separated by deep angular sinuses or openings; they are pale green on the upper surface and silvery white underneath. The **buds** are rounded, red or reddish brown, blunt-pointed; generally like those of red maple.

The **flowers** appear in the spring before the leaves, in dense clusters, and are of a greenish yellow color. The **fruit** ripens in late spring. It consists of a pair of winged seeds or "keys" with wings 1 to 2 inches long on slender, flexible, thread-like stems about an inch long.

The **wood** is soft, weak, even-textured, rather brittle, easily worked, and decays readily when exposed. It is occasionally used for flooring, furniture and fuel.

ASH-LEAF MAPLE (Box Elder)

(*Acer negundo* L.)

THE box elder is a fairly rapid growing tree, found commonly throughout the northern and middle parts of the State growing naturally along stream banks and in cool ravines. It is a tree of medium size, rarely reaching over 24 inches in diameter and 60 to 70 feet in height. It has been considerably planted for shade because in good soil its



BOX ELDER

Twig, two-thirds natural size.
Leaf, one-third natural size.

growth is rapid. Its limbs and branches, however, are very fragile, and the tree as a whole is subject to disease. It is not long-lived or generally satisfactory for any purpose. It is pro-

lific in reproduction but is largely destroyed by grazing and cultivation.

The **bark** on young branches is smooth and green in color; on old trees it is thin, grayish to light brown and deeply divided.

The **leaves** are compound, with usually 3 leaflets (rarely 5 or 7), opposite, smooth and lustrous, green, and borne on a leaf stem or petiole 2 to 3 inches long. The leaflets are 2 to 4 inches long by 1 to 2 inches wide, making the whole leaf 5 to 8 inches in length.

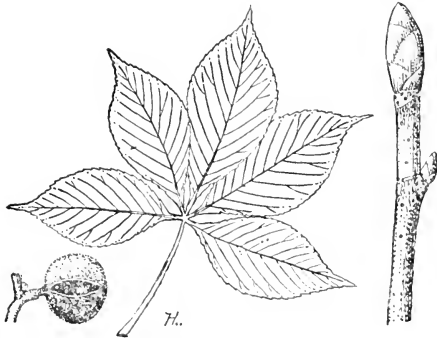
The **seed** is a samara, or key, winged similarly to that of a sugar maple, but smaller. It ripens in late summer or early fall, and so is like its close relatives, the red maple and silver maple.

The **wood** is soft, light, weak, close-grained, and decays rapidly in contact with heat and moisture. It is used occasionally for fuel.

YELLOW BUCKEYE

(Aesculus octandra Marsh.)

THE yellow buckeye, or sweet buckeye, generally known simply as buckeye, flourishes in the rich mountain coves of the southern Appalachians, where it attains a height of 90 feet and a diameter of 4 feet. It extends eastward and westward from the mountains in rich bottoms and moist uplands, chiefly, however, as a shrub.



YELLOW BUCKEYE
Nut, one-third natural size. Twig, three-quarters natural size.
Leaf, one-quarter natural size.

The **bark** is gray-brown and somewhat smooth but breaks up into thin irregular scales.

The **leaves**, unlike those of any other of our tree species except the other member of the buckeye group, are divided into usually 5, but sometimes 6 or 7 oblong, pointed, sharply toothed leaflets 4 to 6 inches long, all set on the end of the leaf stems, which are about as long as the leaflet. The leaves usually fall very early in the autumn on account of the attacks of a disease which causes large brown spots.

The **flowers** are yellowish (sometimes purplish), in large clusters opening when the leaves are about half grown. The **fruit** is smooth, roundish, rusty brown, enclosing one or two rounded, chestnut-brown, shiny seeds called buckeyes. The kernel is "sweet" enough to be eaten readily by hogs and cattle.

The **wood** is cream-white, light and soft and decays rapidly when exposed to the weather. It is used for woodenware, artificial limbs, and for paper pulp.

LINDEN, OR BASSWOOD

(*Tilia* species)

THE lindens, basswoods or lins, are a group of forest trees distinctive, yet as a group so similar that they are being considered together. They grow chiefly in the mountains, where they are common and valuable timber trees, attaining heights of 80 feet and diameters of 4 feet. The bark is light brown, deeply furrowed, and is often peeled for making rough camp buildings. The inner bark furnishes bast for making mats.



LINDEN, OR BASSWOOD
 Leaf, one-third natural size.
 Twig, one-third natural size.

The leaves are more or less heart-shaped, 3 to 6 inches long, thin, saw-toothed, smooth on both sides in some species, but wooly on the under surface of others.

