COMMON TREES of OHIO

by

JOSEPH S. ILLICK

Presented to the Schools of Ohio
by the
Charles Lathrop Pack Forestry Trust

Published and Distributed
by
The American Tree Association
Washington, D. C.

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.

—*by Joyce Kilmer*

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In cooperation with Edmund Secrest,
State Forester of Ohio

A handy pocket manual of the
Common and Introduced
Trees of Ohio

Presented to the Schools of Ohio
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1927

"*If the Nation Saves the Trees*
The Trees will Save the Nation"

—CHARLES LATHROP PACK
President American Tree Association

With acknowledgment to the United States Forest Service for the use of 13 cuts, and to Edmund Secrest, State Forester of Ohio, and his colleagues for their helpful cooperation.

TEN COMMANDMENTS OF THE TRAIL

By HENRY WELLINGTON WACK, F. R. G. S.
(Copyright, 1926)

By Courtesy of Nature Magazine.

FIRST. Use the By-Ways—not the Highways.

SECOND. Don't go Walking to beg a Ride. The Auto-riding Hiker is a Fraud.

THIRD. Everything belongs to Somebody. Then respect all Private and Public Property. Be not the Author of its displacement, disfigurement or disappearance.

FOURTH. Keep off Prohibited Ground. Neither fish nor hunt on Posted Land. Trespassers create bad will toward Nature Lovers, Campers and Sportsmen.

FIFTH. Leave Gates, Fences, Signs, Stakes, growing grain and crops as you found them. Walk around, never across, all planted fields.

SIXTH. Pluck no wild flowers—they belong to all. Leave them for all to enjoy. Pick no cultivated Fruit. Resist the boyhood call of the Melon Patch!

SEVENTH. Clear away twigs, leaves and pine needles down to moist earth, before laying a Camp Fire one foot square. Keep cook fires low, and less than one-fifth the size of the clearing. Large fires prevent cooking, but destroy forests. Only small fires are safe, quick and comfortable to cook with. Put camp fires out with Water, not with a kick. See that the peat or humus around the fire is not burning underground to destroy the woodland after you have left. A single spark may fly a hundred feet and burn a million trees. Arson is no greater crime than stupidity or neglect on the Trail.

EIGHTH. Leave campsites clean: Burn all garbage; replace cut Firewood and Supplies found in camps. You are the Guest of an absent Host—not the vandal of a present opportunity. Leave a note of thanks in a wilderness shelter you have used. Put it in order before you depart.

NINTH. Silence, or speech in whispers, is the sign of trail experience and good woodmanship. Only fools and asses bray in a Forest.

TENTH. When you leave a beautiful Woodland or descend from a Mountain, stop, turn around, and gaze reverently awhile. Then thank God for the boon our Forests are to all Mankind. Treat Life's Trail responsibly and keep it clean. To the seeing eye and the generous soul, Nature's beauty—her mysteries and charm—forever call us to her Trails!

This handbook aims to open the pathway to the delightful study of trees, and to help fashion a right attitude toward the green and glorious out-of-doors. It was prepared to satisfy a growing demand, particularly among the young folks of this State, for interesting and helpful information about the common trees.

Each year a greater number ot boys and girls go out into the fields and forests to take part in some outdoor program of education. To be able to participate in such a wholesome and practical program of education is to enjoy one of the greatest educational privileges ever made available to the young folks of any land.

The inspirational and descriptive sections of this book are offered to its readers to study, because a true appreciation of trees and a correct working knowledge of them will go far to guarantee a sound program of forest conservation, one of the most vital economic problems now confronting the American people.

All the common trees native to this State and a number of introduced trees are described in this handbook. A few of the less common trees had to be omitted. Whoever becomes acquainted with the trees treated in this handbook will have a good working knowledge of the trees of the State and be prepared to appreciate their importance in everyday life.

FOREWORD

By CHARLES LATHROP PACK,
President of the American Tree Association
WASHINGTON, D. C.

ALL GOOD THINGS must be known to be appreciated. There are many things so common in our daily lives that we accept them with little thought. So much a part of our existence they are that they become, perhaps, little known and often less appreciated. Trees run this risk.

Shading us, protecting us, purifying our water supply, furnishing the homes that are built from them, providing the paper we use and serving us in thousands of ways, trees deserve to be known and to be appreciated. Without them existence would be worth little.

Our country is the greatest in the world. In wealth, in standards of living and in comforts it stands alone. Nature endowed it with boundless resources. We have taken this wealth and built a great nation. The trees in our forests have been our greatest resources: they have made possible what has been accomplished.

When our forefathers came to this vast land it was covered with nearly nine hundred million acres of forest. Today only one-fifth of this immense resource remains. A quarter of a billion acres of this original forest are growing young trees, many of little value. More than eighty million other acres whose destiny is to produce forests alone, are producing nothing. Of what remains to us of our forests, we are using four times as fast as we are allowing or helping Nature to replace.

That is the situation with our forest. One tree or one hundred trees do not make a forest. But one tree stands for the forest. We send one man to our Congress to speak for thousands. We can plant a tree in our dooryard and let it speak for millions.

This is the problem of today. It is a problem that the citizens of tomorrow will have brought home to them. They will need to know the trees to meet it.

This little book is the personal story of the trees that grow commonly in the soil of our State. It is the story of the trees whose forefathers peopled the great majority of the acres of our State. They are your trees; citizens of your State; companions of your life; servants of your comfort.

