

COMMON FOREST TREES OF KENTUCKY.

COMMON
**FOREST
TREES**
of KENTUCKY



How To Know Them

Issued by the
STATE DEPARTMENT of AGRICULTURE
W. C. HANNA, Commissioner
FRANKFORT, KY.

In Cooperation with the Forest Service
U. S. Department of Agriculture

1923

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COMMON
FOREST TREES
OF
KENTUCKY.



How To Know Them

A Description of the Common Forest Trees of the State,
with Notes Regarding their Occurrence, the Char-
acter and Value of their Wood, and their
Desirability for Shade and Forest
Planting.



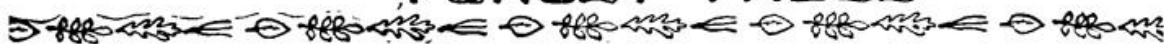
By
WILBUR R. MATTOON, *Forest Examiner*

Issued by the
STATE DEPARTMENT OF AGRICULTURE
W. C. HANNA, *Commissioner of Agriculture*

IN CO-OPERATION WITH THE
FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

1923

FOREST TREES



PURPOSE OF THE MANUAL

The object of this manual is to place in the hands of the people of Kentucky a brief general description of the more common forest trees of the State. The less common trees and many of the very small-sized trees have been intentionally omitted. It is intended for the public, including the "grown-ups" as well as those in our schools who are coming on to assume the responsibilities of the State with its great natural resources.

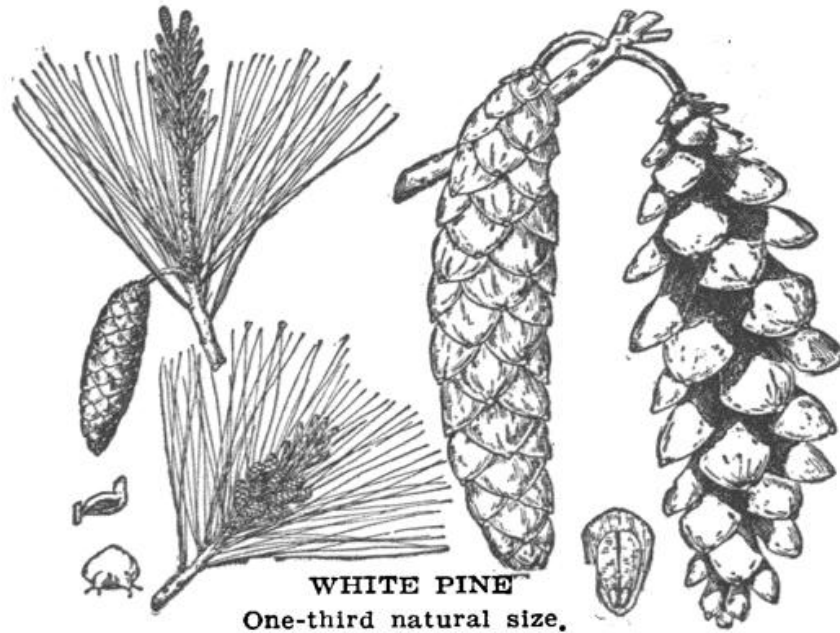
The text, under the direction of the Commissioner of Agriculture, has been prepared by Mr. W. R. Mattoon of the Forest Service, U. S. Department of Agriculture, in collaboration with the State Foresters of Tennessee, North Carolina, Virginia and Maryland who are simultaneously publishing tree guides adapted each to his respective State. The description of the local distribution of the trees within the State accords with information furnished by Professor H. Garman of the Kentucky College of Agriculture, Lexington. Most of the cuts have been loaned by the several State Foresters mentioned above. A large number are from original drawings made especially for this cooperative project by the Federal Forest Service; and those showing the pines and other conifers are from Prof. C. S. Sargent's "Manual of Forest Trees of North America," used here by permission of and by special arrangement with Houghton-Mifflin Company. All of this assistance and cooperation is gratefully acknowledged.

The rapidly increasing interest in outdoor life, stimulated perhaps by good roads, the automobile, the "scout movement" and the widened outlook resulting from the spread of education, encourages the rational treatment of our trees and forests. It is highly important that this be done in order that our forests may continue to furnish the materials so essential to the maintenance of the industrial and domestic life of the State and Nation, protect our farmsteads and mountain streams, and provide places of pleasure and recreation for our people. Indeed, the trees may be justly regarded as "our best friends."

FOREST TREES

WHITE PINE (*Pinus strobus* L.)

THE white pine occurs naturally throughout the mountainous lands in eastern Kentucky, but is nowhere abundant. 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.

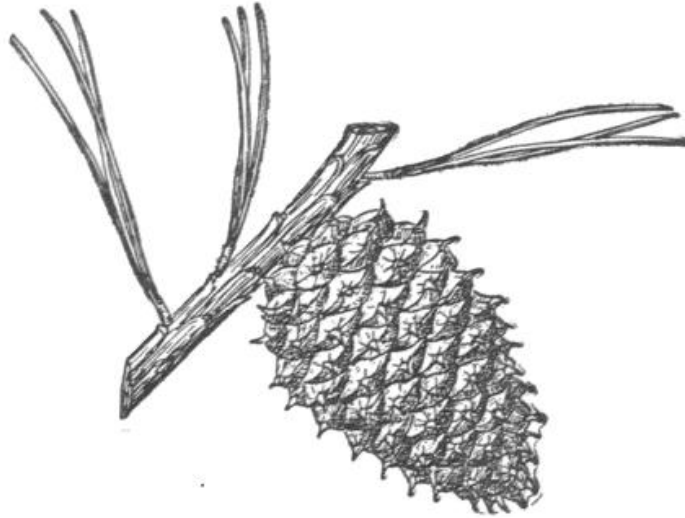
The **leaves**, or needles, are 3 to 5 inches in length, bluish green on the upper surface and whitish beneath, and occur in bundles of 5, which distinguishes it from all other eastern pines. The **cone**, or fruit, is 4 to 6 inches long, cylindrical, with thin, usually very gummy scales, containing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

PITCH PINE (*Pinus rigida* Mill.)

THE pitch pine grows on dry ridges and slopes and in cold swamps and bottoms in the mountains and outlying hilly regions. It occurs scattered with hardwoods or other pine, and is one of the common pines of eastern Kentucky.

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

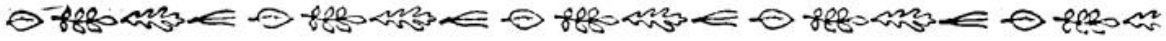


PITCH PINE
One-half natural size.

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

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

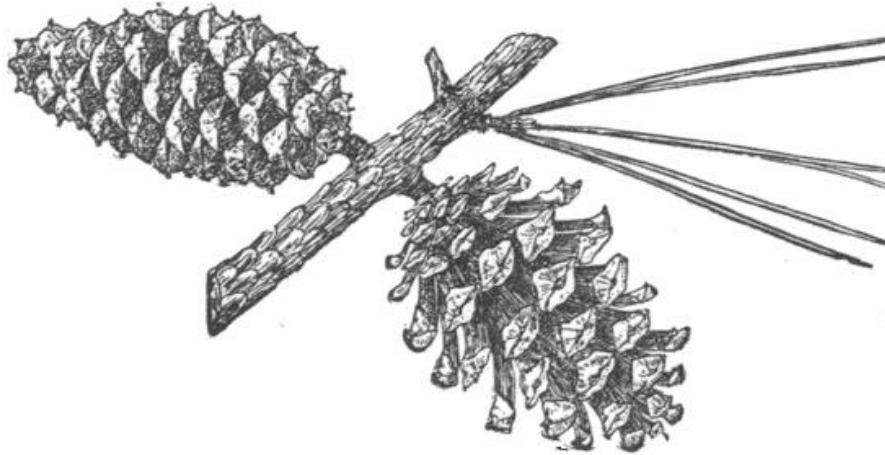
The **wood** is light, soft and brittle. It is sawed into lumber for general construction and is used for fuel. This tree is able to grow on very poor soil and has the capacity, when young, of sprouting successfully from the base of the stump when burned or cut back.



SHORTLEAF PINE (Yellow Pine)

(*Pinus echinata* Mill.)

THE shortleaf pine, also known as yellow pine, is widely distributed throughout the South. In the State it is found in many counties in the eastern part, but is less abundant than the pitch or the scrub pines. The young tree in the open has a straight and somewhat stout stem with slightly as-



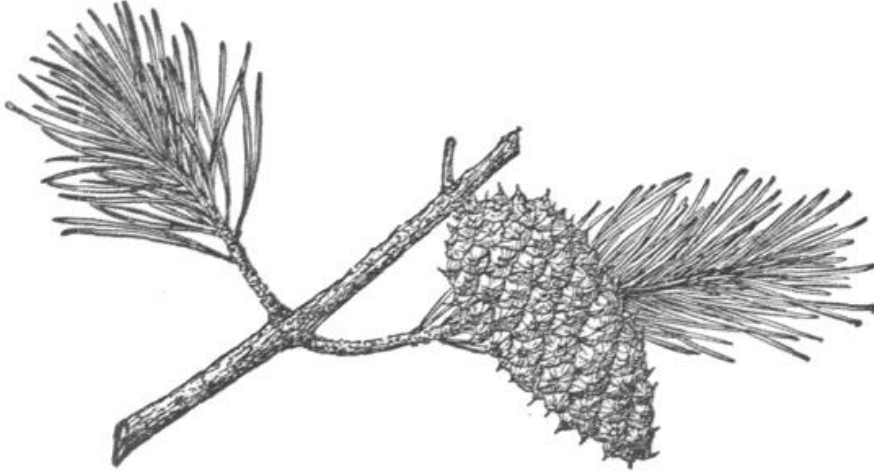
SHORTLEAF PINE
One-half natural size.

ending 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 4½ 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, 1½ to 2½ inches long, oblong, with small sharp prickles, generally clustered, and often holding to the twigs for 3 to 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 for interior and exterior finishing, general construction, paper pulp, excelsior, cooperage, mine props, and other purposes.

