

Common Forest Trees
Of
North Carolina

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COMMON
**FOREST
TREES**
OF
NORTH CAROLINA
HOW TO KNOW THEM



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North Carolina
Survey

In Co-operation
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**NORTH CAROLINA GEOLOGICAL AND
ECONOMIC SURVEY**

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Chapel Hill, N. C.

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Forestry Division

J. S. HOLMES, State Forester.

In Co-operation With
THE FOREST SERVICE, UNITED STATES
DEPARTMENT OF AGRICULTURE.

COMMON
FOREST TREES

—OF—

NORTH CAROLINA



HOW TO KNOW THEM



A POCKET MANUAL

Prepared by
J. S. Holmes, State Forester

NORTH CAROLINA GEOLOGICAL AND
ECONOMIC SURVEY

With the Collaboration of the State Foresters of
Tennessee, Virginia and Maryland, and
the help and advice of the

FOREST SERVICE
U. S. Department of Agriculture



CHAPEL HILL, N. C.

1923

FOREWORD

This handbook has been planned and published by the North Carolina Geological and Economic Survey in order that our people may have a convenient book of reference, by the help of which they may learn to recognize the trees common to their locality. Should the use of this handbook lead to the desire for further knowledge, the State Forester will gladly direct inquirers to literature on any phase of forestry.

Bulletin 6 of the Survey, "The Timber Trees of North Carolina," by Gifford Pinchot and W. W. Ashe, has been out of print for many years, and while the present small book in no way takes its place, it does in part supply a demand for information concerning our trees which has each year become more insistent. The Survey hopes sometime in the future to prepare a volume on our trees more in keeping with the importance of the subject. Until that time, it is hoped that this manual will have the widest possible circulation.

The text has been prepared by the State Forester in collaboration with the State Foresters of Tennessee, Virginia and Maryland, each of whom is adapting it to use in his own State and publishing it simultaneously. The style of the book and many of the descriptions have been based on similar manuals published by Massachusetts, Maine and Vermont. The cuts, as will be noted, have been secured from several sources. Those of the foliage and fruit of many of the hardwoods and all of the hardwood twigs are from original drawings by Mrs. A. E. Hoyle, made especially for this publication, and furnished free by the U. S. Forest Service. The other plates have been purchased or borrowed. Special acknowledgment is due to Professor C. S. Sargent for figures illustrating the conifers (pines, cedars, etc.) which are from his "Manual of Forest Trees of North America," here used by permission of and by special arrangement with Houghton-Mifflin Com-

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pany; and to the Vermont Experiment Station for its courtesy in loaning a number of these illustrations. The valuable and unstinted aid of Mr. W. R. Mattoon, Extension Specialist, U. S. Forest Service, is hereby gratefully acknowledged. Without his initiative and guidance and that of the Forest Service, the production of this handbook at the present time would have been well-nigh impossible.

The inclusion in this book of the botanical or scientific names of the trees is thought advisable in order to avoid the confusion likely to arise from the use of the common names alone, which often vary not only in different States, but even in separate localities within the same State.

A similar confusion has also been observed in the use of the scientific names of certain trees because of the difficulty of knowing which tree the botanist had in mind when he gave it the name. Hence, the practice has arisen of attaching the initials or abbreviation of the name of the botanist who gave the plant that particular scientific name. It seems wise, therefore, to follow the usual custom and give in full these scientific names for the sake of accuracy, but the general reader is not urged to burden his memory with them.

(Trees are the largest and oldest of living creatures. They are in one way or another perhaps more closely associated with our own daily lives than is any other class of living things, yet most of us know less about them and can hardly even tell one of these friends from another.) It is hoped that this book will furnish information which will enable even the child to know our common trees at sight, and will stimulate so great an interest in the life and habits of these denizens of our forests that all North Carolinians may learn to appreciate, foster and protect the great heritage of our trees.

In using this book it should be borne in mind that nearly two-thirds of the area of our State is still

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classed as forest land; that most of this has had the greater part or all of the merchantable timber cut from it; and that through destructive lumbering, turpentineing, roving livestock and forest fires, this timber has been replacing itself very slowly or not at all.

It should also be remembered that a happy change is taking place. Landowners are cutting more carefully; cattle and hogs have been controlled in nearly all our counties; and protection from fires is being extended as rapidly as County, State and Federal funds become available. The chief thing lacking now is the interest and co-operation of the people of the towns as well as of the country in growing and protecting our trees and forests. If this little book will bring about a better understanding of trees and a greater appreciation of their aesthetic and economic value to us and those who come after, its purpose will have been accomplished.

JOSEPH HYDE PRATT, Director
N. C. Geol. and Econ. Survey.



A TREE.

A tree is one of nature's words, a word of peace to man;
A word that tells of central strength from whence all things
began;

A word to preach tranquillity to all our restless clan.

Ah, bare must be the shadeless ways, and bleak the path
must be,

Of him who, having open eyes, has never learned to see,
And so has never learned to love the beauty of a tree.

Who loves a tree, he loves the life that springs in stars and
clod,

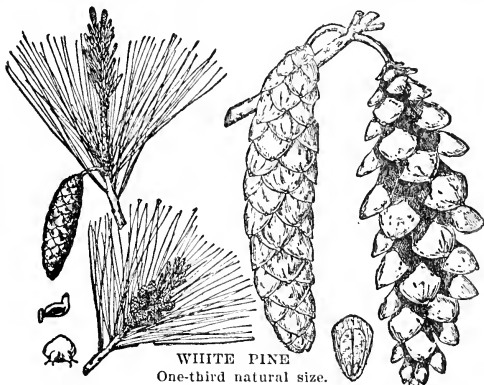
He loves the love that gilds the clouds, and greens the April
sod;

He loves the Wide Beneficence; his soul takes hold on God.

—From *“Arbor and Bird Day Manual for
North Carolina, 1915.”*

WHITE PINE (*Pinus strobus* L.)

THE white pine occurs naturally throughout the mountains and extends into the adjacent region. 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



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.

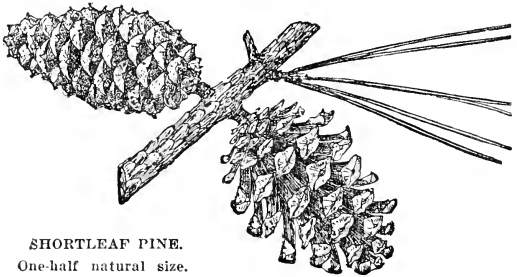
The **leaves**, or needles, are 3 to 5 inches in length, bluish green on the upper surface and whitish beneath, and occur in bundles of 5, which distinguishes it from all other eastern pines. The **cone**, or fruit, is 4 to 6 inches long, cylindrical, with thin, usually very gummy scales, containing 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 (Rosemary Pine)

(Pinus echinata Mill.)