Knowledge of trees is more than a duty of good citizens. It is a joy to the one who has this knowledge. The tree is a

living thing. It grows as we grow. It pushes upward as we should push upward in life. It spreads its branches outward, as we should spread the branches of our minds, broadened by experience in life. The tree is a constant lesson to humanity,—a lesson in erectness, in courage, in dignity and in steadfastness. It serves us in thousands of material ways, so should we know it that it may serve us in human ways as a guide and a friend.

Throughout our great country our future citizens are everywhere widening their acquaintance with trees. Through various organizations, as well as the schools, they are discovering the happiness that this knowledge brings.

This little book will serve as a letter of introduction to the common trees in your yard, on your street, in the woodlot on the edge of the city and in the young forest beyond. You can use it freely and many times. It will give you the knowledge that leads to appreciation, and this will lead to enjoyment even beyond expectation.

A NOTICE

(A notice found nailed to a tree in one of the parks of Seville, Spain. Copied from the book "Spanish Sunshine," by Elinor Elsner.)

"To the Wayfarer—

Ye who pass by and would raise your hand against me
Harken ere you harm me!
I am the heat of your earth on the cold winter nights,
The friendly shade screening you from the summer sun.
My fruits are refreshing draughts,
Quenching your thirst as you journey on,
I am the beam that holds your house,
The board of your table,
The bed on which you lie,
And the timber that builds your boat,
I am the handle of your hoe,
The door of your homestead,
The wood of your cradle,
And the shell of your coffin.
I am the bread of kindness, and the flower of beauty.
Ye who pass by, listen to my prayer; harm me not."

TREES IN OHIO

BY

EDMUND SECREST
State Forester

THE tree in diversified ways probably contributes more to the welfare and happiness of mankind than any living plant. It has furnished the lumber for the construction of countless American homes and the furniture to make us comfortable. Every day as we go about our work and play we use almost countless articles and accessories made from wood which assists us in the performance of these activities.

The great forests which covered a large portion of America made possible in no small measure the prosperity with which we are blessed today. They provided a source of lumber, which has made our basic industry of agriculture the most prosperous of any on earth. It enabled the American farmer to build substantial buildings and equipment at small cost. The industry of lumbering itself is one of the largest, and the manufacture of products in which wood plays a part is almost as varied as the use of wood itself.

When the first white man came to Ohio, he was privileged to view one of the finest hardwood forests in the world. Nowhere did the white oak, the tulip poplar, the black walnut, the white elm, or the shellbark hickory grow larger or make better lumber than the ones that covered hill and dale in Ohio. Next to the soil the original forests of Ohio constituted its greatest natural asset, far outranking in potential value the combined mineral resources.

The forests which covered Ohio contributed in no small degree to the upbuilding of the soil, and this factor in itself had in great measure to do with their destruction in order to give way to the farms which furnish food for our people.

As soil conservers, the trees which clothe the mountains and hillsides render a distinct service to mankind. The tree roots and the litter on the forest floor check the soil from washing into the valleys below, thus preventing the filling of stream channels with silt and soil debris which in turn raises the level of the channels and accentuates the flooding of valleys. At the same time the forest prevents the sudden run-off of rain waters from steep slopes, for the leafy floor and porous soil absorbs more than the hard, bare ground and gives it off slowly to feed the woodland springs and small brooks.

But if trees have served to make us prosperous, and have contributed to our comforts and protection, they have again exerted a tremendous influence on our lives because of their aesthetic value. Who would want to live in a country without trees? How would the city or village street appear without its avenues of trees? Would your home be a home without the trees in the yard?

It is said that the city of Washington is the most beautiful in America. Yet the fine buildings would stand out cold and uninviting were it not for the fine trees that line the avenues and surround the buildings, framing them into beautiful pictures.

The crowning glory of the Ohio landscape is its trees. They are one with the topography in giving to our countryside the appeal that it has. Destroy the trees and you have destroyed the typical Ohio landscape.

From the time of spring, when life awakens, the tiny bud opens to unfold the delicate new leaf and the fruit buds its bloom and perfume—through the leafy bowers of summer to that delightful phenomena of autumn colors, and then into bleak winter, the trees of the woods hold a charm that makes men love them, and seek them for the many fine impulses they inspire.

It is in the winter when trees are unadorned that they often show their most interesting character. It is then that their form and habits of branching, bud formation, and the delicate variation in color of bark on trunk and branch stand out to best effect. To those who love the woods in winter, trees seem almost human in their individuality. There is a friendliness and a comradeship about trees on a bleak winter day. Perhaps it is the sheltering trunks, or the softly-spoken words of the wind through the branches. But it is there for you to discover and to admire. Anyway, the boy or girl who makes excursions into the deep woods in winter will soon learn to like them even better than in summer. Then, too, there is the delight of knowing trees in their winter condition. At that season they must be identified by their buds, bark, and general habit of growth. I hope every Ohio boy and girl will have the opportunity and inclination to know the trees and the wild woods intimately in winter, and at least learn the names of the common ones at that season.

Finally, for the sake of their service to our State, let every Ohio boy and girl resolve to do all in his or her power to prevent needless injury or destruction to trees or forests.

The virgin forests of Ohio have long since passed. Only a few small detached remnants remain to bespeak the glory of what was once the original landscape. We must now commence to rehabilitate our depleted woodlands by protecting that which we have from the agencies of destruction and by planting trees on lands whose primary use is for growing forests.