The flowers are yellowish white, in

drooping clusters opening in early summer, and the flower-stem is united to the middle of a long, narrow, leaf-like bract. They are very fragrant and from them the bees make large amounts of choice-grade honey.

The fruit is a berry-like, dry, 1 or 2 seeded and rounded pod, one-quarter to one-half an inch in diameter, covered with short, thick and brownish wool. It remains attached in clusters to the leafy bract, which later acts as a wing to bear it away on the wind.

The wood is light, soft, tough, not durable, light brown in color. It is used in the manufacture of pulp, woodenware, furniture, trunks, excelsior and many other articles.

DOGWOOD

(*Cornus florida* L.)

THE dogwood, sometimes referred to in books as flowering dogwood, is found growing throughout the State, usually under the larger forest trees. It is a small tree, usually 15 to 30 feet high and 6 to 12 inches in diameter, occasionally larger, with a rather flat and spreading crown and short, often crooked trunk. The bark is reddish brown to black and

broken up into small 4-sided scaly blocks.

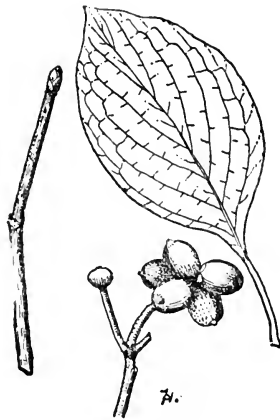
The leaves are opposite, ovate, 3 to 5 inches long, 2 to 3 inches wide, pointed, entire or wavy on the margin, bright green above, pale green or grayish beneath.

The flowers, which unfold from the conspicuous, round, grayish, winter flower buds before the leaves come out, are small, greenish yellow, arranged in dense heads surrounded by large white or rarely pinkish petal-like bracts, which give the appearance of large spreading flowers 2 to 4 inches across.

The fruit is a bright scarlet "berry," one-half an inch long and containing a hard nutlet in which are 1 or 2 seeds. Usually several fruits, or "berries," are contained in one head. They are relished by birds, squirrels and other animals.

The wood is hard, heavy, strong, very close-grained, brown to red in color. It is in great demand for cotton-mill machinery, turnery handles and forms. One other tree has quite similar wood—the persimmon.

The dogwood, with its masses of early spring flowers, its dark-red autumn foliage and its bright-red berries, is probably our most ornamental native tree. It should be used much more extensively in roadside and ornamental planting.



DOGWOOD
Leaf, one-half natural size.
Twig, two-thirds natural size.

SOURWOOD

(Oxydendron arboreum DC.)

THE sourwood is found scattered throughout the State on both rich and poor soil, but is least abundant in the low alluvial parts of the State. It is a tree of small dimensions, 8 to 12 inches in diameter and 30 to 40 feet high, rarely larger.

The **bark** is thin, light gray and divided into narrow shallow ridges. On the strong, straight, first-year shoots it is often a bright red.



SOURWOOD
Leaf, one-half natural size.
Twig, two-thirds natural size.

The **leaves** are from 2 to 5 inches long, simple, alternate, decidedly acid to the taste, often rough with solitary stiff hairs. They are a lustrous green on the upper surface, generally turning a deep crimson in the fall.

The **flowers** are small, white or cream-colored, borne in panicles from 5 to 10 inches long on the ends of the twigs, and appear in late summer. They provide storehouses of nectar from which bees make excellent honey.

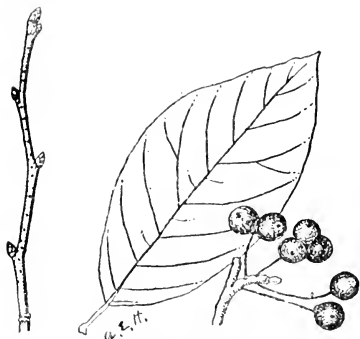
The **fruit** is a conical, dry capsule, one-third to one-half an inch in length, containing numerous small seeds. These capsules hang in drooping clusters sometimes a foot in length, often late into the fall.

The **wood** is heavy, hard, very close-grained, compact, brown in color, sometimes tinged with red. It is used to some extent for turnery, handles, and for some other uses.

BLACK GUM

(Nyssa sylvatica Marsh.)

THE black gum, often called sour gum, has been considered a weed in the forest. Weed-like, it finds footing in many types of soil and conditions of soil moisture throughout the State. In the lowlands it is occasionally found in year-round swamps with cypress, and in the hills and mountains on dry slopes with oaks and hickories.



BLACK GUM
One-half natural size.

The **leaves** are simple, 2 to 3 inches long, entire, often broader near the apex, shiny, and dark green in color. In the fall the leaves turn a most brilliant red.