THE shortleaf pine, also known as rosemary pine, yellow pine and old-field pine, is widely distributed throughout the South. It is the characteristic pine over the uplands and the lower mountain 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.

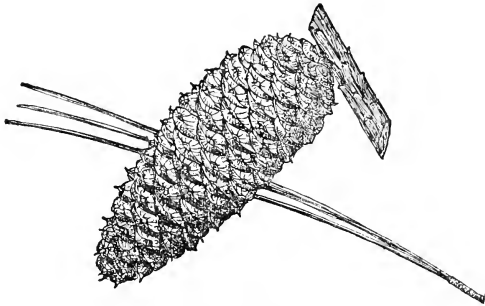
with slightly ascending branches. In maturity the tree has a tall, straight stem and an oval crown, reaching a height of about 100 feet and a diameter of about $4\frac{1}{2}$ feet. The young tree, when cut or burned back, reproduces itself by sprouting from the stump.

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.

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 from the southernmost county of Delaware. 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.

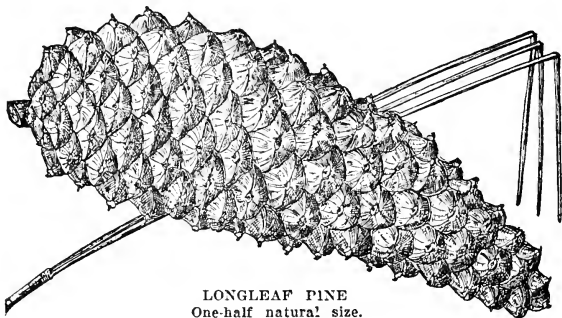
water is close to the surface. It is also frequent in clumps along the borders of swamps and as scattered specimens in the swamp hardwood forests.

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.

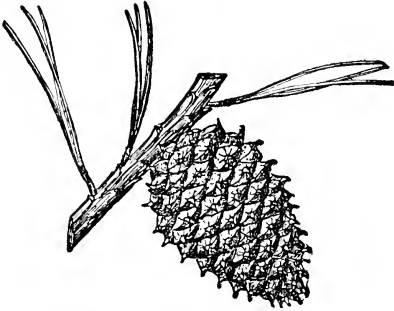
The **wood** is heavy, hard, strong, tough and durable. As Georgia pine, pitch pine and southern pine, it has been, and still is, used for all kinds of building and other construction. Naval stores, consisting of tar, pitch, rosin and turpentine, are obtained almost exclusively from this tree and its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

PITCH PINE, OR BLACK 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 up to about 3,500 feet elevation. 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, OR BLACK 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.

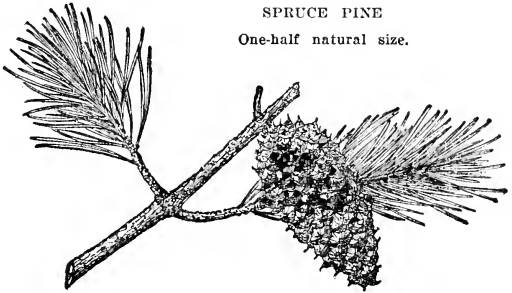
SPRUCE PINE (Scrub Pine)

(*Pinus virginiana* Mill.)

THE spruce pine, scrub or southern jack pine, is found in greatest abundance over the upper and hilly parts of the State. It occurs often in pure stands in old fields and is very persistent in gully-ing, 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

SPRUCE PINE

One-half natural size.



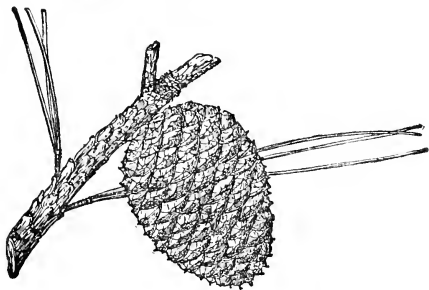
a scrubby appearance to the tree which is responsible for one of its common names.

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.

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.

lobby 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.

TABLE MOUNTAIN PINE

(*Pinus pungens* Lambert.)

THE table mountain pine, for which mountain pine is suggested as being a more appropriate name, is a rather small tree, 20 to 60 feet high, with an average diameter of 1 to 2 feet. It occurs scattered sparingly through the higher Appalachian Mountains on the drier slopes and ridges and associated with the black or pitch pine.

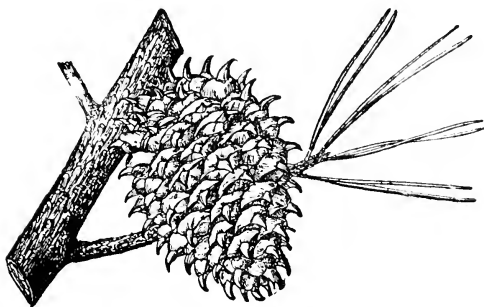


TABLE MOUNTAIN PINE

One-half natural size.

The **bark** of the trunk is lighter-colored than that of the black pine, but the bark of the small branches is broken into thin loose scales.

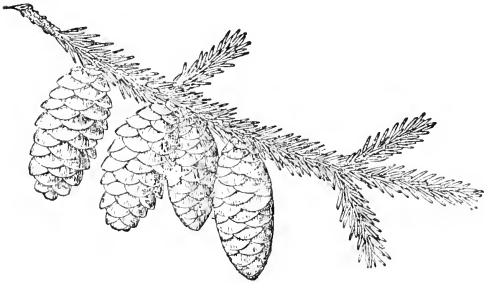
The **leaves** are short, 2 to 4 inches long, in clusters of two, rarely of three, bluish green, stiff, stout and more or less twisted, persisting for 2 to 3 years. The **flowers** are of two kinds on the same tree, the male in long loose clusters on the old twig, the female in whorls of 2 to 7 on the new growth.

This pine can readily be distinguished by its heavy massive **cones**, 2 to 3 inches long, with very stout curved prickles, which occur usually in close groups around the twigs. The cones open when ripe and shed their seed gradually, but the empty cones remain on the tree often for many years.

The **wood** is soft, light, not strong, resinous and coarse-grained. Along with associated species it is sometimes cut for rough lumber, and in other places for charcoal, but its chief value is for fuelwood.