VIRGINIA PINE (*Scrub Pine, or Spruce Pine.*)
(*Pinus virginiana* Mill.)



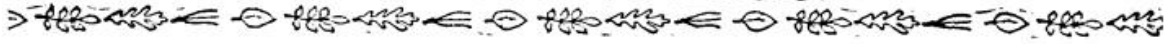
VIRGINIA PINE.
One-half natural size.

THE Virginia pine, scrub, or spruce pine, is quite widely distributed and common over the eastern and central parts of the State. It occurs often in pure stands and is very persistent in gullying, broken and very dry soils. It is one of our slower-growing pines. The side branches usually persist for many years, even after dying, thus giving a scrubby 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.

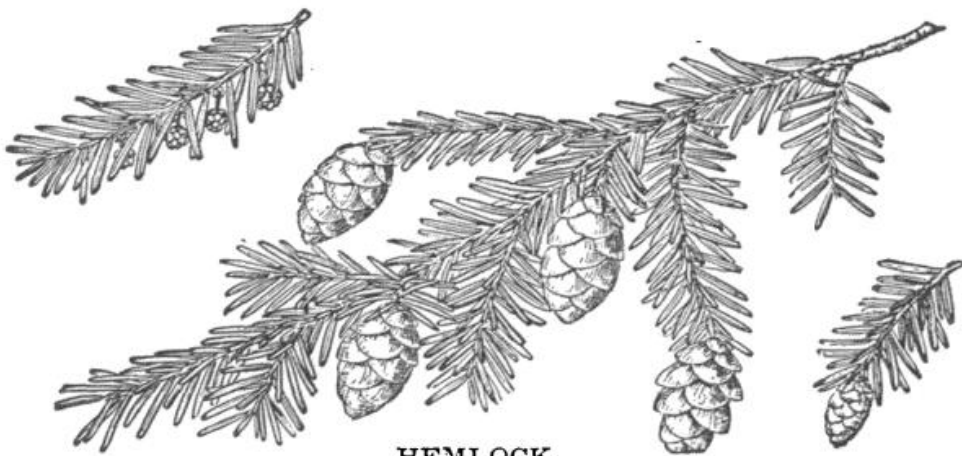
Except in the occasional large-sized trees, the **wood** is very knotty because of the persistence of the side branches. It is light and soft, but fairly durable in contact with the soil, so that it is being used to some extent for posts, poles and piling. The lumber is increasingly used for rough construction,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

FOREST TREES.



HEMLOCK (*Tsuga canadensis* Carr.)

THE hemlock, also 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 of eastern Kentucky, and also follows the Green River westward nearly to the Ohio River. Its horizontal or ascending branches and drooping twigs, forming a pyramidal crown,



HEMLOCK
One-half natural size.

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.

FOREST TREES

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 western part of the State. Its straight trunk with numerous ascending branches, and narrow conical outline makes the tree



CYPRESS
One-half natural size.

one of 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.

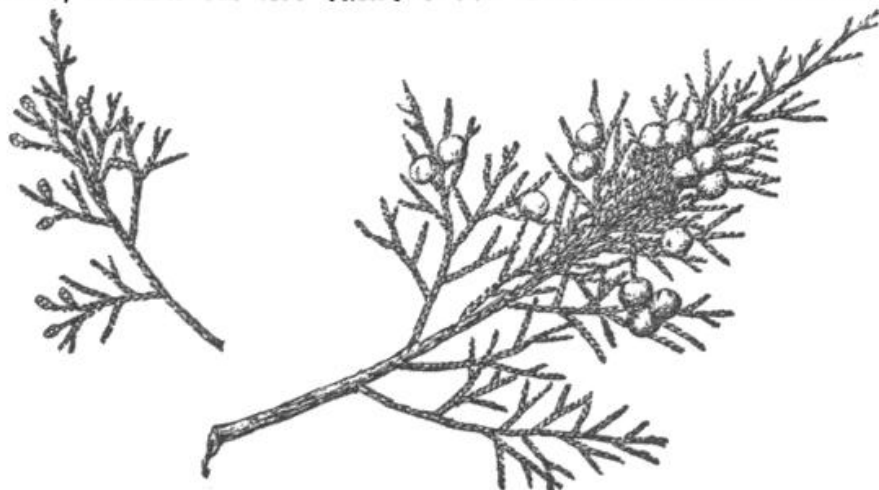
FOREST TREES



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 widely distributed and common throughout the State.

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.

BUTTERNUT (White Walnut)

(*Juglans cinerea* L.)

THE butternut, known also as white walnut, 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 black walnut in being



WHITE WALNUT OR BUTTERNUT

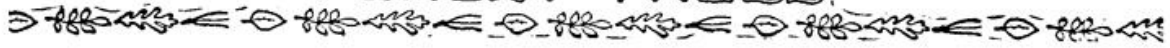
Twig, one-half natural size. Leaf, one-sixth natural size.

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 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-stock, 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.

FOREST TREES

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

THE pecan is found native in the State chiefly in the Mississippi and lower Ohio river bottomlands, but has been planted for nuts pretty widely, and from them has sometimes spread considerably. It makes an excellent shade tree, and for this purpose it has also been planted. The pecan is the largest of the hickories, attaining heights of over 100



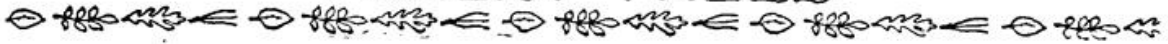
PECAN
One-quarter natural size.

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

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

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

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



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 and 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.

BIG SHELL-BARK HICKORY (King Nut)

(*Hicora laciniosa* (Michx. f.) Sarg.)

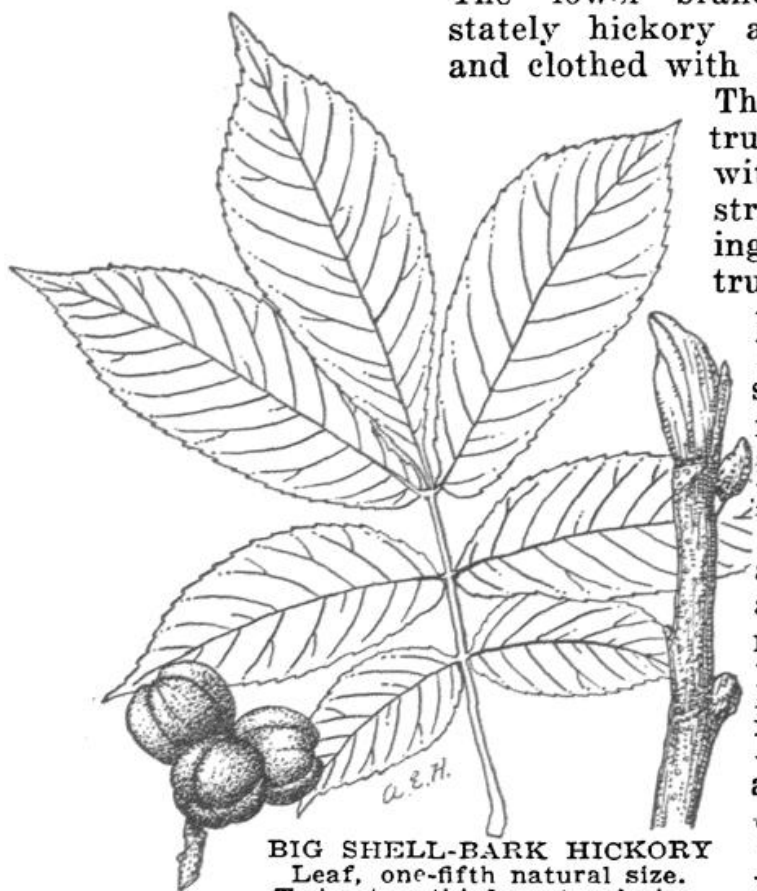
(*Carya laciniosa* Schn.)

THE big shell-bark hickory, big nut, or king nut, is widely scattered over the western and southern counties. It is similar in appearance to the scaly-bark hickory, but the nuts are brown and larger and the twigs much stouter. It is distinctly a tree of the bottomlands and coves near rivers.

The lower branches of this stately hickory are drooping and clothed with large leaves.

The bark of the trunk is shaggy, with long thin strips separating from the trunk. The winter terminal buds are sometimes nearly 3 inches in length.

The leaves are alternate and vary mostly from 15 to 22 inches in length; they are composed of 5 to 9, usually 7 leaflets on a leaf-stalk abruptly



BIG SHELL-BARK HICKORY
 Leaf, one-fifth natural size.
 Twig, two-thirds natural size.

thickened at the base, which remains after the leaflets fall and often curls backward. The fruit is a nut enclosed in a thick hard husk which splits into several pieces; it is prominently 4 to 6 ridged or angled, and somewhat flattened. The nuts are borne singly or in pairs and average from 1 to 2 inches in diameter. The kernel is light brown and sweet and much sought as food.

The wood differs but little from that of the shell-bark hickory. It is heavy, hard, tough, and very strong, and used for many purposes requiring a wood of unusual strength, hardness, and toughness.



PIGNET OR BITTERNUT HICKORY

(*Hicoria minima* Britton)
(*Carya cordiformis* K. Koch)

THE pignut, or 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 common everywhere and is well known by its roundish bitter nuts.

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



Twig, one-half natural size.

PIGNET, OR 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.