To our fathers the tree was a cumberer of the ground. To our children it will be one of the most valued of assets. Upon us who live in the present generation devolves the difficult task of breaking away from traditional habits of thought and action and adapting ourselves to new and radical different conceptions.

HISTORIC TREES OF OHIO

By EDMUND SECREST

State Forester

Logan Elm

Of all the trees in Ohio that are identified with history, the Logan Elm is the best known and perhaps the most beautiful. The trunk of the tree is 7 feet in diameter 6 feet above the ground. It is 70 feet in height, and the crown has a spread of 148 feet. The Logan Elm is still a vigorous tree, notwithstanding that a part of its top was blown off. The tree with a plot of ground of a few acres is now a State Park.

The Logan Elm was named in honor of the Indian, Logan, a chief of the Mingo tribe, whose character and personality were of unusual quality.

The tree gets its historic significance from the Dunmore-Indian war. Lord Dunmore, then Colonial Governor of Virginia, is supposed to have made a treaty with the Indians under the elm which was subsequently named in honor of Chief Logan. Another version is that Logan delivered his famous speech under the branches of this tree.

The Dunmore-Indian treaty was made in 1774, two years before the American Revolution, and had it not been for this treaty the western boundary of the Colonies at the close of the Revolution would probably have been the Allegheny Mountains.

The Logan Elm State Park is 6 miles south of Circleville in Pickaway County.

The McGuffy Elms

The McGuffy Elms, a fine row of trees extending across the north side of the campus of Ohio University at Athens, are said to have been planted by William McGuffy while he was president of that Institution. The row at present contains fifteen trees of a probable original number of forty-eight. They range in diameter from 24 to 40 inches, and are about 80 years old.

The trees commemorate the author of the famous series of school readers used generally a half century ago.

The Fort Ball Sycamore

This tree marks the site of Old Fort Ball, in Tiffin, Seneca County, built in 1813 by order of General William Henry Harrison. It is approximately 2½ feet in diameter, and 8 feet from the ground forms a double trunk. A tablet was erected at its base by the Dolly Todd Madison Chapter of Daughters of the American Revolution in 1926.

The Centennial Oak

This white oak was planted July 4, 1876, by the Woman's Suffrage Political Club of Newbury, Geauga County, one of the earliest organized clubs of its kind in America, to commemorate the organization.

It is a fine tree, about 16 inches in diameter and stands a half mile south of Punderson Pond, and twelve miles south of Chardon. A lead box was planted beneath its roots, containing a roster of those present, and the addresses of the speakers, numbered among whom was Frances Willard.

The Cary Oak

This tree is intimately related to the lives of Alice and Phœbe Cary, the famous Ohio authors. It was in 1832 when Alice was 12 years old, and Phœbe 8, that returning home from school one day they found a small tree which a farmer had grubbed up and thrown into the road. One of them picked it up and said to the other, "Let us plant it." As soon as said, these happy children ran to the opposite side of the road and with sticks they dug out the earth and planted the tree. It stands on the Hamilton-Cincinnati Pike just north of the Clover Nook Home for the Blind, at the entrance to the old Cary homestead. It was injured by a stroke of lightning in 1926, but was subsequently repaired by tree surgeons.

Leas Oak

Leas Oak (Quercus Leana) is a hybrid of the Shingle and Black Oak, and is interesting because it was the original tree from which the description of the hybrid was taken. This hybrid occurs throughout Ohio. It is a fine large tree, and stands in the city of Cincinnati.

The President's Grove

"The President's Grove" at Spiegel Grove, Fremont, Ohio, the home of former President Rutherford B. Hayes, and now a state park, is a grove of fine oaks and hickories of the original forest. A number of these trees have been named after former Presidents of the United States. They were christened by the former Presidents placing their hands on the trees at the various times they visited the home of President Hayes.

Colonel Webb Hayes, the son of President Hayes, expects to continue the naming of the trees at Spiegel Grove for the former Presidents of the United States.

The Author's Grove

The Author's Grove is located in Eden Park, Cincinnati, and it was here that the first Arbor Day as a school festival was celebrated. The trees in the grove were planted April 27, 1882, and from one to three, for each famous American author. A Red Oak dedicated to Emerson was set on the day of his death. There are six species of oaks, white ash, blue ash, sugar maple, Norway maple, catalpa, sweet gum, walnut and wild cherry in the grove.

There are other historical trees in Ohio which space will not permit of a description here.

The State Forester at Wooster makes the request that anyone who has information regarding historical trees or those of outstanding size will send the information to him.

Trees of unusual size and beauty in Ohio include the Caskey Elm in Oberlin, the Elyria Elm in the city park of Elyria, the Gunkel Locust in Dayton, the Chillicothe Bald Cypress with a circumference of 10 feet. The Rathburn Elm in Marietta, one of the largest trees in Ohio, is on No. 8 Highway, as it enters the city on the north.

Among some of the finest examples of the original forest of Ohio may be found in the Huston Woods near Oxford; Cedar Falls and Ash Cave State Forests Parks in Hocking County, and the woods of the Ohio State Sanatorium near Mt. Vernon. Unfortunately a number of the large trees of the Sanatorium woods were cut a few years ago.

* * * * * *

"Now the trees are sentient beings; they have thoughts and fancies; they stir with emotion; they converse together; they whisper or dream in the twilight; they struggle and wrestle with the storm."

JOHN BURROUGHS.