RED SPRUCE (*Picea rubra* Dietr.)

THE red spruce is found on the summits and upper slopes of our highest mountains where it grows on well-drained but moist and rocky soil, at elevations of 4,000 to 6,700 feet. Here it naturally combined with the southern balsam to form dense forests, which unfortunately have been largely destroyed in recent years.



RED SPRUCE
One-half natural size.

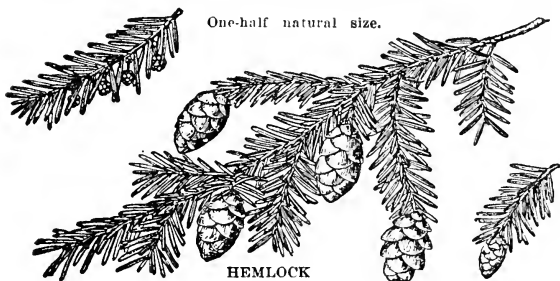
The red spruce is narrowly conical in outline. It is a medium-sized tree, commonly reaching a height of 60 to 80 feet and a diameter of 1 to 2 feet. The trunk is straight and tapers gradually. The branches are somewhat drooping below, horizontal in the middle, ascending above, and are very persistent even in a dense stand.

The **leaves** are linear, four-sided, about one-half inch long, sharp-pointed, dark yellow-green and glossy. They grow from all sides of the twigs. The **flowers** are of two kinds on the same tree and mature in one season. The **cones**, or burrs, are oblong, 1 to 2 inches long, with thin reddish brown scales. Unlike those of the balsam, the cones of the spruce hang down and soon after the seeds are scattered they fall without breaking apart.

The **wood** is light and moderately soft but strong and elastic. It is in great demand for special construction purposes and newspaper pulp. Its combined elasticity and strength fit it admirably for use in making musical instruments and airplanes.

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 and extends somewhat into the adjoining regions. Its horizontal or ascending branches and drooping twigs, forming



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.

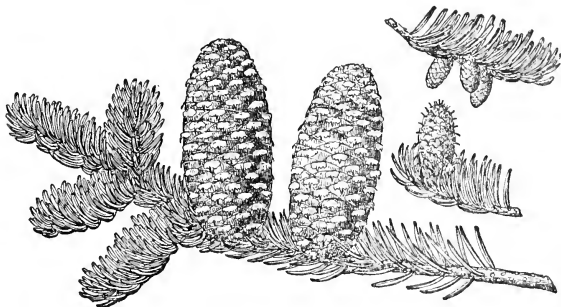
The **wood** is light, soft, not strong, brittle and splintery. It is used for coarse lumber and for paper pulp. The **bark** on old trunks is cinnamon-red or dark gray and divided into narrow, rounded ridges, and is one of our chief sources of tannin.

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 and in north-eastern Tennessee. It is a very desirable tree for ornamental planting.

SOUTHERN BALSAM (Southern Balsam Fir)

(*Abies fraseri* Poir.)

THE southern balsam, also known as mountain balsam, Fraser fir, and locally as she-balsam, is found on our highest mountains, usually associated with red spruce, from which it can easily be distinguished by its cones and leaves. It prefers moist, cool slopes at elevations of 4,000 to 6,700 feet. It is a tree of medium size, 40 to 70 feet high and 1 to



SOUTHERN BALSAM

One-half natural size.

over 2 feet in diameter. The **bark** on the younger trees is pale gray, smooth, thin and prominently marked by "blisters" filled with resin or balsam. The branches are produced regularly in whorls on the young tree, and the head retains its pointed pyramidal shape until old age.

The **leaves** are flat, linear, one-half to one inch long, with point rounded and often notched, dark green and lustrous above, silvery white beneath, arranged on the twig apparently in two ranks.

The **flowers** are of two kinds, the male yellow tinged with red, the female cone-shaped, and the prominent yellow-green bracts are spine-tipped. The **fruit** is an upright purple cone, the long yellow-green bracts, however, often making it appear this latter color. The seeds have very wide wings, and when ripe, fall together with the scales and bracts of the cone, leaving the hard central axis standing upright on the twig.

The **wood** is light, soft, not strong, coarse-grained. It is used for construction lumber and with spruce for paper pulp

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 Mississippi Valley region. Its straight trunk with numerous ascending branches, and narrow conical outline makes the tree one of



CYPRESS

One-half natural size.

considerable beauty. In old 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.

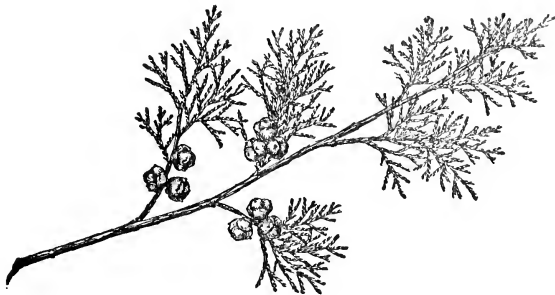
The **fruit** is a rounded cone, or "ball," about one inch in diameter, consisting of thick irregular scales.

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.

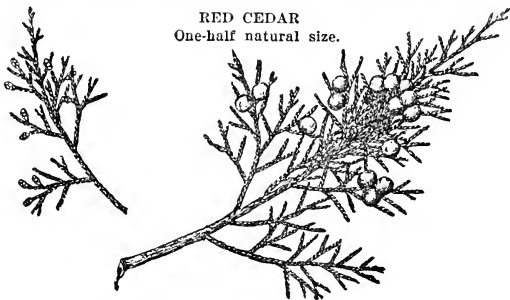
The **bark** is quite thin, varies in color from ashy gray to light reddish brown, and readily separates into loose plate-like scales, which easily peel off in long fibrous strips. The **wood** is light, soft, close-grained, slightly fragrant, especially in contact with water. These qualities make it 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, but it is most important in the middle section.

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 in the highlands and where it attains its best development, it reaches a height of 70 feet and a diameter of 3 feet. The trunk is usually forked or crooked, and this makes it less desirable for saw timber. The **bark** differs from that of the



WHITE WALNUT, OR BUTTERNUT

Twig, one-half natural size.

Leaf, one-third natural size

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.