The **bark** on younger trees is furrowed between flat ridges, and gradually develops into quadrangular blocks that are dense, hard and nearly black.

The greenish **flowers** on long slender stems appear in early spring when the leaves are about one-third grown. They are usually of two kinds, the male in many-flowered heads and the female in two to several-flowered clusters on different trees. The **fruit** is a dark blue, fleshy berry, two-thirds of an inch long, containing a single hard-shelled seed, and is borne on long stems, 2 to 3 in a cluster.

The **wood** is very tough, cross-grained, not durable in contact with the soil, hard to work, and warps easily. It is used for crate and basket veneers, box shooks, rollers, mallets, rough floors, mine trams, pulpwood, and fuel. In the old days, the hollow trunks were used for "bee gums."

TUPELO GUM (Cotton Gum)

(*Nyssa aquatica* Marsh.)

THE tupelo gum, or cotton gum, inhabits only the deep river swamps or coastal swamps which are usually inundated during a part of the year. The commonly enlarged base, large-sized fruit, or "plum," hanging on a long stem, together with the brittleness of the twigs, serves to distinguish it from the black gum. It forms a tall, often slowly



TUPELO GUM
 Leaf, one-third natural size.
 Twig, two-thirds natural size.

tapering, somewhat crooked trunk, 50 to 75 feet in height and 2 to 3 feet in diameter. The spreading, rather small branches form a narrow, oblong or pyramidal head. The branches are generally smooth and light brown in color. The bark of the trunk is thin, dark brown, and furrowed up and down the trunk.

The leaves are simple, ovate or oblong in shape, acute and often long-pointed. When mature, they are thick, dark green and lustrous on the upper side, pale and somewhat downy on the lower side, 5 to 7

inches long and 2 to 4 inches at the top, wedge-shaped at the base, irregular and slightly notched or toothed on the margin. The leaf-stem is stout, 1 to 2 inches long, grooved and enlarged at the base.

The flowers, which appear in March or April, are of two kinds, usually borne on separate trees, the male in dense round clusters, and the female solitary on long slender stems.

The fruit, ripening in early fall, is a so-called "plum," oblong or obovate in shape, about an inch long, dark purple, and has a thick, tough skin enclosing a flattened stone, borne on a slender stalk 3 to 4 inches long.

The wood is light, soft, and not strong. It is used for woodenware, broom handles, fruit and vegetable packages. As lumber it is marketed as tupelo or bay poplar. The root-wood is often extremely light in weight and is sometimes used for floats for fish nets.

PERSIMMON

(*Diospyros virginiana* L.)

THE persimmon, often called "simmon," is well known throughout its range. It is a small tree, rarely exceeding 50 feet in height and 18 inches in diameter, occurring throughout the State, except in the high mountains. It seems to prefer dry, open situations, and is most abundant in old fields, though it occurs on rich bottomlands. The bark of

old trees is almost black and separated into thick nearly square blocks, much like the black gum.

The leaves are alternate, oval, entire, 4 to 6 inches long, dark green and shining above, paler beneath.

The small flowers, which appear in May, are yellowish or cream-white, somewhat bell-shaped, the two kinds occurring on separate trees; the male in



PERSIMMON

Leaf, one-half natural size.
Twig, three-quarters natural size.

clusters of 2 or 3, the female solitary. They are visited by many insects.

The fruit is a pulpy, round, orange-colored or brown berry, an inch or more in diameter and containing several flattened, hard, smooth seeds. It is strongly astringent while green, but often quite sweet and delicious when thoroughly ripe. It is much relished by children, and by dogs, 'possums and other animals.

The wood is hard, dense, heavy, strong, the heart-wood brown or black, the wide sapwood white or yellowish. It is particularly valued for shuttles, golfstick heads, and similar special uses, but is not of sufficient commercial use to warrant its general encouragement as a timber tree.

SILVERBELL

(Halesia carolina L.)

THIS tree occurs in its best development in the mountains of the State but is common also through the Piedmont section. It attains a height of about 100 feet and a diameter of 30 inches or more, but only in favorable localities does it grow large enough for commercial use. It is commonly found among the upper watercourses. It is occasionally planted, as it makes a desirable ornamental tree.



SILVERBELL
 Leaf, one-half natural size.
 Twig, one-third natural size.

The **leaves** are simple, opposite, oval, pointed, thin, finely toothed, and vary in length from 4 to 6 inches.

The **bark** ranges in color from very light gray in young trees to a very dark reddish brown in old trees. It separates into scales and strips as the tree grows older.