FOREST TREES

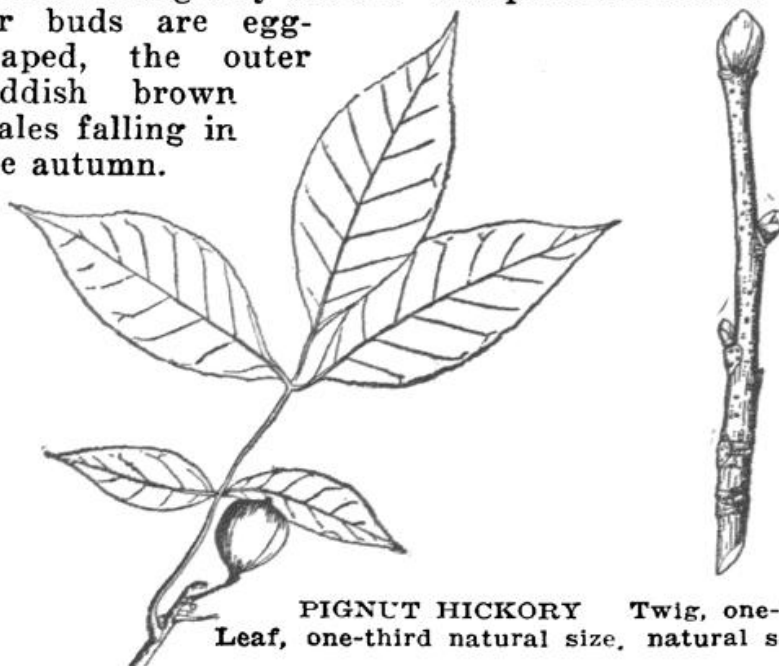
BROOM, BLACK OR PIGNUT HICKORY

(*Hicoria glabra* Britton)

(*Carya glabra* Sweet)

THIS hickory is a medium to large tree, occurring plentifully on poor soil in the mountains and in cool and moist places locally through 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.



PIGNUT HICKORY Twig, one-half
Leaf, one-third natural size, 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 (*Caryu 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.

FOREST TREES

WHITEHEART OR MOCKERNUT HICKORY

(*Hicoria alba* Britton)

(*Carya alba* K. Koch)

THE mockernut, white hickory, whiteheart, or big-bud hickory is common on well-drained soils throughout the State. It is a tall, short-limbed tree often 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

MOCKERNUT OR WHITEHEART HICKORY

Leaf, one-fifth
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 and handles. It furnishes the best of fuel. This and the other hickories are very desirable both for forest and shade trees.

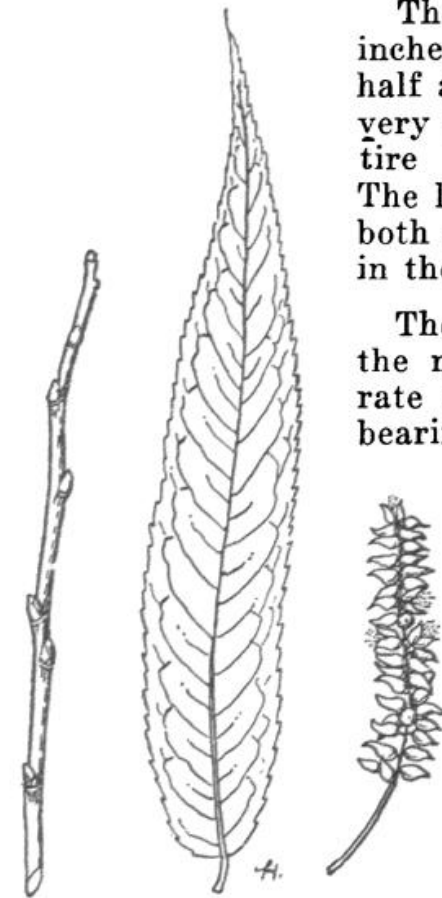
BLACK WILLOW (*Salix nigra* Marsh)

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.

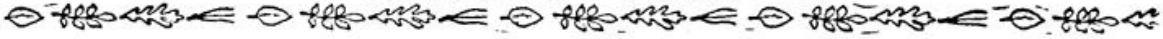


BLACK WILLOW
Two-thirds natural size.

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.

FOREST TREES



COTTONWOOD (Carolina Poplar)

(*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



CAROLINA POPLAR

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

leaves 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,

FOREST TREES

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. It is found throughout the State.

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.

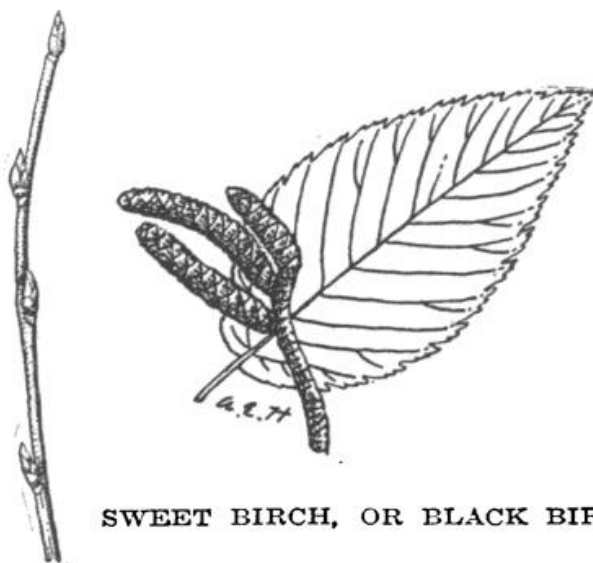
The **flowers** are in catkins, the two kinds growing on the same tree. The **fruit** is cone-shaped about 1 inch long, and densely crowded with little winged nutlets that ripen from May to June.

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.

SWEET BIRCH OR BLACK BIRCH

(*Betula lenta* L.)

THE sweet birch, also known as black birch or cherry birch, occurs only in the 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.



SWEET BIRCH, OR BLACK BIRCH

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

HOP HORNBEAM (Ironwood)
(*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 widely scattered, perhaps more common on rather dry soils throughout the upland and mountain regions.



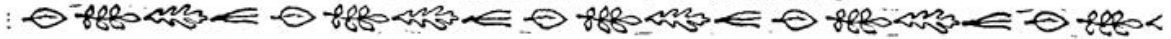
HOP HORNBEAM
Twig, one-half natural size. Leaf, one-third natural size.

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 scattered 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.

HORNBEAM

Leaf, two-thirds natural size.

The **flowers** are borne in

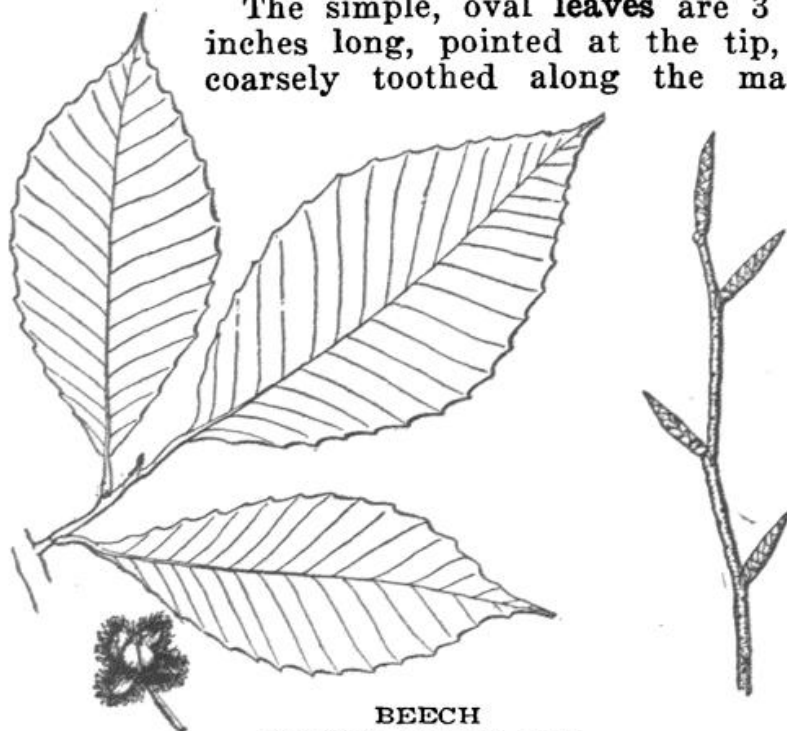
catkins separately on the same tree; the male catkin about 1½ inches long, the female about three-fourths of an inch, with small, leaf-like, 3-lobed green scales. The **fruit** is a nutlet about one-third of an inch long. It falls, attached to the leaf-like scale which acts as a wing in aiding its distribution 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 widely scattered over the State. In some sections, it is a tree characteristic of poor soils, known as "beech flats." It makes its best growth, however, in deep, moist loam. The beech is slow growing and endures shade to an unusual degree. 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.



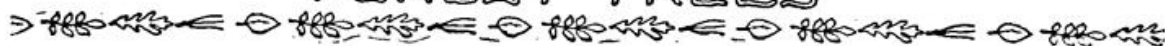
BEECH
One-half natural size.

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.

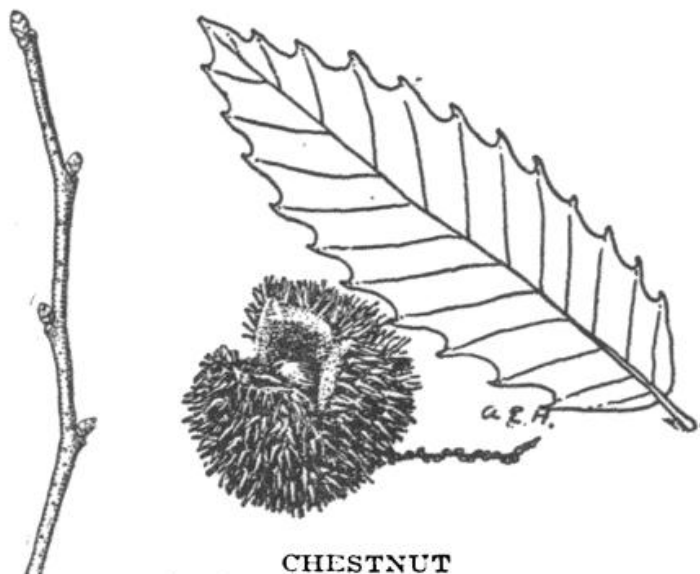
The **wood** of the beech is very hard, strong, and tough, though it will not last long on exposure to weather or in the soil. The tree is of no great economic importance as a lumber tree, though the wood is used to some extent for furniture, flooring, carpenters' tools, and novelty wares.



CHESTNUT (*Castanea dentata* Borkh.)