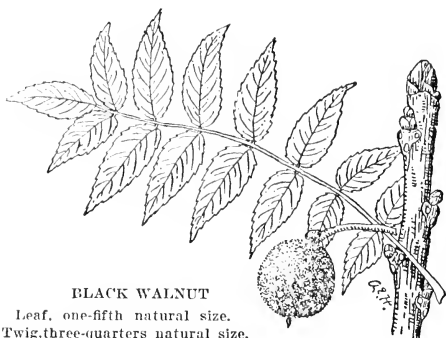
The compound **leaves** are 15 to 30 inches long, each with 11 to 17 sharp-pointed, oblong, finely toothed leaflets 2 to 3 inches long.

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 throughout 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.

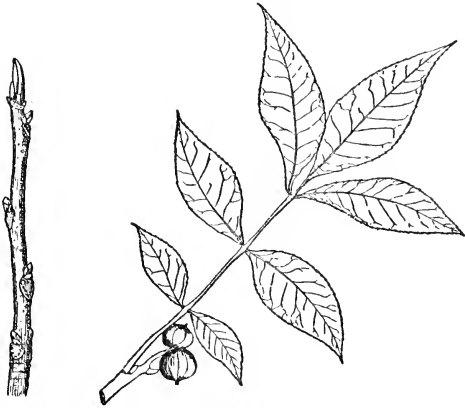
The **heartwood** is of superior quality and value. It is heavy, hard and strong, and its rich chocolate-brown color, freedom from warping and checking, susceptibility to a high polish, and durability make it highly prized for a great variety of uses, including furniture and cabinet work, gun-stocks, 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.

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



Twig, one-half natural size.

BITTERNUT HICKORY.
Leaf, one-third natural size.

the 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.

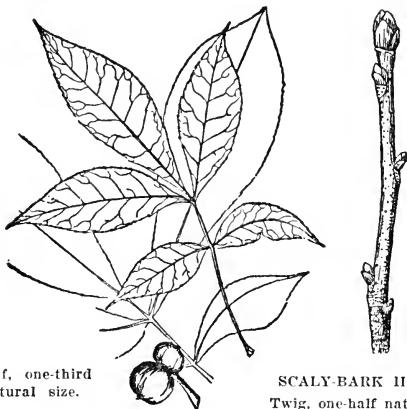
The **flowers** are of two kinds on the same tree. The **fruit** is about 1 inch long and thin-husked, while the nut is usually thin-shelled and brittle, and the kernel very bitter.

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 common along streams and on moist hillsides throughout the State.



Leaf, one-third natural size.

SCALY-BARK HICKORY
Twig, one-half natural size.

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 obovate 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)

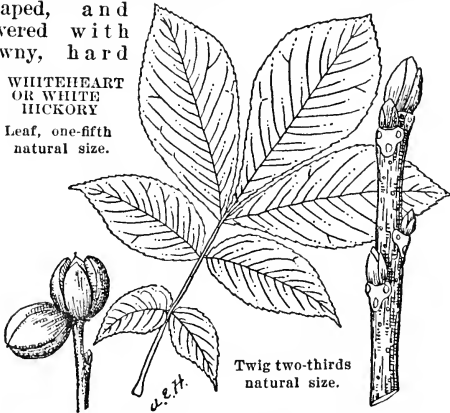
(*Hicoria alba* Britton) (*Carya alba* K. Koch)

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, closely 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.



Twig two-thirds
natural size.

scales. 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

(*Hicoria 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 falling in the autumn.



PIGNET HICKORY
Leaf, one-third natural size.



Twig, one-half natural size.

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.

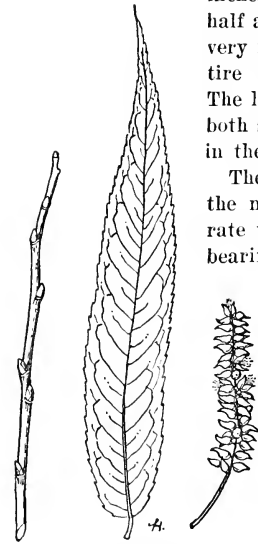
BLACK WILLOW (*Salix nigra* Marsh.)

THE black willow is common along streams throughout the State except in the high mountains. 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.



BLACK WILLOW
Two-thirds natural size.

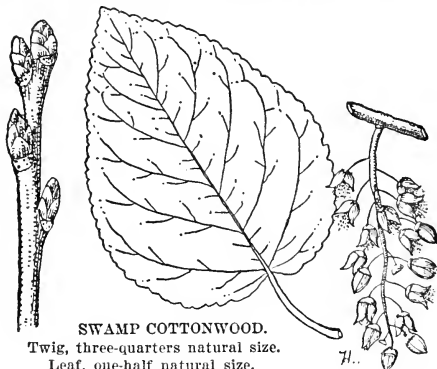
The **wood** is soft, light and not strong. A high grade of charcoal, used in the manufacture of gunpowder, is obtained from willow wood, and it is the chief wood used in the manufacture of artificial limbs.

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 woolly 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.

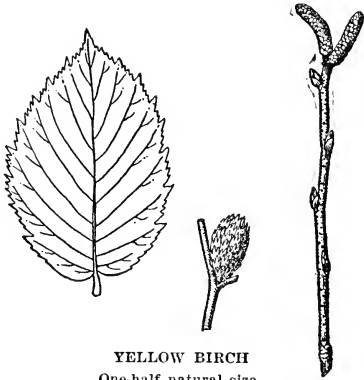
The **flowers** are in catkins, the two kinds growing on the same tree. The **fruit** is cone-shaped about 1 inch long, and densely crowded with little winged nutlets that ripen from May to June.

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.

YELLOW BIRCH (*Betula lutea* Michx.)

THE yellow birch is confined to our cool, high mountain slopes, generally at greater elevations than the black birch, from which it can usually be distinguished by its bark. It is a large tree, often with a short or crooked trunk, occasionally reaching a height of 100 feet and a diameter of 4 feet.

The **bark** on the trunk and large branches is silvery or yellow-gray, with thin papery layers sepa-



YELLOW BIRCH
One-half natural size.

rating and often curling at the edges, giving the trunk a ragged appearance. The twigs are light brown, lustrous and slightly aromatic, but less so than those of the black birch.

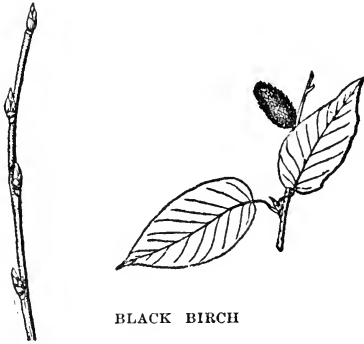
The **leaves** are simple, alternate, oval or approximately oblong, doubly and finely toothed, 3 to 5 inches long, dark green and lusterless on the upper surface.