* * * * * *

"It is pleasant to walk over the beds of these fresh, crisp, and rustling leaves. How beautifully they go to their graves! How gently they lay themselves down and turn to mould, painted of a thousand hues, and fit to make the beds of us living."

HENRY DAVID THOREAU.

INVALUABLE TREATISE

By HON. VIC DONAHEY,
Governor of Ohio.

Every boy and girl in Ohio should study nature at first-hand.

No education is complete without an understanding of its "various languages."

There is a certain phase of this important subject to which I have called marked attention each year since I became Governor—it is that of trees and forests. Arbor Day, which is April 17th, has afforded me an opportunity to proclaim the necessity for vital interest in our trees. The occasion which might just as well have been called "Everybody-Plant-A-Tree Day" has served its purpose well but our schools should go much further than the mere observance of it.

A treatise which acquaints the school children of this commonwealth with common trees will prove invaluable. The lessons of youth are a lumination to the pathway of the adult. Let us inculcate in the minds of our boys and girls a love for their real friends—our trees.

WELFARE OF MANKIND

FROM childhood I have been interested in trees, their lessons and their beneficent contributions to the welfare of mankind. He who plants a tree renders a service to humanity. Long after the one who plants and nurtures it is gone, the tree refreshes by its shade or sustains by its fruit. Johnny Appleseed, who gathered apple seeds from the orchards of the East and carried them on his back into the remote forest fastnesses of Ohio and planted them, rendered a greater service to Ohio than many a statesman or military hero famed in the annals of history.

Tree planting is not entirely a vicarious service. As a boy, I helped plant shade trees that are now more than two feet in diameter, and for years I have enjoyed the annual harvest of fruit trees which I helped my father to plant. Father always urged the necessity of setting out fruit trees, and when he was 80 years old he planted cherry trees, the fruit of which he lived to enjoy and which is now being gratefully enjoyed by others.

Trees have personality—it is no mere metaphor to speak of the sturdy oak, the stately elm, the graceful maple, the drooping willow—all speak a voiceless tongue and kindle human hope and aspiration. A man can make a house, but it takes God to make a tree: what it took God a thousand years to build, man may hew down in an hour.

I saw through my childhood years a solid line of heavy dark woods on the farms across the way. I knew every tree that reared its head into the sky line, but one towered above them all like a giant—it was a

white oak—its every fiber strong because it had fought the tempests for centuries. One day the ax-man came. The titan of the forest was unafraid, for had he not seen the sons of men come and go in his mighty shadow for uncounted generations? The first strokes of the ax were almost unnoticed; as the chips cut deeper a tremor went through the giant's body, and then with a moan he went dashing to earth, leaving a lonesome place against the sky never to be filled again. Trees must be felled for the use of man, but let the forests not be unnecessarily infringed upon.

Our national parks and forest reserves should be carefully guarded and jealously protected. A land stripped of its trees is permanently impoverished. Denuded hillsides wash away in ruin. Treeless areas cause floods. Trees are living monuments. Planted in memory of our war heroes, they speak to us in solemn eloquence of battles fought and victories won.

Tree planting, tree study, tree preservation—all these are economically important, civically uplifting, and spiritually inspiring.

FRANK B. WILLIS,
United States Senator from Ohio.

OHIO'S FORMER FOREST

OHIO was at one time the center of the great hardwood forest of the United States, and now ranks third in consumption of hard wood lumber used in industry. The State has a land area of 26,073,600 acres. There the peak of lumber production was in 1899, with a cut of 990,497,000 board feet, while in 1924 it was 155,016,000 board feet. The once great forest has been removed, only scattering wood lots remain, and the present estimated forest area is 4,000,000 acres.

Following a study of forest conditions, I introduced a bill in the Senate providing for the establishment of a forest experiment station in the Ohio and Mississippi valleys. This bill became law on July 3, 1926, and organization now awaits an appropriation authorized in the measure.

SIMEON D. FESS,
United States Senator from Ohio

TREES

THE beauty and the safety of our landscape depends on trees—"barren" and "treeless" are almost synonymous, from both the standpoint of appearance and that of value. The tilled field should have no trees, but the successful drainage of most areas, upon which the fields depend, demands groves, and tree-lined watercourses, and, if there is much slope, even forests.

The attacks on our trees by insects and disease have discouraged planting somewhat, especially of the nut and fruit trees. These latter are particularly desirable, because they have value beyond shade, beauty, and the regulation of waterflow and land washing. The present situation

should lead us, on the one hand, to plant more trees to make good the losses, and on the other, to do more to protect them from enemies.

Some of this science—information on what planting will likely prove permanent, when to plant, and how to care and protect trees, is being given us by the American Tree Association. But the Association is especially eager that all our teachers and all the pupils in our schools shall have the desire to start and care for trees, and in some way act on the desire. This impulse will be strengthened if we know trees, the native trees especially, but also other trees in the parks and orchards.

To know nothing of trees marks an ignorant man or woman about as plainly as any other sort of ignorance. Fortunately it has become fashionable for persons to be interested both in nature and in America's resources. Knowledge of trees and their growth belongs in both of these lines of study.

W. B. BLISS,
Assistant Director,
Ohio Dept. of Education.

TREES ARE TRUEST FRIENDS

DO we study music in our schools because all of us intend to be musicians? Do we study art in our schools because all of us intend to be architects or artists? Do we not study these subjects that we may be the better able to understand and enjoy good music, and appreciate more thoroughly beautiful buildings and bridges and paintings?