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

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



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

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

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

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

A bark disease, known as the chestnut blight, is proving fatal to the chestnut, and has already practically exterminated the tree over much of the northeastern 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.

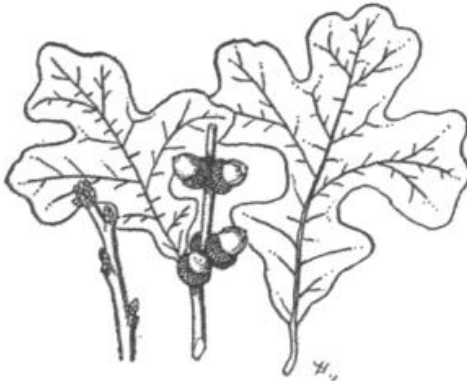
The **leaves** are alternate, simple, 5 to 9 inches long and about half as broad. They are deeply divided into 5 to 9 rounded, finger-like lobes. The young leaves are a soft silvery gray or yellow or red while unfolding, becoming later bright green above and much paler below. The **fruit** is an acorn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

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

POST OAK

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

THE post oak is 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. It is a common oak in some of the southern counties and extends into the western part of the State.



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.

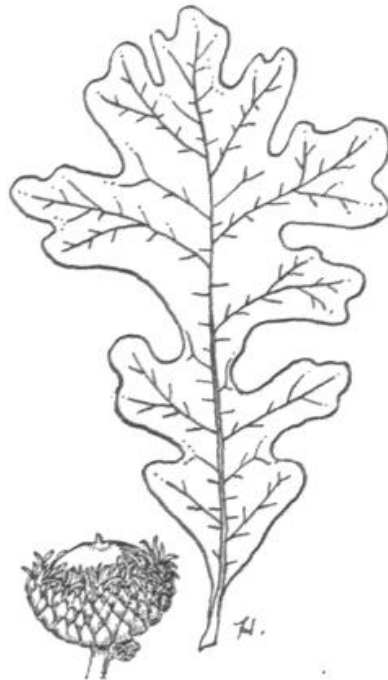
The **flowers**, like those of the other oaks, are of two kinds on the same tree, the male in drooping, clustered catkins, the female inconspicuous. The **fruit** is an oval acorn, one-half to 1 inch long, set in a rather small cup which may or may not be stalked.

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.

BURR OAK (Mossy Cup Oak)

(*Quercus macrocarpa* Michx.)

THE burr oak is one of the commonest trees in Bluegrass Kentucky, and extends over the State except in the high mountains. It takes its name from the fringe around the cup of the acorn. It usually has a broad top of heavy spreading branches and a relatively short body. In maturity, it attains a diameter of 5 feet or more and a height of



BURR OAK
One-third natural size.

over 80 feet. The **bark** is light gray and is usually broken up into small narrow flakes. The burr oak does not often form a part of the forest stand, as do some other oaks, but occurs generally singly in open stands and in fields. It requires a moist but well-drained soil.

The **leaves** resemble somewhat those of the common white oak, but have a pair of deep indentations on their border near

the base, and wavy notches on the broad middle and upper portions of the leaf. They range from 6 to 12 inches long and 3 to 6 inches wide. The **fruit**, or acorn, is a nut set deeply in a fringed cup. It is sometimes 1 inch or more in diameter but varies widely in respect to size and the degree to which the nut is enclosed in the mossy fringed cup.

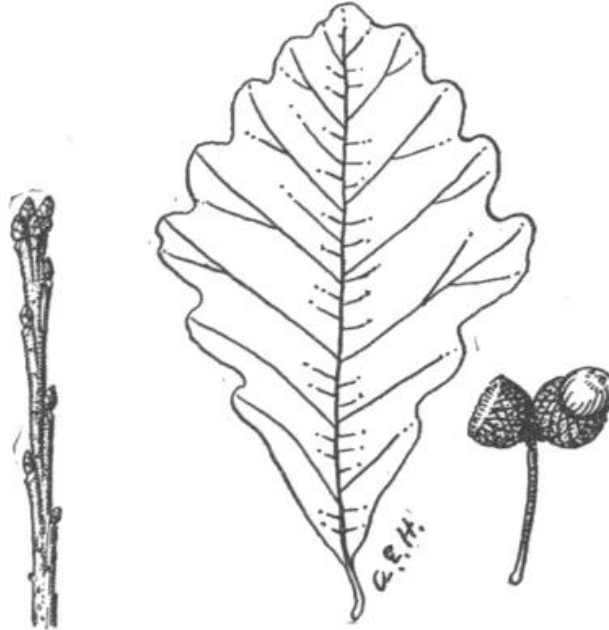
The **wood** is heavy, hard, strong, tough and durable. It is used for much the same purposes as the other white oaks—for lumber, cross-ties and fuel.



SWAMP WHITE OAK

(*Quercus bicolor* Willd., formerly *Q. plantanoides* Sudw.)

THE swamp white oak, as the name implies, inhabits the low grounds and bottom lands, and in general appearance is much like that of the true white oak. It is found chiefly in the northern parts of the State, in association with several other oaks, gum, maples, ash and hickories.



SWAMP WHITE OAK
One-half natural size.

The **bark** is deeply and irregularly divided by fissures into broad ridges of a grayish-brown color.

The **leaves** are generally broader at or beyond the middle length (pear-shape) and wedge-shaped toward the base, wavy and indented along the margin, dark

green and shiny above and grayish and fuzzy beneath, and 5 to 6 inches in length by 2 to 4 inches in width. The chestnut oak and swamp chestnut oak have leaves somewhat similar, but acorns of different shape and larger.

The acorn, or **fruit**, occurs commonly in pairs and requires only one season to mature. It is borne on slender stalks from 2 to 4 inches in length. The nut, or acorn proper is about 1 inch long by two-thirds of an inch thick and enclosed for about one-third its length in a thick narrow-shaped cup.

The **wood** is heavy, hard, strong and tough, and used for similar purposes as the true white oak, such as furniture, cabinet work, flooring, cooperage, ties, fence posts and fuel.

The swamp chestnut oak (*Q. prinus* L.), often associated with the above, has a leaf more nearly oblong and more finely notched on the margin, and a nut more than 1 inch in length. It is found over the western part of the State.

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 also occurs in the western part of the State.



CHESTNUT OAK
One-third natural size.

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

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

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

CHINQUAPIN OAK (Chinquapin, Pin Oak)

(*Quercus muhlenbergii* Englem., formerly
Q. acuminata Sarg.)

THIS oak, which is an excellent timber tree, occurs throughout the State, but more abundantly in the Bluegrass region. It grows on practically all classes of soil and in all moisture conditions except in swamps, and is a very tenacious tree on shallow, dry soil. The **bark** is light gray, and breaks up into short narrow flakes on the main trunk and old limbs.



CHINQUAPIN OAK
One-third natural size.

It reaches a height of 70 to 90 feet. The straight, shapely trunk bears a round-topped head composed of small branches, which makes it an attractive shade tree.

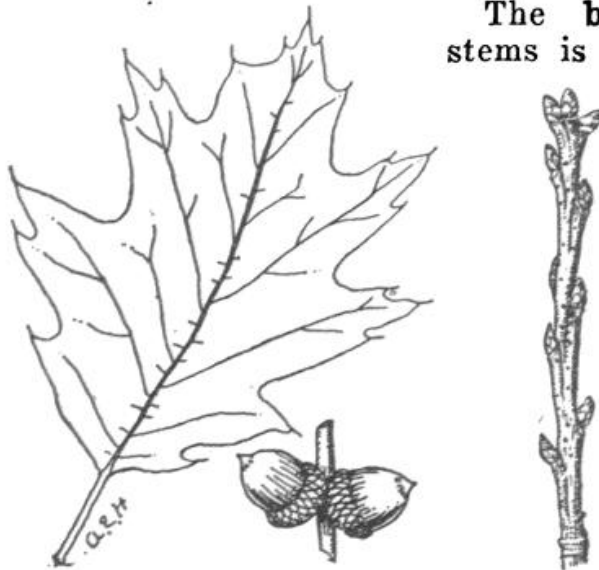
The **leaves** are oblong, 3 to 6 inches in length, 1½ to 3 inches wide, and equally toothed or notched on the edges, resembling the leaves of the chestnut oak. The **fruit**, which ripens in the fall of the first season, is light to dark brown when ripe, and edible if roasted. This acorn is from one-half to nearly an inch long, usually less than one inch in diameter, and is set in a shallow cup.

The **wood** is heavy, very hard, tough, strong, durable, and takes an excellent polish. It is used in manufacturing lumber and timbers, crossties, fence posts and fuel. A portion of the lumber no doubt goes into furniture.

RED OAK (Northern Red Oak)

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

THE northern red oak occurs throughout the State. It is not found in swamps. Like many of the better timber trees, it is not as abundant as formerly. 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.



RED OAK

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

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 ins. wide, broader toward the tip, divided into

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 (Spanish 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 prevalent oaks in the southern and western parts of the State. Its large spreading branches form a broad, round, open



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

top. The **bark** is rough, though not deeply furrowed, and varies from light gray on younger trees to dark gray or almost black on older ones.

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

the central lobe often 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, 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 common throughout the State. 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.

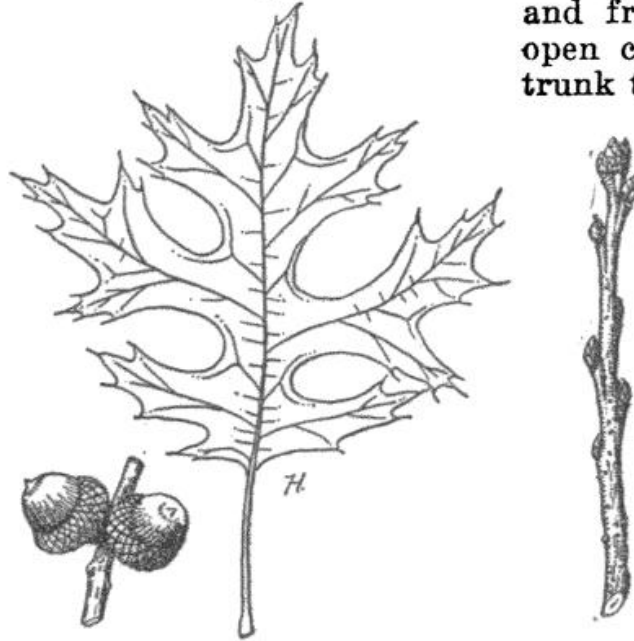
The **fruit** matures the second season. The light-brown nut is from one-half to 1 inch long, more or less hemispherical in shape, and from one-half to three-quarters enclosed in the thin, dark-brown, scaly cup. The kernel is yellow and extremely bitter.