The **flowers** are in catkins; the male, or staminate catkins, purplish and visible all the winter previous to opening; the female, or pistillate, catkins greenish, erect, shorter and thicker than those of the black birch, and developing in the spring.

The **wood** is heavy, strong, hard, close-grained and light brown in color. It is used for flooring, woodenware, furniture, and other uses, but is considered inferior to the black birch. It is prized as 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.

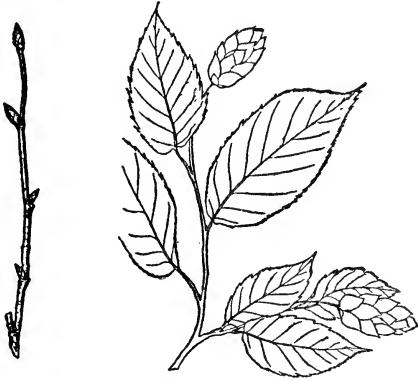
The **flowers** are of two kinds; the male catkins, usually 3 to 4 on a shoot, forming in the summer and blooming the following spring when the female catkins or "cones" open from the winter buds. The seeds ripen in late summer or autumn and fall with the loosened scales of the "cone."

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. Often used for fence posts, handles of tools, mallets and other small articles.

HORNBEAM (*Carpinus caroliniana* Walt.)

THE hornbeam, often known as ironwood 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 extending 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.



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

HORNBEAM

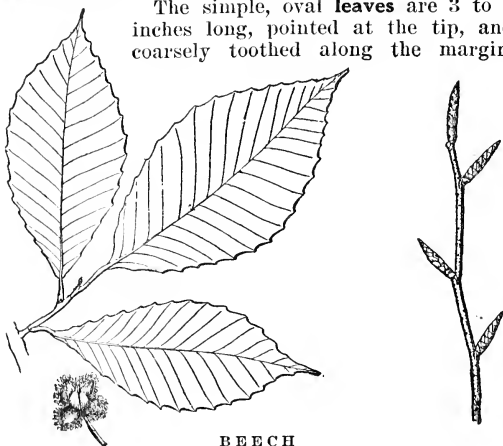
The flowers are borne in catkins separately on the same tree; the male catkin about 1½ inches long, the female about three-fourths of an inch, with small, leaf-like, 3-lobed green scales. The fruit is a nutlet about one-third of an inch long. It falls, attached to the leaf-like scale which acts as a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



BEECH
One-half natural size.

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."

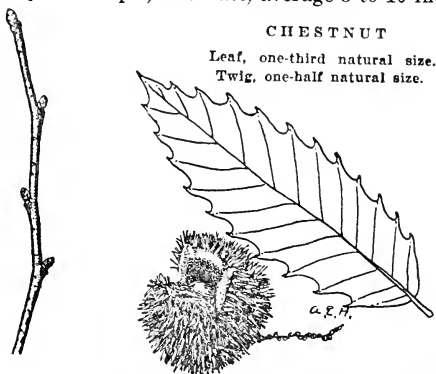
The little, brown, three-sided beech **nuts** are almost as well known as chestnuts. They form usually in pairs in a prickly burr. The kernel is sweet and edible, but so small as to offer insufficient reward for the pains of biting open the thin-shelled husk.

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.)

OVER 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



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.

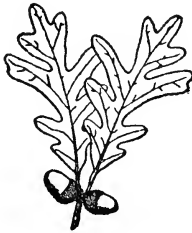
The **bark** becomes broken into light-gray, broad, flat ridges, which often have a tendency toward a spiral course around the trunk.

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.

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.

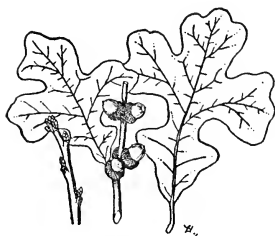
The **leaves** are alternate, simple, 5 to 9 inches long and about half as broad. They are deeply divided into 5 to 9 rounded, finger-like lobes. The young leaves are a soft silvery gray or yellow or red while unfolding, becoming later bright green above and much paler below. The **fruit** is an acorn maturing the first year. The nut is three-quarter 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 usually 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 considerably larger. It occurs throughout the State, ascending in the mountains to 2,500 feet, but is most abundant on the poorer soils of the middle districts.



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.



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

The **flowers** 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, and less commonly in the upland part of the State in similar dry, rocky situations.

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.



CHESTNUT OAK
One-third natural size.

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.

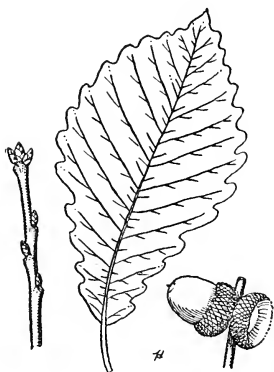
The **wood** is generally similar to that of the other upland white oaks, heavy, hard, strong, and durable in contact with the soil. It is extensively cut into crossties and heavy timbers for bridge, railroad, and other rough construction, and used for fence posts and fuel.

SWAMP CHESTNUT OAK

(Basket Oak, or Cow Oak)

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

THIS tree occurs in its greatest abundance in the bottomlands of the eastern part of the State, and is found sparsely in other sections, outside of the mountains. 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.



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

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.

The acorn, or **fruit**, attains a diameter of more than an inch and a length of 1½ 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,

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



LIVE OAK

Two-thirds natural size.

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.

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 $1\frac{3}{4}$ 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.

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.



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

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

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 year. 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.

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



Twig one-half natural size.

BLACK OAK
Leaf, one-third natural size.

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

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

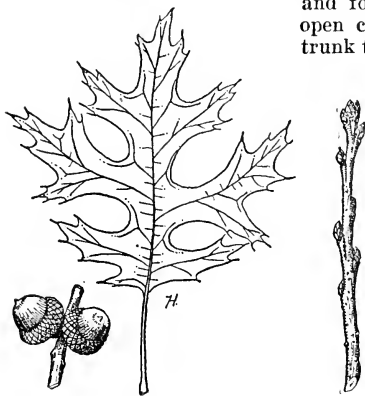
The **leaves** are alternate, simple, 5 to 10 inches long and 3 to 8 inches wide, shallow or deeply lobed, the shape varying greatly. When mature, the leaves are dark green and shiny on the upper surface, pale on the lower, more or less covered with down, and with conspicuous rusty brown hairs in the 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, throughout the uplands of the lower mountains, 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 ends and form a narrow, open crown and the trunk tapers rapidly.