It is the same with other things in life. The more we know about the things which fill our lives, either in our employment or our pleasure or our spiritual life, the more they mean to us and the more worth while they are. Trees are no exception. To know trees merely through the name-trees—not understanding their individual properties and qualities and characteristics—is to miss far more in our enjoyment of them than we realize.

This would be a sorry world without trees. They are the truest friends we have, for they are continually working and growing to make this world beautiful, healthy, productive and enjoyable. Take them away and the winds rage, the floods surge through the valleys, the rich top soil is lost, the streams dry up, game perishes, birds disappear, and industry ceases.

Without industry, civilization declines and nations disintegrate.

As loyal American citizens, we must do our duty not only in obeying the laws, but in helping to keep our land growing the wood necessary for its prosperity.

Our spiritual life is nurtured by the peace and rest which comes through the love of the trees, and from communion with nature in the woodland.

To know our trees as individuals, as distinct species and varieties, is to give us an added interest in them. This interesting booklet, published by the American Tree Association, offers this opportunity, and a careful study of its contents will do much to add beauty and usefulness to our lives.

MRS. W. W. MILAR,
Chairman, Division of Conservation
Ohio Federation of Women's Clubs.

THE WOODS

WHERE is the boy with spirit so low who upon hearing the name Robin Hood does not long to go to the woods; and where is the girl who upon hearing the name Gene Stratton Porter, does not wish to go out among the beauties of nature. There is only one way for boys and girls to satisfy this longing for the out-of-doors and that is to get ready, go out into the open, and there fill up on the many good things that nature holds ever ready to give to us.

The forest is much more than a grouping of trees. It is a complex community of living things. Associated with the trees are shrubs, wild flowers, ferns, fungi, mosses, and many other plants. And among this varied plant life live the birds, the deer, the rabbits, the snakes, the squirrels, and a long list of other animals. All these living things are a part of the forest. To know the forest fully means that we know these wonderful creatures of a great creation. Blessed is the boy and the girl who can go out into the woods and learn the many interesting and useful lessons that a woods environment makes available.

There is no better place for summer play than among the trees. A tree environment is the best place to seek adventure, to become handy and hard, to see beauty, to think quietly, to walk reverently, to become acquainted with trees, flowers, and ferns, and to study the feathered folks and their furred friends. But we cannot have these privileges unless we care for our forests. It is a sad story, but only too true, that the forests have been swept with haste from the face of the civilized world. Few original forests, except those out of reach, are now left.

It is time to begin a constructive occupancy of the earth. To exist as a Nation, to prosper as a State, and to live as a people, we must have forests. But to have them we must do our part in rebuilding the wrecked and wasted forest areas that now abound everywhere. Forest fires must be stopped. More and better trees must be produced. Existing forests must be handled more wisely. Idle forest land must be put to work. Unless these and many other necessary things are done, forest restoration will not move forward. Our forest slogan should be, "Let's have good forests and get them now." If you want to do an act of kindness—*Protect the Forests.* If you want to do an act of faith—*Plant Forest Trees.* If you want to prove that you are unselfish—*Devote Yourself to the Woods.*

THE TREES

TREES are much more than columns of wood that lift their heads toward the sky. They are living and friendly creatures of a great and wonderful creation. They are glorious nature-made objects, surpassed only by him who walks among them in living beauty and thinking grace. They are the earth's fairest cloak, designed primarily for a life of service and to broadcast happiness and bring comforts to the people of the earth.

The botanist tells us that "a tree is a woody perennial plant having a single main stem commonly exceeding 10 feet in height and usually devoid of branches below, but bearing a crown of branches and foliage at the summit." This may be a good descriptive definition of a tree, but it does not really tell us what trees are. To really know trees we must have a knowledge of more than the length of their trunk, the position of their crown, and the distinctive characteristics of their bark, branches, twigs, buds, leaves, flowers, fruit and other structural features. Trees are living things, and in their lives are more interesting and worthwhile lessons than in their structures. The lives of trees unfold to us beautiful messages and fashion an attitude of tree appreciation without which tree knowledge is soulless.

There is a human as well as a material side to trees. They do so many things that man doeth. To say that they breathe, eat, drink, grow, reproduce, work, and rest is naming only a few of their common functions. They have habits, possess peculiarities, and are adaptive to the environment in which they live. All these attributes place them among the most interesting living things on the face of the earth.

Many a time have I been impressed with the quiet and natural ways of trees and their clean and normal lives. It will ever be to our credit if we too can grow, live and give in the same quietness and naturalness. Then, too, they stand erect, reach high, root deep, and do many good deeds. In many ways the acts of trees are worthy patterns for all of us. If our lives give shelter, pleasantness, and relief as do the trees, they will bring blessings and comforts in growing abundance.

TREES ARE OUR FRIENDS

TREES LIVE TO GIVE. Whenever we look at a tree we should think it has some gifts for us. If the gifts are not wood or food, shade or shelter, they may be one of a long list of other good things we need in our everyday life. Trees are such commonplace things that we often overlook their full service to us. Let us pause just long enough to list a few of the things our tree friends do for us:

Trees make a great contribution to the world's beauty. They pay beauty dividends every day. No place is complete without them. A home without trees is charmless. A road without trees is shadeless. A park without trees is purposeless. A town without trees is cheerless. A country without trees is hopeless.