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 ridges and uplands over the eastern half of the State. (Not on limestone soils.) It 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 from 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.

PIN OAK (Swamp Oak)
(*Quercus palustris* Muench.)

PIN OAK is rarely found naturally except on the rich moist soil of bottom lands and the borders of swamps. It is usually not abundant in any locality but found scattered with other kinds of trees. It is a tree of the eastern and southern parts of the State. The tree commonly has a single, upright stem with numerous long tough branches, the

lower ones drooping, the middle horizontal, and the upper ascending. The many small bristling twigs and branches give the tree its name. The **bark** on young stems is smooth, shining and light brown; on old trunks light gray-brown and covered by small, close scales.



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

The leaves generally resemble those of scarlet oak, but the rounded openings do not extend quite so near to the midrib; they average somewhat smaller, being 3 to 5 inches long and 2 to 4 inches wide.

The **flowers** are of two kinds on the same tree, and appear when the leaves are about one-third grown. The **fruit**, taking two years to mature, is an acorn nearly hemispheric, about one-half inch long, light brown, often striped, enclosed only at the base in a thin, shallow, saucer-shaped cup.

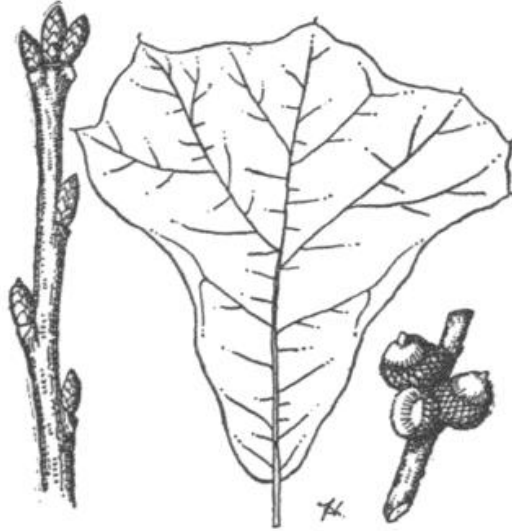
The **wood** is heavy, hard, strong, and usually knotty. It is light brown, with thin, darker-colored sapwood. It is sold and has the same uses as red oak, although it is generally not so good in quality.

Because of its beauty, its hardiness, and its fairly rapid growth, pin oak makes an exceptionally fine street tree.

BLACK JACK OAK

(*Quercus marilandica* Muench.)

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

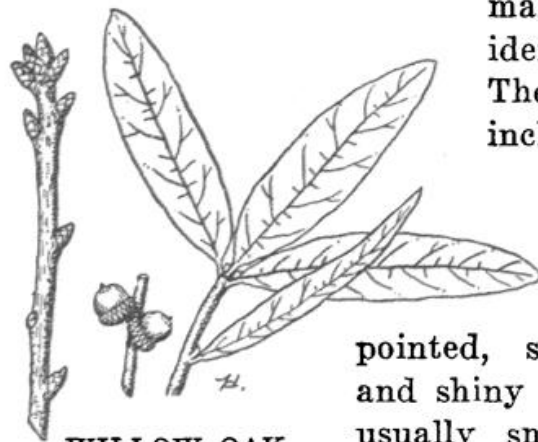
The **wood** is heavy, hard and strong; when used at all, it is used mostly as firewood.



WILLOW OAK (*Quercus phellos* L.)

THE willow oak, sometimes called water oak, is common only in the southern tier of counties. It is most often found on flat and rather wet land, such as along the borders of rivers and swamps, but sometimes 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 and general construction.

SHINGLE OAK (*Quercus imbricaria* Michx.)

THIS relatively small-sized oak is found most abundant over the western and southern portions of the State. Kentucky is about the center of its botanical range in the United States. When growing alone, the tree develops a symmetrical rounded top, conspicuous on account of the good-sized, regular-shaped, oblong leaves which differ in shape from those of all other native oaks. It forms a handsome tree. It is sometimes incorrectly called "laurel" oak.



SHINGLE OAK
 Leaf, one-half natural size.
 Twig, three-fourths natural size.

The **bark** is rather thin and divided by shallow fissures into broad ridges of a dark brown color.

The **leaves** are alternate in arrangement along the stem, oblong in shape, 4 to 6 inches long by 1 to 2 inches wide, leathery in texture with smooth margins sometimes wavy in outline, dark green and shiny above, and thick downy or velvety below.

The **fruit** is an acorn about one-half inch in length, borne singly or in pairs on stout stems, full or rounded at the end and faintly streaked, enclosed for about one-half its length in a thin-walled cup. Like all members of the black-oak group, the fruit requires two seasons to mature.

The wood is heavy, hard, rather coarse-grained, and used for common lumber, shingles (whence it got its common name), posts and firewood. The average small size of the tree does not permit of much wide lumber.

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 OAK
Leaf, one-third natural size.

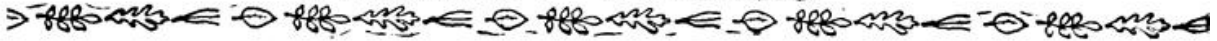
The **leaves** are alternate, simple, 4 to 6 inches long, rather thick, somewhat one-sided, doubly toothed on the margin, and generally smooth above and

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.

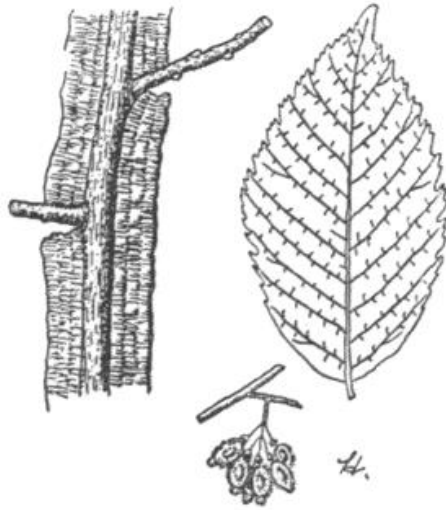
Because of its spreading fan-shaped form, graceful pendulous branches, and long life, the white elm justly holds its place as one of the most desirable shade trees.



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 is a small tree, common in southern and western counties, 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, topped with 2 small incurved awns, or beaks, oblong, reddish brown, about one-third of an inch long, with a long slender stalk at the base, and covered with white hairs.

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

SLIPPERY ELM (*Ulmus fulva* Michx.)

THE slippery elm, or red elm, is a common tree in all sections of the State. It is found principally on the banks of streams and on low hillsides in rich soil. It is a tree of small to moderate size, but noticeably wide-spreading. It is usually less than 40 feet in height and 16 inches in diameter, although trees of larger dimensions are occasionally found.

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



Twig one-half natural size



SLIPPERY ELM
Leaf,
one-third natural size.

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

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

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

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

HACKBERRY (*Celtis occidentalis* L.)

THE hackberry is a common tree throughout the State, except in the high mountains. It occurs most abundantly and of greatest size in the rich alluvial lands, 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



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

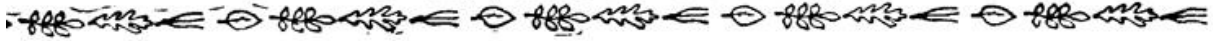
feet high and 10 to 20 inches in diameter. Its limbs are often crooked and angular and bear a head made of slender, pendant branches or short, bristly, stubby twigs. In the open the crown is generally very symmetrical. It makes an excellent shade tree.

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

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

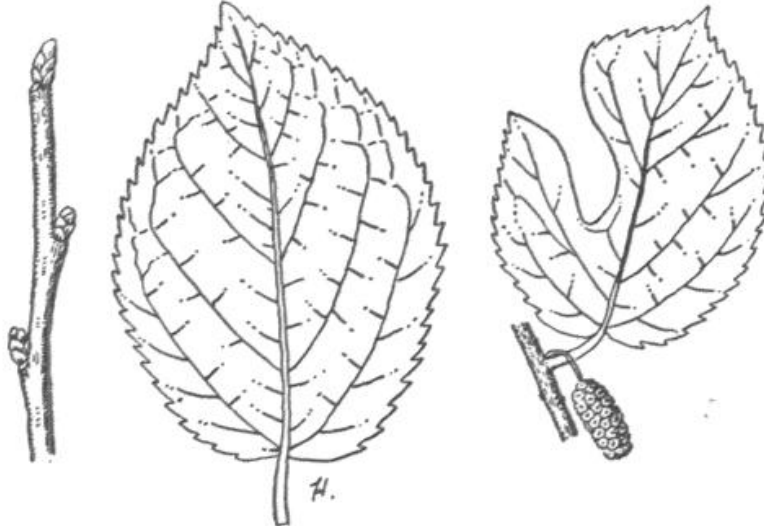
The **flowers** are inconspicuous, and the two kinds are borne on the same tree. They appear in April or May, and are of a creamy greenish color. The **fruit** is a round, somewhat oblong drupe, or berry, from one-quarter to one-third of an inch in diameter. It has a thin, purplish skin, and sweet, yellowish 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 scattered throughout the State. It was formerly more abundant, but never formed a large part of the forest. 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



RED MULBERRY

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

become naturalized. The red mulberry is a small tree, rarely 50 feet high and 2 feet in diameter, often growing in the shade of large 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.