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

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 north-

ern red oak. The bark is often mottled or spotted with gray. The inner bark is reddish.

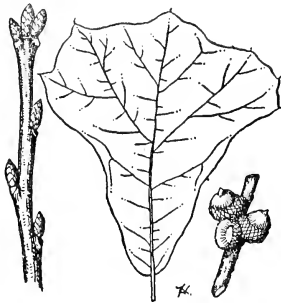
The leaves are simple, alternate, somewhat oblong or oval, 3 to 6 inches long, 2½ to 4 inches wide, usually 7-lobed, the lobes bristle-pointed and separated by rounded openings extending at least two-thirds of the distance to the midrib, giving the leaves a very deeply "cut" appearance. The leaves turn 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.

BLACK JACK OAK

(*Quercus marilandica* Muench.)

THE occurrence of blackjack 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 except the high mountain regions. The tree sometimes reaches a



BLACK JACK OAK

Twig, two-thirds natural size.

Leaf, one-third natural size.

height of 50 or 60 feet and a diameter 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 and somewhat farther inland. It has been considerably 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



WATER OAK

Leaf, one-third natural size.

Twig, one-half natural size.

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—

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.

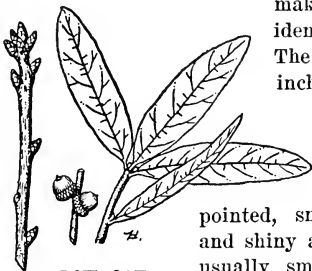
The **flowers** appear in April when the leaves are beginning to unfold. The **fruit**, or acorn, matures at the end of the second season. The acorn is from one-half to two-thirds of an inch in length and nearly as broad, light brown or yellowish brown and often striped, enclosed at the base only in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



WILLOW OAK

Twig,
one-half natural size.

Leaf,
one-third natural size.

make 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.

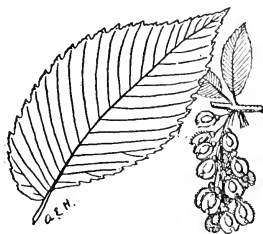
WHITE ELM (American Elm)

(*Ulmus americana* L.)

THE famous shade tree of New England, whose range, however, extends to the Rocky Mountains and southward to Texas. Within this vast area, it is generally common except in the high mountains and wet bottom lands. 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 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.



Twig one-half natural size.



WHITE ELM
Leaf, one-third natural size.

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.

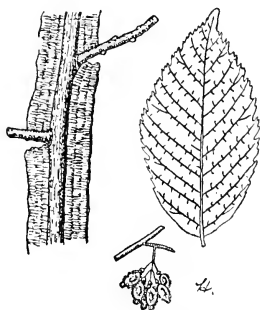
The **wood** is heavy, hard, strong, tough, and difficult to split. It is used for hubs of wheels, saddle trees, boats and ships, barrel hoops, and veneer for baskets and crates.

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.

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.



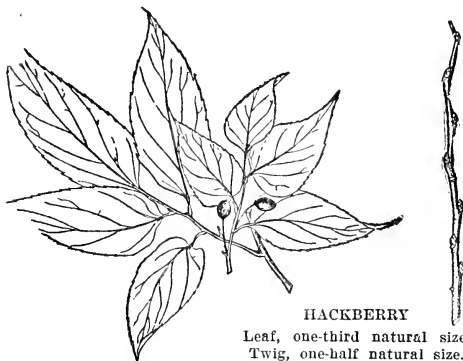
WINGED ELM
Two-thirds natural size.

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.

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 lower 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



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

to 20 inches in diameter. Its limbs are often crooked and angular and bear a head made of slender, perdant 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.

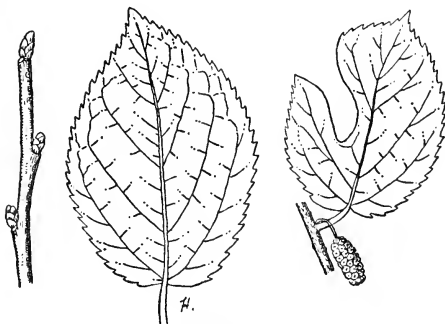
The **leaves** are simple, ovate, alternate, one-sided, 2 to 4 inches long, the edges toothed towards the long point.

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 the rich soils of the lower and middle districts, but 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 natural-



RED MULBERRY

Twig, two-thirds natural size.

Leaf, one-third natural size.

ized. The red mulberry is a small 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.

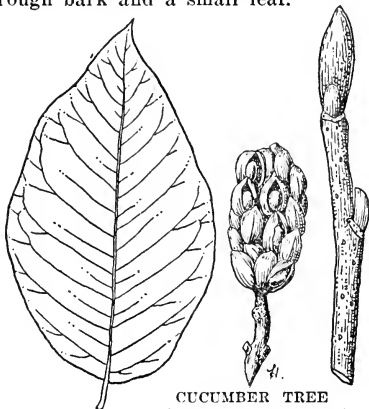
The **leaves** are alternate, thin, rounded or somewhat heart-shaped, toothed, pointed, 3 to 5 inches long, rough hairy above and soft hairy beneath. Often some of the leaves, especially on young trees and thrifty shoots, are mitten-shaped or variously lobed.

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, 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—2½ to 3 inches long. The 6 upright petals are whitish green, tinged with yellow. The **fruit** is a smooth, dark-red, often crooked “cone,” 2½ 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.

SWEET BAY, OR WHITE BAY

(*Magnolia virginiana* L.)

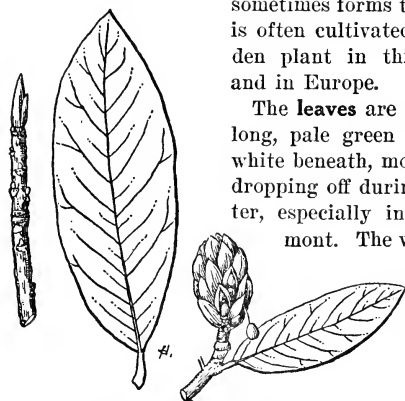
SWEET BAY, or white bay, is a small slender tree with gray branches attaining heights of 15 to 30 feet, depending upon the soil conditions. It is found on low, moist or wet lands, and along the margins of water in the Coastal Plain and less abundantly in the eastern portion of the Piedmont region. It is associated with white cedar in the "juniper bays." It sprouts up freely after fires and

sometimes forms thickets. It is often cultivated as a garden plant in this country and in Europe.