Trees give us shade and shelter. Beneath their friendly branches man has found refuge from the scorching sun and the angry winds. Today, as in ages past, man seeks the shade of friendly trees to write and enjoy what others have written. Some of the world's greatest thoughts were born in the soft shades of friendly trees. Wherever I see trees shading occupants of benches in our city parks as they shelter the lambs that gather at their feet in the pasture, I think of their friendliness.

Trees help purify the atmosphere. They give out enormous quantities of oxygen through the tiny openings in their leaves. In this way they help make and maintain the pure air we need to keep us alive.

Trees help supply us with wholesome water. The best drinking water comes from the springs that flow from tree-covered watersheds. The pure water that trickles out from among the roots of trees is a great factor in maintaining the health of our people.

Trees safeguard us against drought and protect us against raging floods. They increase the low water runoff in summer and decrease the high water runoff in early spring.

Trees feed, shelter, and give homes to the wild animals of the forest, particularly the birds.

Trees give us rich food. Every boy and girl remembers the delicious chestnuts, walnuts and hickory nuts gathered from trees. The cherries, apples, pears, and the tasty persimmons are also among our favorite fruits.

Trees enrich the soil. Their leaves, upon falling to the ground, are a big factor in maintaining the fertility of our soil. Tree-enriched soils make possible the production of many of the necessary crops of life.

Trees give us a wonderful environment for play. There is no better place to play and rest than among the trees. The lap of a tree is the most comfortable and attractive resting place on the face of the earth. Clean, outdoor play grounds make clean young hearts. The right use of leisure is as vital to good citizenship as the right use of toil.

Trees supply us with wood, which is one of the most necessary things of life. We use it every day. We cannot get along without it. It is essential to our welfare and our life.

Not all the good things that trees do for us have been listed. There are many other ways in which they help us. Enough benefits have been recorded, however, to convince every boy and girl and their teachers, that trees are truly among our best helpers and greatest benefactors.

WITHOUT TREES

WITHOUT TREES this would be a dreary and uncomfortable world. Trees are among nature's best gifts, but they are so common that we do not half appreciate their shade and beauty. We partake of their food and wood as a matter of course. Oft it is with trees as with friends; we do not appreciate their real value until we have lost them. What would we think and how would we feel if some powerful dragon would rush through our streets and about our countryside and over-night destroy all the trees. Then, as never before, would we think of their gifts and realize how intimately they serve us.

Without trees man would be without many indispensable things of life. Without trees the birds, squirrels, and many other wild folks would be homeless. Without trees many

of the choicest wild flowers and ferns would be without a sheltering canopy. Without trees the whole balance of nature would be destroyed and human life imperiled.

Man cannot get along without trees. Apart from their practical value, they make for better manhood and womanhood by inspiring cleaner thoughts and higher ideals. The spiritual value of loving them and being with them is beyond estimate. If we want to continue as a happy people and a prosperous nation we must see to it that we have plenty of thrifty and healthy trees. This is our civic and social duty. Treeless lands are as cheerless as creedless countries are hopeless.

THE PARTS OF A TREE

WHEN we look at a tree we can recognize in its makeup three principal parts. They are the roots, the stem, and the crown. The roots comprise that part of a tree that is usually found below the ground. Our common trees have two general type of root systems, namely, shallow-rooted and tap-rooted. Such trees as the spruces, the hemlocks, and the pines have roots that tend to spread and lie close to the ground. These shallow-rooted trees are, as a rule, not windfirm. Other trees, such as the hickories, the oaks, and the walnuts develop a long taproot. These trees are firmly anchored and rarely uprooted.

Roots have three main lines of work. They anchor the trees to the ground, absorb water from the soil, and transport water to the stem. Without roots, trees could not stand up, and without roots trees would starve for they supply water and food to the stem, branches, twigs, leaves, and other parts of the crown. The principal work of the big roots near the stem is to help the trees stand up, while the fine root hairs at the end of the rootlets are the ones that absorb the water from the soil.

The stem of a tree, also called trunk and bole, is the main axis extending from the roots to the crown, or to the tip in case of an unbranched stem. Tree stems show a wide range in form. They range from long to short, straight to crooked, and from erect to prostrate. An examination of a cross-section of a stem will show three principal parts—bark, wood, and pith. In the central part of the stem is the pith. About it is the wood, which in many trees can be divided into the darker heartwood and the lighter sapwood. Between the wood and the bark is a thin layer known as the cambium. This is the most vital part of a tree, for it is here that all new wood and bark are made. When a tree

is girdled, the ring of cambium is severed. This kills the tree, for the thin cambium layer is the life-giving part of the stem. The most valuable part of a forest tree is the stem, for in it is produced the wood that is used so extensively by man. The principal functions of the stem are (1) support of the tree crown; (2) transportation of food and water; and (3) storage of food. During the winter months considerable food is stored in the stem for use early in spring when growth starts.

The bark may be divided into two parts—the outer or dry bark, and the inner or living bark. The bark of some trees is very valuable. Some of their products are tannin, cork, dye, and other important commercial products. The bark is very helpful in identifying many of our common trees. The beech can always be recognized by its smooth gray bark, the shagbark hickory by its shaggy bark, and the paper birch by its white bark which peels off in thin papery scales. Other trees also have very distinctive features.