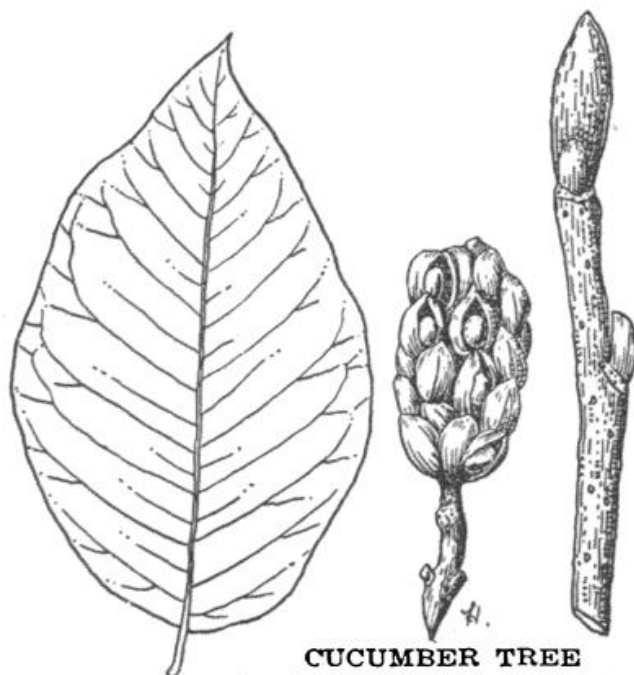
The **flowers** are of two kinds, on the same or different trees, in long drooping catkins, the female catkins shorter, appearing with the leaves. The **fruit** is dark red or black, and resembles a blackberry; however, a stalk extends through it centrally, and it is longer and narrower. The fruit is 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 westward throughout the State. 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 **y o u n g** 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.

UMBRELLA TREE (*Magnolia tripetala* L.)

THIS magnolia is more common in the State than its close relative the great-leaved magnolia, both of which occur more abundantly in the mountainous portions. A small-sized tree with large leaves crowded on the stem and sometimes used as umbrellas, the



umbrella tree has a straight or slightly inclined trunk, with a few large, often crooked, branches giving it an irregular-shaped head. The bark is thin, light gray, smooth, and roughened by irregular protruding portions.

UMBRELLA TREE
 Leaf, one-sixth natural size.
 Twig, three-fourths natural size.

The leaves vary from 14 to 22 inches long by 8 to

10 inches wide and are borne on stout stems. They are alternate, simple, narrowly pear shaped or ovate, pointed at both ends, smooth, and fall in the autumn with little change in color. The flowers are creamy white, ill-scented, cup shaped, with petals 6 to 9 inches long and mostly standing erect, and appear in May. A whorl of leaves usually surround the flower. The fruit is rose-colored when ripe, from 2 to 4 inches long, cylindrical or cone-shaped, consisting of small capsules each containing a red seed about one-half inch in length.

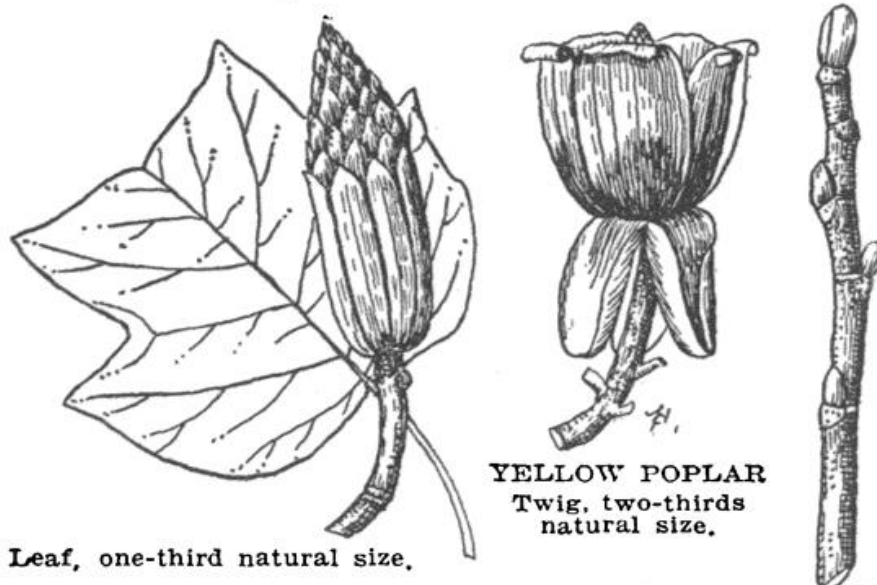
The wood is light, soft, close-grained, light brown in color, and without special uses.

The umbrella tree is considerably planted for ornamental purposes both in this country and in parts of Europe. The great-leaved magnolia has leaves from 20 to 30 inches long and fragrant flowers.

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.

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.

PAPAW (*Asimina triloba* Dunal.)

THE papaw, which grows as a small tree or large shrub, is very well known throughout the State, and sometimes called the "wild banana" tree. Most commonly it occurs as an undergrowth in the shade of larger trees. When growing alone, however, it



PAPAW

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

forms a pyramid-shaped top. The **bark** is thin, dark grayish brown, and smooth, or slightly fissured on old trees.

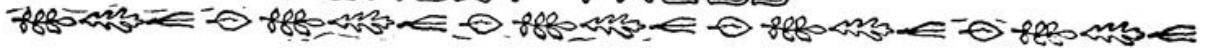
The **leaves** are alternate on the stem, pear-shaped, with pointed ends and tapering bases, smooth and light green above, from 8 to 10 inches long, and clustered toward the ends of the branches.

The dark-purple, attractive **flowers** appear with the leaves singly or in twos along the branch, measure nearly 2 inches across, and produce nectar which attracts the bees.

When thoroughly ripe, the **fruit** is delicious and nutritious. It measures from 3 to 5 inches in length, turns from greenish yellow to very dark brown in color, and holds rounded or elongated seeds which separate readily from the pulp.

The **wood** is light, soft or spongy, and weak, greenish to yellowish in color, and of no commercial importance.

Because of its handsome foliage, attractive flowers and curious fruit, the papaw has been much used in ornamental planting.



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 a common tree or shrub everywhere in Kentucky, 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 the trunk is



SASSAFRAS

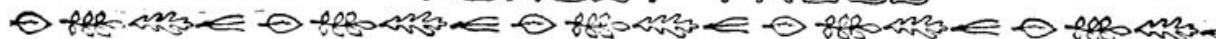
Twig, one-half natural size. Leaf, one-third natural size.

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 very common tree on flat lands in western Kentucky, and follows scattering along the rivers into the higher lands. It is usually abundant 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 give them a winged appearance.



SWEET GUM

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

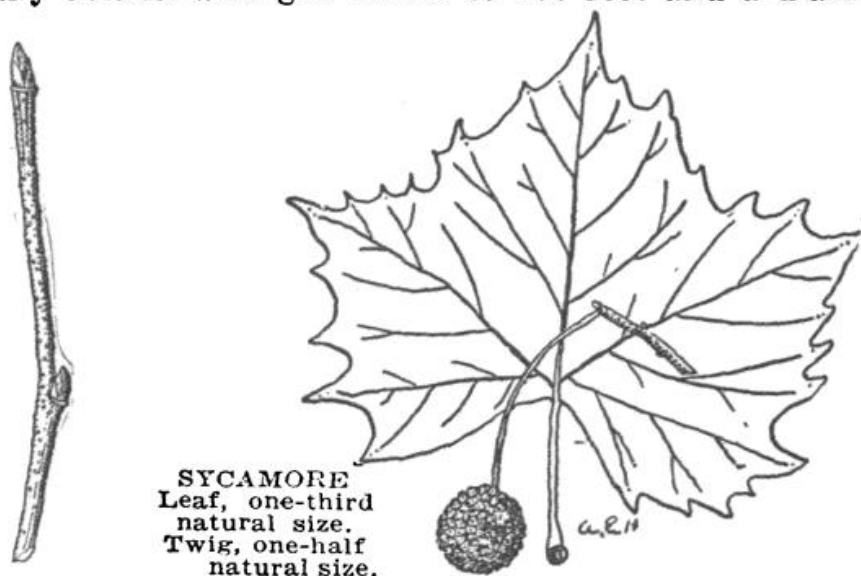
The simple, alternate star-shaped leaf, with its 5 to 7 points or lobes, is 5 to 7 inches across and very aromatic. In the fall its coloring is brilliant, ranging from pale yellow through orange and red to a deep bronze.

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. In the south, 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 diam-



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

eter 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-TREE, OR SERVICE-BERRY

(*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-TREE, OR SERVICE-BERRY

One-half natural size.

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

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

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

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

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



**HAWTHORN (Haw, White Haw, Red Haw,
Thorn Bush)** (*Crataegus* species.)

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



HAWTHORN
Two-thirds natural size.

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

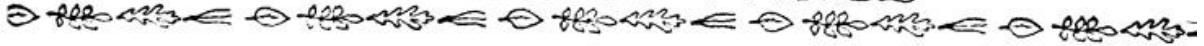
of little commercial value.

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

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

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

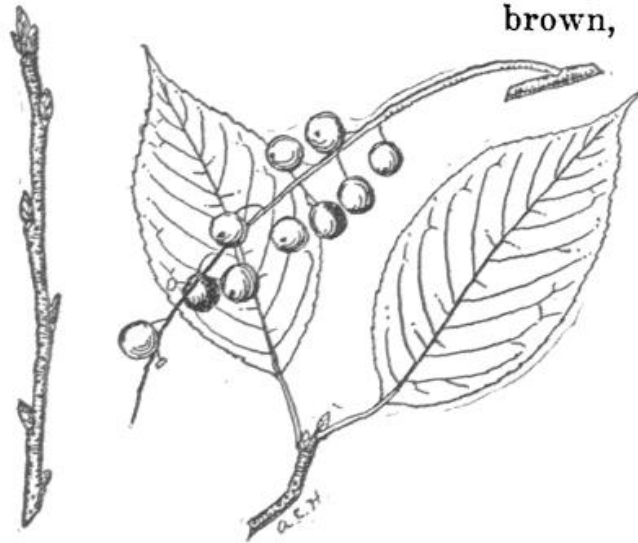
The **wood** is strong, tough, heavy, hard, but rarely used for any purpose.