The **flowers** are white or sometimes tinged with pink, nearly an inch long, and appear in early spring with the unfolding of the leaves. The pendant, bell-like flowers suggest the names silverbell and snowdrop tree. The **fruit** is from 1 to 2 inches long and nearly an inch wide, with a corky, four-winged covering. The solitary seed is a bony stone.

The **wood** is soft, light cherry-colored streaked with white; the sapwood is white or creamy. Where large enough, it is cut for lumber and used as a substitute for cherry.

The large commercial tree is by some considered a separate species, *Halesia monticola* Sarg.

WHITE ASH

(*Fraxinus americana* L.)

THE white ash is common in the northern half of the State and grows to best advantage in the rich moist soils of mountain coves and river bottomlands. It reaches an average height of 50 to 80 feet and a diameter of 2 to 3 feet, though much larger trees are found in virgin forest. The **bark** varies in color from a light gray to a gray-brown. The rather



WHITE ASH

Twig, one-half natural size.

Leaf, one-third natural size.

narrow ridges are separated with marked regularity by deep, diamond-shaped fissures.

The **leaves** of the white ash are from 8 to 12 inches long and have from 5 to 9 plainly stalked, sharp-pointed leaflets, dark green and smooth above, pale green beneath. The ashes form the only group of trees in eastern America that have opposite, compound leaves with 5 or more leaflets. This fact in itself provides a ready means of identifying the group. The **flowers** are of two kinds on different trees, the male in dense reddish purple clusters and the female in more open bunches. The **fruit** of the ash is winged, 1 to 1½ inches long, resembling the blade of a canoe paddle in outline, with the seed at the handle end. The fruits mature in late summer and are distributed effectively by the winds.

The **wood** of the white ash is extremely valuable on account of its toughness and elasticity. It is preferred to all other native woods for small tool handles, such athletic implements as rackets, bats and oars, and agricultural implements. It is also used extensively for furniture and interior finish.

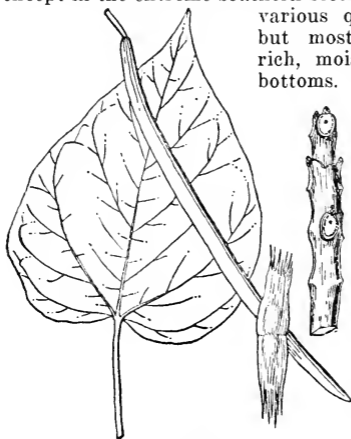
CATALPA

(*Catalpa speciosa* Engelm.)

THIS species of catalpa, known also as Indian beam or Indian cigar, and often miscalled "catawba," is native to the central Mississippi River basin, but has been widely planted and has spread somewhat farther as a result of cultivation. The catalpas are found sparsely throughout the State except in the extreme southern section, and occur on

various qualities of soil, but most frequently on rich, moist soil, such as bottoms. It is a medium-

sized tree, usually not exceeding 40 to 50 feet in height and 12 to 15 inches in diameter. The trunk is usually short and the head broad with spreading branches. Because of its attractive flowers and conspicuous heart-shaped leaves, it is considerably used for



CATALPA

Leaf, one-third natural size.
Twig, two-thirds natural size.

shade and ornament.

The **leaves** are simple, opposite, oval, long-pointed, 6 to 10 inches long, and heart-shaped at the base. The catalpa Sphinx moth is a pest and sometimes defoliates the tree.

The **flowers** appear in clusters or panicles in May or June. They are white with purple and yellow markings, and this makes them decidedly showy and attractive. The **fruit** consists of a bean-like pod, 8 to 16 inches long and from three-eighths to one-half inch in diameter. It hangs on the tree over winter and gradually splits into 2 parts, or halves. The seeds are about 1 inch long and terminate in wings that are rounded and short-fringed at the ends. They are freely carried by the wind.

The **wood** is rather soft, light, coarse-grained, and durable in contact with the soil. It is used for fence posts, poles and fuel, and occasionally for railroad ties.

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FARM FORESTRY HELPS FARMERS IN:

Marketing timber profitably.

Supplying timber for farm needs.

Furnishing paying employment during the winter.

Making waste lands yield a profit.

Increasing the sale value of the farm.

FARM FORESTRY MEANS:

Improving the woods by the right kind of cutting.

Protecting the woods from fire and other injuries.

Utilizing farm timber to the best advantage.

Reclaiming gullies and utilizing waste lands by planting forest trees.

Keeping the home forest growing at its maximum rate of production.

Farm forestry, as a branch of agriculture, is the handling of forest trees and woodlands in such a manner as to increase the income and permanent value of the farm and add to its comfort and attractiveness as a home.

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