The crown of a tree is made up of many parts such as branches, twigs, buds, leaves, flowers, and fruit. The branches and twigs have many markings, such as lenticels (breathing pores), leaf-scars, and bundle-scars, which are helpful in recognizing trees. The buds of most trees are either opposite or alternate in their arrangement. They are among the best tree features to use for the identification of trees in winter. In summer the leaves have the most distinctive characteristics. In using them in tree identification work, it is helpful to classify them into four major groups: (1) those with opposite leaves; (2) those with alternate leaves; (3) those with simple leaves; and (4) those with compound leaves. If this simple classification method is followed, tree identification becomes easy and interesting.

THE FOOD OF TREES

WE KNOW that trees grow. They get bigger from year to year. In order that they can grow they must feed. The raw material out of which trees make their food comes from two sources—the soil and the air. The rootlets with their many small root-hairs absorb water and with it many food substances are held in solution. During the growing season there is a continuous flow of sap from the roots through the stem to the leaves, where it is converted into nutritious tree food. When the sunlight plays upon the granules of leaf green, tree food is manufactured. To make the food, water is brought from the stem through the leaf-stalks into the leaves. Then a complex chemical process takes

place. This is the reason why leaves have been called the laboratory of the trees. The principal product derived from this process, known by the technical name of photo-synthesis, is starch. As rapidly as the food is manufactured in the leaves, it makes its way down through the cells of the twigs, branches, and the stem. A continuous stream of nutritious sap is moving downward. The thin layer of cambium cells which encircle the tree then draws upon this food supply to build up new wood, bark, and other tree tissue. When there is an excess of food material it is stored in the roots, stems, branches, and twigs for later use.

It is interesting to know that in making the starch, oxygen is a by-product. This explains why it is healthy to have green growing plants about us in daytime. Leaves prepare food only in daytime, and their output is the greatest in full sunlight, and is almost negligible during dark nights. This is the reason why we find the most luxuriant tree growth in moist, sunny, and warm regions. It is also worth knowing that during the periods of the year when the leaves are not manufacturing food, the trees live upon a food supply stored up during the long and light days of summer time.

THE ENEMIES OF TREES

TREES have many enemies. They are fighting for their lives all the time. There are 200,000 known kinds of insects that attack trees. It is estimated that caterpillars, beetles, borers, and other insects cause a loss of one hundred million dollars every year. Birds help us a lot in holding the insects in check. But they cannot wage war unaided We must take a hand in this serious insect problem.

When we think of tree enemies we must not overlook tree diseases, such as blights, rusts, and rots. They too are a serious menace. These diseases affect the tree's health, just as human diseases affect our health. Not many years ago the chestnut was the foremost tree in many eastern states. Now middle-size to large chestnut trees are very scarce. There is a good reason for this. In 1904 the deadly chestnut blight was imported from China. In twenty years it travelled over practically the entire range of the chestnut, killing trees by the millions. So far no practical method of control has been found. As a result of its destructive work the chestnut tree is rapidly vanishing.

There are thousands of other tree diseases continuously at work holding back the growth of trees. And decay is always hard at work destroying the wood that the trees have built up. Trees must be kept strong and healthy so they can

throw off disease. To accomplish this we must keep our forests clean. Unless we do this we will pay an ever increasing price for lumber, and later on we will have no more forests to draw on.

The greatest enemy of our trees is fire. The carelessness of man is responsible for nearly all forest fires. With this in mind, let us consider a few of the things forest fires do.

1. Forest fires destroy the beauty of the woodlands.
2. They destroy animal and plant life.
3. They destroy tree seeds and seedlings that would grow into valuable stands of timber.
4. They kill an enormous number of promising young, middle-aged and old trees.
5. They consume large quantities of felled timber and other forest products.
6. They destroy the leaf litter on the forest floor.
7. They impoverish the forest soil. Many bare and sterile hillsides are the result of repeated forest fires.
8. Forest fires open the way for the destructive work of insects, fungi, erosion, floods, and drought.
9. They frequently destroy buildings, crops, and fences, and occasionally homes.
10. They may also be responsible for the loss of human lives.

There is no end to the damage forest fires do. They bring no good to anyone. In their wake we find waste and impoverishment. To prove our citizenship we must begin right now to battle this red foe.

Every boy and girl should become a tree protector, and it would be well for the grown-ups to turn a heedful ear to the lessons of forest protection. If we want to continue as a nation of wood users we must become a nation of wood growers. To do this effectively we must wage a constant warfare against the foes of our friends—the trees. PREVENT FOREST FIRES—IT PAYS is a slogan that should be repeated over and over again until it becomes a household word, for everybody loses when our forests burn.

WHAT FORESTRY IS

FORESTRY is the art of handling forest land in such a way that it will be of the greatest service to man. This implies a good working knowledge of forest trees, for they are the principal members in the make-up of the forest. A

correct working knowledge of trees will go far to guarantee a sound program of forest conservation, which is one of the most vital problems confronting the people of our state.

WHEN TREES GROW

MOST PEOPLE believe that trees grow from early spring when the leaves begin to come out until the first frost when they start to show their autumn color. That this widespread belief is not correct is now known. For instance in the latitude of southern Pennsylvania the native forest trees make 90 per cent of their height growth in 40 days of spring and early summer.