BLACK CHERRY (Wild Cherry)

(*Prunus serotina* Erh.)

A common tree in Kentucky and attaining sizes up to about 70 feet in height and 1 to 3 feet in diameter, black cherry as a tree is at its best in the hills and 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



BLACK CHERRY

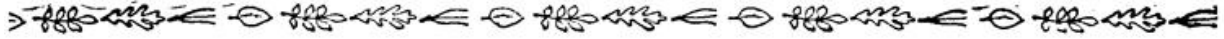
Twig, two-thirds natural size.
Leaf, one-third natural size.

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

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

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

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



WILD PLUM (*Prunus americana* March.)

THE common wild plum, or yellow plum, is a small tree which at a height usually of 3 to 6 feet divides into many spreading branches, often drooping at the ends. Not uncommonly it grows in thickets where it attains only large shrub size. The value of the tree lies in its fruit from which jelly and preserves are made and its handsome form and foliage, pure white fragrant flowers, and showy fruit which make it desirable for ornamental planting.



WILD PLUM
Three-quarters natural size.

The leaves are alternate, oval, pointed, sharply toothed (often doubly toothed) along the margin, thick and firm, 3 to 4 inches long by 1 to 2 inches wide, narrowed or rounded at the base, and prominently veined on both surfaces.

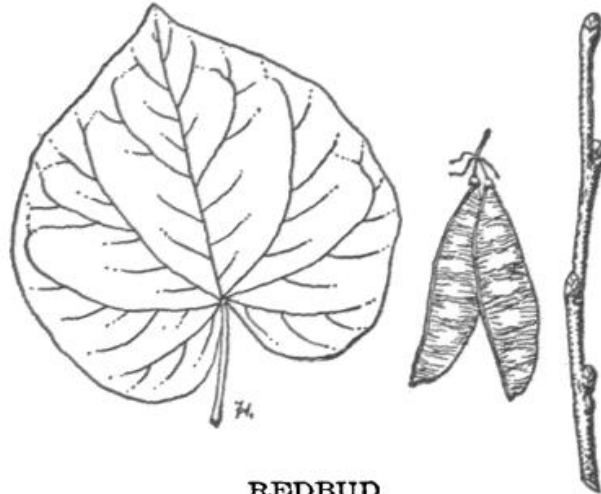
The flowers appear in numerous small clusters before or simultaneous with the leaves, and are white with small bright red portions in the center. With a profusion of flowers, this tree is one of the delights of early spring in the woods. The fruit, or plum, which ripens in late summer, is red or orange colored, about an inch in diameter, contains a stone or pit that is flattened and about as long as the pulpy part, and varies rather widely in its palatability. Horticulturists have selected and improved certain strains for cultivation.

The wood is heavy, hard, close grained, reddish brown in color and has no special commercial uses.

The wild goose, or river, plum also occurs over the State. Its leaves are smaller, narrower and more noticeably pointed.

REDBUD (*Cercis canadensis* L.)

THE redbud, sometimes called Judas-tree from its oriental relative of that name, is a small tree occurring under taller trees or on the borders of fields on hillsides and in valleys throughout the State. It ordinarily attains a height of 25 to 50



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

feet and a diameter of 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 numerous clusters along the twigs and small branches and appear before or with the leaves in early spring. With the redbud in its full glory, a drive through the country is likely to be one long remembered.

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

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

FOREST TREES

HONEY LOCUST (*Gleditsia triacanthos* L.)

THE honey locust occurs and is common throughout Kentucky except in the high 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 besides roads and fields. It reaches a diameter of 30 inches and a height of 75 feet. The **bark** on old trees is dark



HONEY LOCUST

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

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.

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.

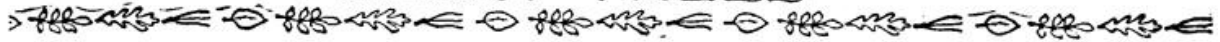


BLACK LOCUST

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

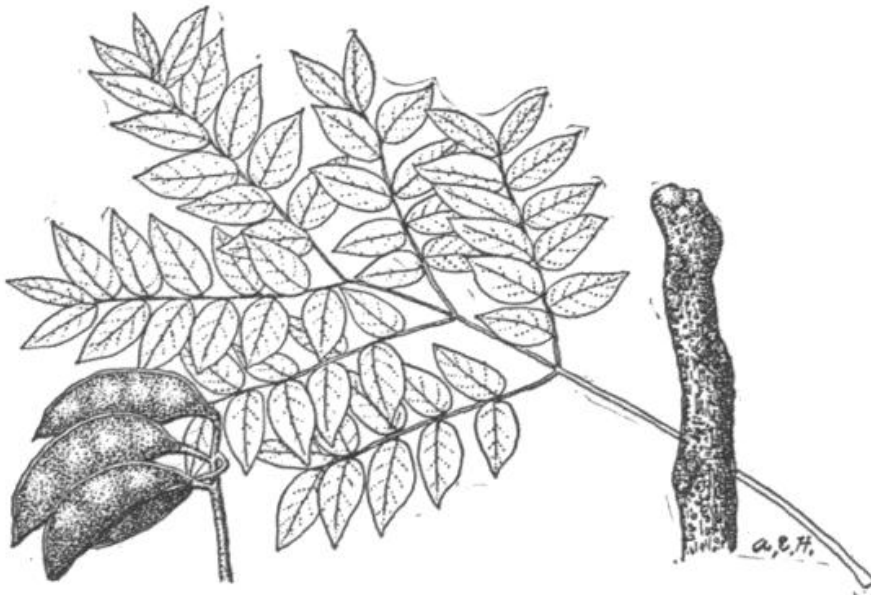
The fruit is a pod from 3 to 5 inches long containing 4 to 8 small hard seeds which ripen late in the fall. The pod splits open during the winter, discharging the seeds. Some seeds usually remain attached to each half of the pod, and this acts as a wing upon which the seeds are borne to considerable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



COFFEE TREE (Kentucky Coffee Tree)
(Gymnocladus dioicus K. Koch.)

THIS tree, a member of the pea or bean family (legumes) rises with a straight shaft and, in the open, is topped with a widespreading noticeably light or airy crown made up of graceful foliage evenly distributed. It is a well-known tree and found throughout the State. Because its seeds in early days were to some extent used as a substitute for coffee, it has become widely known by its present common name.



COFFEE TREE
 Leaf and fruit, one-eighth natural size.
 Twig, one-half natural size.

The **bark** is relatively thin, fissured, dark gray tinged with red, and roughened by numerous small scales.

The **leaves** are alternate, doubly compound with 5 to 9 pinnae (pairs of leaf branches) each having 6 to 14 smooth leaflets, generally ovate in shape. The complete leaf including the stem measures from 1 to 3 feet in length by 18 to 24 inches in width. The small **flowers** are borne in clusters, and each individual tree bears only male or female flowers, as the case may be. The **fruit** is a pod, borne several in a cluster. The pods measure from 4 to 10 inches in length, remain closed through the winter, and contain seeds about three-quarters of an inch across, separated by a thick layer of sweet pulp.

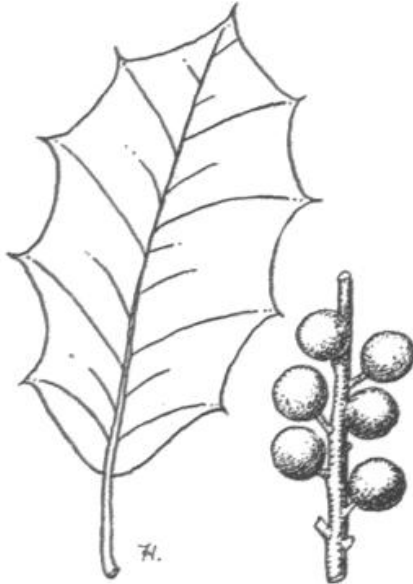
The wood is heavy, strong, coarse-grained, and durable in contact with the soil. It is occasionally used for cabinet work, and for posts and in general construction.



HOLLY (*Ilex opaca* Ait.)

THE holly is essentially a mountain tree but occurs sparingly scattered throughout the rest of the State. It prefers a rich moist soil, but in the mountains 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 a common and favorite tree in Kentucky. No other tree has so many pleasant associations of our youthful days. In the open it grows fairly rapid 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



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

is light gray and 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 reddish 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.

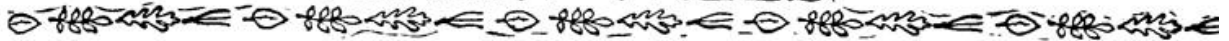


RED MAPLE
 Leaf, one-third natural size.
 Twig, one-half natural size.

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 some time before they open. The winter buds are small, red and round or blunt-pointed. The **fruit** ripens in late spring or early summer. It consists of pairs of winged seeds, or keys, one-half to 1 inch in length, on long drooping stems, red, reddish brown or yellow in color.

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



SILVER MAPLE (White Maple, Water Maple)
(*Acer saccharinum* L.)

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



SILVER MAPLE

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

stems is dark gray and broken into long flakes or scales on the young shoots; it is smooth and varies in color from reddish to a yellowish gray. The silver maple grows rapidly and has been much planted as a shade tree. Because of the brittleness of its wood, it is often damaged by summer storms and winter sleet.