The **leaves** are simple, oblong, pale green above and white beneath, most of them dropping off during the winter, especially in the Piedmont. The winter buds

are thickly covered with fine hairs.

The **fragrant flowers**, with 9 to



SWEET BAY, OR WHITE BAY
 Leaf, one-third natural size.
 Twig, two-thirds natural size.

12 pure white petals on slender smooth stems, measure from 2 to 3 inches across. They continue to open during several weeks in the spring and early summer. The **fruit** cluster, or "cone," is oval in shape, dark red, smooth, about 2 inches long by one-half an inch broad, and contains scarlet seeds which are variably oval and much flattened, about one-quarter of an inch long.

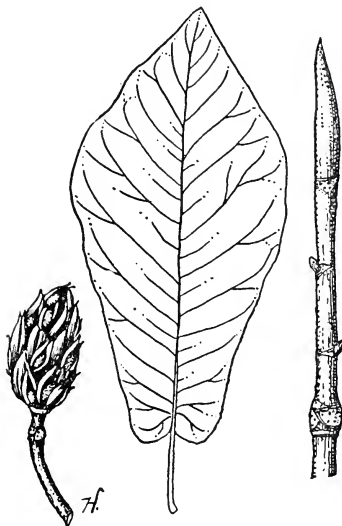
The **wood** is soft, light brown tinged with red, with cream-white sapwood. The tree is usually too small for the wood to be of much commercial importance, although it is sometimes used along with gum for woodenware and for making paper pulp.

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.

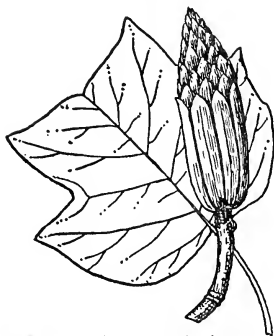
The **wood** is light, soft, weak and easily worked. It is only occasionally used for lumber or pulpwood, in places where practically all species are being cut.

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

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-



Leaf, one-third natural size.



YELLOW POPLAR

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



SASSAFRAS

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.

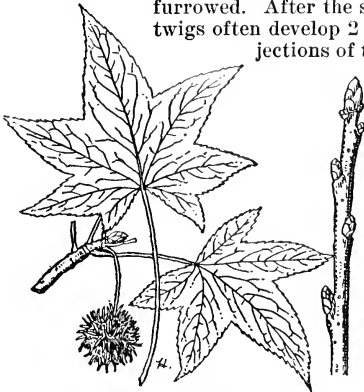
The **flowers** are clustered, greenish yellow, and open with the first unfolding of the leaves. The male and female flowers are usually on different trees. The **fruit** is an oblong, dark blue or black, lustrous berry, containing one seed and surrounded at the base by what appears to be a small orange-red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

give 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

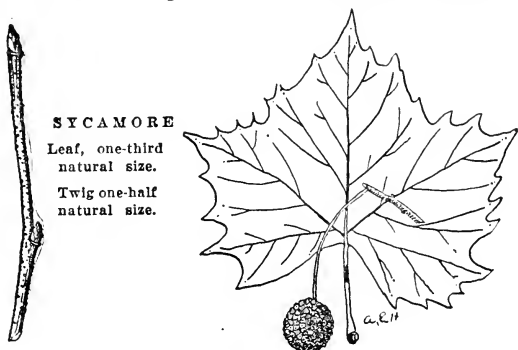
pale yellow through orange and red to a deep bronze.

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 diame-



ter 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** 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 younger 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.

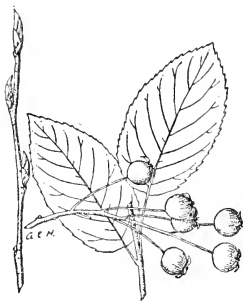
The **wood** is hard and moderately strong, but decays rapidly in the ground. It is used for butchers' blocks, tobacco boxes, furniture and interior finish.

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.

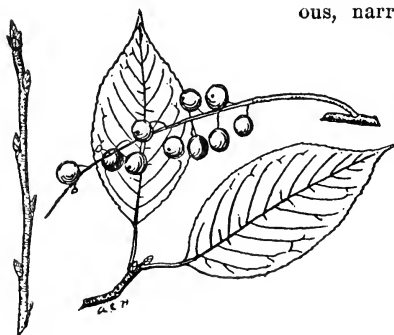
The **wood** is heavy, exceedingly hard, strong, close-grained and dark brown. It is occasionally used for handles. This is a desirable ornamental tree and should be planted for this purpose and to encourage the birds.

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 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.



BLACK CHERRY

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

The leaves are alternate, simple,

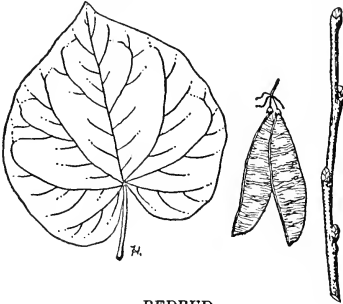
oval to lance-like in shape, with edges broken by many fine incurved teeth, thick and shiny above, and paler beneath.

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.

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, except in the mountains, though it is more abundant in the middle district. It ordinarily attains a height of 25 to 50 feet and a diameter of



REDBUD

Leaf, one-fifth natural size.

Twig, two-thirds natural size.

6 to 12 inches. Its stout branches usually form a wide flat head.

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 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.

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—are sufficient to identify the honey locust.



HONEY LOCUST

Twig, 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 entire 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.

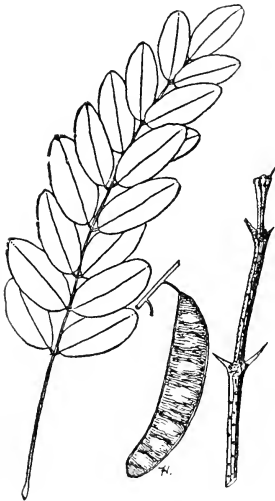
The twigs and branchlets are armed with straight or slightly curved sharp, strong spines, sometimes as much as 1 inch in length which remain attached to the outer **bark** for many years. The bark is dark brown and divides into strips as the tree grows older.

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 pendant racemes.

The **fruit** is a pod 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.



BLACK LOCUST

Leaf, one-third natural size.

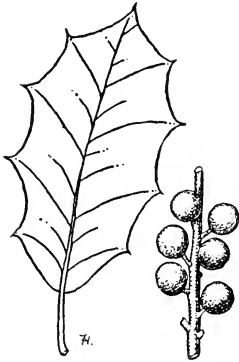
Twig, two-thirds natural size.