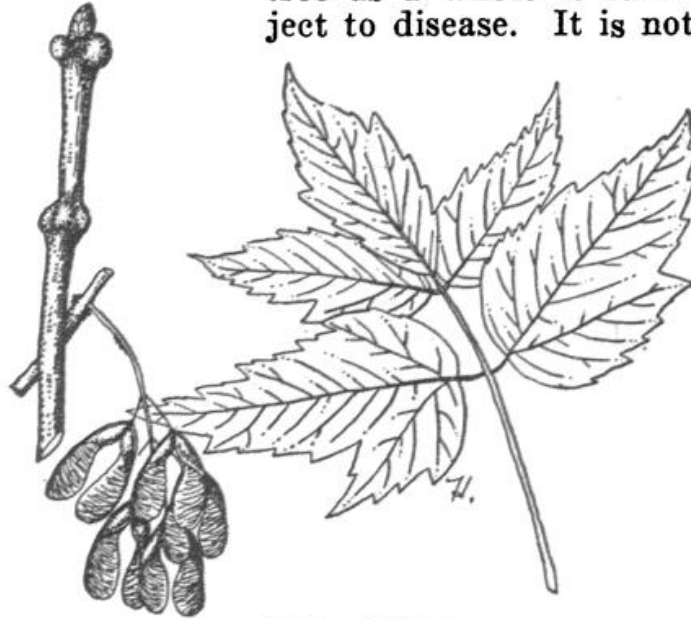
The **leaves** are opposite on the stem, have from 3 to 5 lobes ending in long points with toothed edges and are separated by deep angular sinuses or openings; they are pale green on the upper surface and silvery white underneath. The **buds** are rounded, red or reddish brown, blunt-pointed; generally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

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

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

BOX ELDER (Ash-Leaf Maple) (*Acer negundo* L.)

THE box elder is a fairly rapid growing tree, found commonly along streams rather generally over the State. It is a tree of medium size, rarely reaching over 24 inches in diameter and 60 to 70 feet in height. It has been considerably planted for shade because in good soil its growth is rapid. Its limbs and branches, however, are fragile, and the tree as a whole is rather subject to disease. It is not long-



BOX ELDER

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

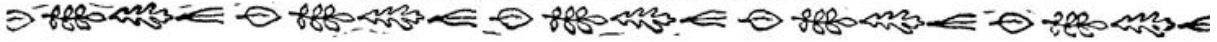
lived or generally satisfactory for any purpose. It is prolific in reproduction but is largely destroyed by grazing and cultivation.

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

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

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

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



OHIO BUCKEYE (Fetid Buckeye)
(*Aesculus glabra* Willd.)

A COMMON tree and well-known to every school boy. It reaches a height of 60 to 70 feet and a diameter of 18 to 24 inches, but forms no considerable part of the forest stand. The trunk is usually short, limby and knotty. It occurs on both rich and poor soil and is found also on very "glady" areas. The crown, or head, is generally open and made up of small spreading branches and twigs orange-brown to reddish brown in

color. The bark is light gray and, on



OHIO BUCKEYE

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

old trees, divided or broken into flat scales, which make the stem of the tree rough; the bark is ill-smelling when bruised.

The leaves are compound, or star-shaped, opposite on the stem, and generally like those of the yellow or sweet buckeye, though smaller and fetid or ill-smelling. They usually turn yellow in the summer and then fall off.

The flowers are cream-colored and appear in clusters, 5 to 8 inches long in April or May. The fruit is regularly rounded, pale brown, generally thin-walled, roughened with blunt prickles or warts, and, breaking into 2 or 3 valves, discloses the bright, shiny mahogany colored seeds, or nuts.

The wood is light, soft and weak, and decays rapidly when exposed. It is used for woodenware, artificial limbs, paper pulp, and for lumber and fuel.

The sweet or yellow buckeye (*Aesculus octandra* Marsh.) is a tree of the mountains. It has a smooth coat or hull around the nut or nuts.



BASSWOOD, OR LINN (*Tilia species*)

THE lindens, basswoods or linns, 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.



BASSWOOD, OR LINN
 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.

At least three species occur in Kentucky, the most common being *T. Americana*; others are the downy-leaf basswood (*T. michauxii* Nutt.) and white basswood (*T. heterophylla* Vent.)

DOGWOOD (*Cornus florida* L.)

THE dogwood, often referred to 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.



DOGWOOD

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

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 **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.

SOURWOOD (*Oxydendrum arboreum* DC.)

THE sourwood, a common tree in the mountains of Kentucky, is found scattered throughout the State on both rich and poor soil. 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.

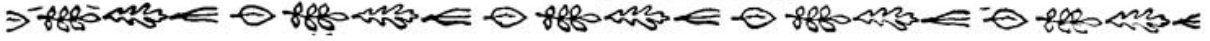
The **leaves** are from 2 to 5 inches long, simple, alternate, decidedly acid to the taste, often rough with solitary stiff hairs. They are a lustrous green on the upper surface, generally turning a deep crimson in the fall.

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. Canes are made of this wood and prized because of their color and durability.

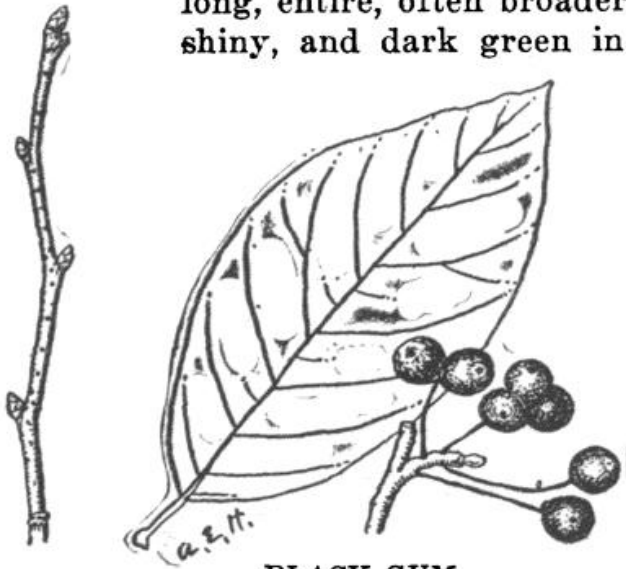
FOREST TREES



BLACK GUM (*Nyssa sylvatica* March.)

THE black gum, often called sour gum, is a common and attractive tree to Kentuckians. 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



BLACK GUM
One-half natural size.

fall the leaves turn a most brilliant red.

The **bark** on younger trees is furrowed between flat ridges, and gradually de-

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."

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. It seems to prefer dry, open situations, and is most abundant in old fields, though it occurs on rich bottom lands. The bark of old trees is almost black and separated

into thick nearly square blocks, much like the black gum.



PERSIMMON

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

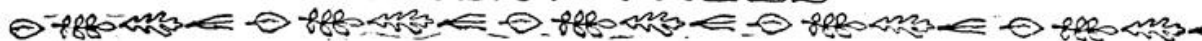
The leaves are alternate, oval, entire, 4 to 6 inches long, dark green and shining above, paler beneath.

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 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 heartwood 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.



WHITE ASH (*Fraxinus americana* L.)

THE white ash is found throughout the State, but grows to best advantage in the rich moist soils of the mountains and river bottom lands. The **bark** varies in color from a light gray to a gray-brown. The rather narrow ridges are separated with marked regularity by deep, diamond-shaped fissures.



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

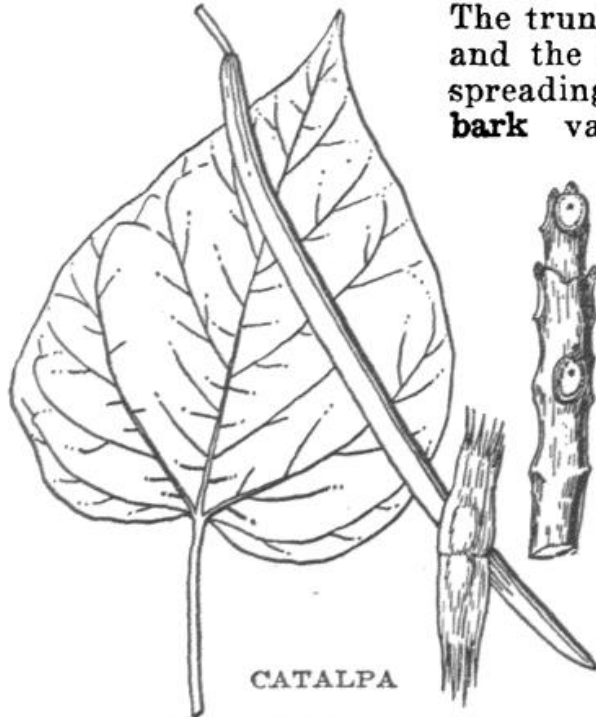
The **leaves** of the white ash are from 8 to 12 inches long and have from 5 to 9 plainly stalked, sharp-pointed leaflets, dark green and smooth above, pale green beneath. The ashes form the only group of trees in eastern America that have opposite, compound leaves with 5 or more leaflets. This fact 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.

The blue ash (*F. quadrangulata*, Michx.) is widely scattered, and especially found growing on poor soils, sometimes along with beech.

CATALPA (*Catalpa speciosa* Engelm.)

THIS tree, often miscalled "catawba," is native to the central Mississippi River basin, but has been widely planted and has spread somewhat farther as a result of cultivation. It is found native on bottomlands in the western part of the State. It is a medium-sized tree, usually not exceeding 40 to 50 feet in height and 12 to 15 inches in diameter.



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

The trunk is usually short and the head broad with spreading branches. The **bark** varies from dark gray to brown, slightly rough, being divided into narrow shallow strips or flakes. Because of its attractive flowers and conspicuous heart-shaped leaves, it is considerably used for shade and ornament.

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

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

The **wood** is rather soft, light, coarse-grained and durable in contact with the soil. It is used for fence posts, poles and fuel, and occasionally for railroad ties. It is a mistake to attempt to grow catalpa for fence posts or other uses except on good agricultural soil.

TREES

I think that I shall never see
A poem lovely as a tree.

A tree whose hungry mouth is prest
Against the earth's sweet flowing breast

A tree that looks at God all day
And lifts her leafy arms to pray.

A tree that may in summer wear
A nest of robins in her hair.

Upon whose bosom snow has lain:
Who intimately lives with rain.

Poems are made by fools like me,
But only God can make a tree.

JOYCE KILMER.
(Who gave his life in France)

The enemies of the forest are fire, indiscriminate cutting, insects, fungous diseases, over-grazing, wind, and sleet storms, but the worst of them all is Fire.

Protect the Forests From Fire!

Give Them a Chance to Grow!