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.



HOLLY

Two-thirds natural size.

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.

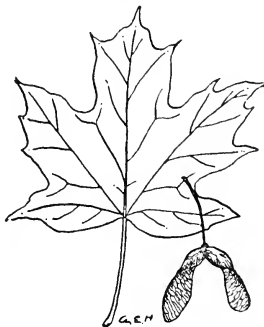
The **flowers** are small, whitish and inconspicuous; the male and female flowers are usually borne on separate trees.

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.

SUGAR MAPLE (*Acer saccharum* Marsh.)

THE sugar maple, often called sugar tree, is common only on the cool slopes of our higher mountains. It is generally a rather slow-growing tree, but in the open it grows faster and has a very symmetrical, dense crown, affording heavy shade. It is therefore quite extensively planted as a shade tree. The bark on young trees is light gray



SUGAR MAPLE

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

to brown and rather smooth, but as the tree grows older it breaks up into long, irregular plates or scales, which vary from light gray to almost black. The twigs are smooth and red-

dish brown, and the winter buds sharp-pointed. The tree attains a height of more than 100 feet and a diameter of 3 feet or more. The sap yields maple sugar and maple syrup.

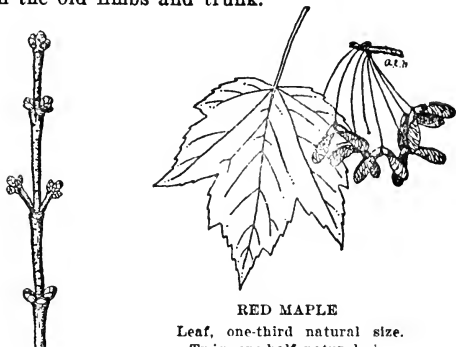
The leaves are 3 to 5 inches across, simple, opposite, with 3 to 5 pointed and sparsely toothed lobes, the divisions between the lobes being rounded. The leaves are dark green on the upper surface, lighter green beneath, turning in autumn to brilliant shades of dark red, scarlet, orange and clear yellow.

The flowers are yellowish green, on long thread-like stalks, appearing with the leaves, the two kinds in separate clusters. The fruit, which ripens in the fall, consists of a two-winged "samara," or "key," the two wings nearly parallel, about 1 inch in length and containing a seed. It is easily carried by the wind.

The wood is hard, heavy, strong, close-grained and light brown in color. It is known commercially as hard maple, and is used in the manufacture of flooring, furniture, shoe-lasts and a great variety of novelties.

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 old 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.

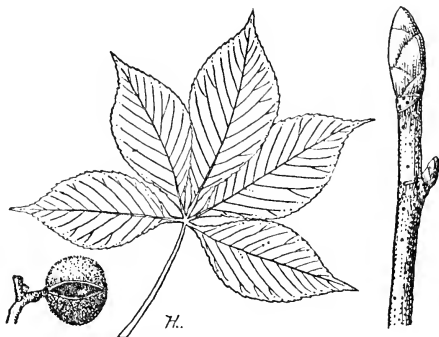
The red **flowers** in dense clusters appear in early spring before the leaves, the buds turning a deep red sometime before they open. The winter buds are small, red and round or blunt-pointed. The **fruit** ripens in late spring or early summer. It consists of pairs of winged seeds, or keys, one-half 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.

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.

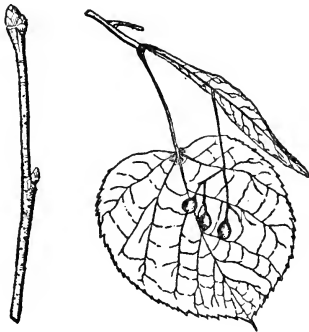
The **leaves**, unlike those of any other of our tree species except the other member of the buckeye group, are divided into usually 5, but sometimes 6 or 7 oblong, pointed, sharply toothed leaflets 4 to 6 inches long, all set on the end of the leaf stems, which are about as long as the leaflet. The 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-half 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 woolly 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.

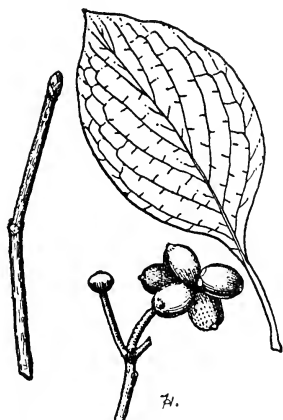
The **leaves** are opposite, ovate, 3 to 5 inches long, 2 to 3 inches wide, pointed, entire or wavy on the margin, bright green above, pale green or grayish beneath.

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 (*Oxydendrum 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.

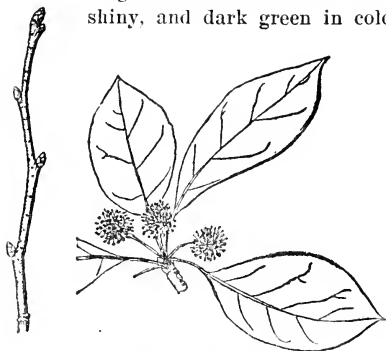
BLACK GUM (*Nyssa sylvatica* Marsh.)

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.

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 de-



BLACK GUM
One-half natural size.

velops 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, golf-stick 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 Great Smoky Mountains, but extends throughout the whole mountainous region. 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 along the upper watercourses. It is occasionally planted, as it makes a desirable ornamental tree.

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



SILVERBELL

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

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

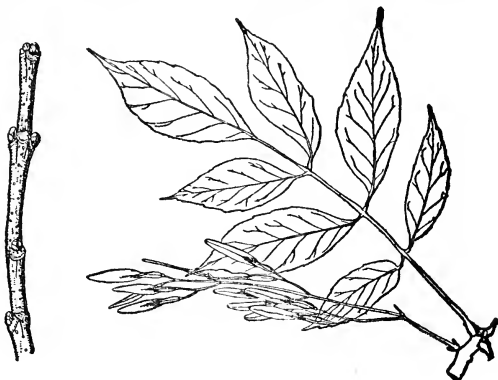
leaves. The pendent, bell-like flowers suggest the names silverbell and snowdrop tree. The **fruit** is from 1 to 2 inches long and nearly an inch wide, with a corky, four-winged covering. The solitary seed is a bony stone.

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 found throughout the State, but 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 narrow ridges are



WHITE ASH

Twig, one-half natural size.

Leaf, one-third natural size.

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.

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