Not all trees begin to grow at the same time. Some begin early in spring, while others delay starting their growth until late April or early May. The Wild Black Cherry starts about the first of April, while the Tulip Tree or Yellow Poplar does not begin until late in April, and the Norway Spruce waits until early in May. The fact that the different trees start their growth at different times may not seem strange, but where is the person who is not amazed to learn that the Sweet Buckeye has its whole height growth for the season completed in some regions by the tenth of May. For ten years the author has watched different specimens of this tree in Pennsylvania, and with no single exception all the height growth for the year was finished by May 10. This means that the height growth took place in 35 days in springtime.

An even greater revelation of this growth study was the fact that growth takes place by leaps and bounds. Periods of rest often occur between periods of growth. These rest periods may be long or they may be short. In this respect trees are not different from boys and girls who are willing to have long rest periods scattered freely among their working hours.

Several years ago, the author tagged a chestnut oak tree and measured its growth carefully. It began growing on April 17, and grew regularly until May 23. Then it began a rest period of 32 days. On June 24 it started to grow again and continued until July 13. If you figure out this tree's height growth you will find that at the beginning of the season it grew for 36 days, then rested for 32 days, and thereafter grew again for 20 days. During the first growth period it grew 10 inches—an average of about one-third of an inch per day, and during the second period 13½ inches—an average of more than three-fifths of an inch per day.

This was one of the most interesting tree studies ever undertaken by the writer of this handbook. He hopes that many boys and girls will continue this study and help add to our tree knowledge.

DO TREES BREATHE?

THAT TREES BREATHE is a firmly established scientific fact. Year after year, during night and day, in summer and in winter, trees inhale oxygen and exhale carbon dioxide. Trees breathe from the time they are seeds until they die.

The leaves are often called the lungs of a tree. It is true most of the oxygen enters through little openings on the leaves. Most of these tiny openings are on the lower leaf surfaces. They have been given the technical name of *stomata*. On the leaves of some trees there have been counted as many as 100,000 openings on a square inch. These little doorways open to let in oxygen and to let out carbon dioxide. During the day trees also take in carbon dioxide and give off oxygen through the small leaf openings. This is a part of the process of food manufacture known under the scientific name of photosynthesis. Not all the oxygen is inhaled through the leaves, for some is taken in through little openings on the twigs known as lenticels. They can readily be recognized as pale to brown dots. On some trees, such as the birches, cherries, and sumacs, they are large and easily visible to the naked eye, while in other trees they are small and obscure.

Trees also transpire, that is, give off water. We may call it perspiring or "sweating." When an excess amount of water is delivered to the leaves it is given off through small stomata, the same openings through which the trees breathe. This excess water is given off as an invisible vapor. Scientists have estimated that a big oak may transpire as much as 150 gallons of water during a single day of summer.

HOW TO TELL THE AGE OF TREES

SOME TREES reach a great size and become very old, while others remain small and die young. A definite age limit cannot be set for each kind of tree, but for general use our common trees may be said to be long-lived or short-lived. Of our native trees, the White Oak, Button-wood, White Pine, and Hemlock are long-lived trees, and the Poplars, Willows, some Cherries, and a few Oaks are short-lived. Some of the Sequoias of California exceed the 3,000-year

mark, and the big Cypress Tree of Tule growing in the state of Oaxaca, Mexico, has been estimated from 4,500 to 5,000 years, and is sometimes spoken of as "the oldest living thing in the World."

It is not always easy to tell the age of a tree. Sometimes accurate written records are available. In other cases it may be possible to get a reliable verbal statement from one who knows exactly when a specific tree or a group of them was planted. In the absence of accurate records or reliable statements, the best way to tell the age of a tree is to count the annual rings on the cross section of the stem near the ground, and add to this count the number of years it took the tree to grow to the height at which the count was made. In case of a felled tree, the stump section is a good place to make the count. The number of rings on the top section, plus the number of years it took the tree to grow to the height of the stump, gives the total age of the tree, for each ring usually represents a year's growth. To determine the age of standing trees an instrument is in use known as an increment borer. By means of this borer a small core about ⅛ of an inch in diameter is taken from the stem, and rings thereon are counted. The results furnish a good basis for estimating the age of trees. It has proved very valuable to foresters in studying the growth of standing forest trees.

There is another method that is helpful in telling the age of such trees as White Pine, which develop their lateral branches in distinct whorls or stories one above another. The distance between these whorls of branches normally represents a year's growth. If the branches have fallen off or been removed, one can often see the circle of branch scars on the stems. By counting the number of sections between these separate stories of branches one can estimate very closely the age of the trees in question. The age of young hardwood trees can also be told by counting the rings of terminal bud-scale scars upon the twigs and the slender stems. The portion of the twigs from the tip to the first ring of bud-scale scars is one year's growth. The distance between the first and second rings is another year, and so on as far down the stem as these scars remain visible.

Telling the age of trees is fascinating pastime. After you have been successful in telling the age of a few trees you will find yourself questioning the age of others. You will not have gone far in your study of the age of trees until you will be convinced that the age of young trees like that of children is far more easy to tell than that of grown-up trees.

WHERE TO STUDY TREES

THE best place to study trees is right where you are—if a tree happens to be near. If you are in a city and it is not convenient for you to go out into the woods, you can study the trees on the home grounds, along the streets, or in the parks. Do not forget to get acquainted with the tree that may stand near your front door. Other satisfactory places are fence rows, stream banks, waste places, abandoned fields, and woodlots. But the best place of all to get an acquaintance with trees is out in the great forest stretches on the mountain tops and in mountain valleys. Out there the trees are so plentiful and look so natural.

Then too we must not forget that many trees have been planted in all parts of the State. Among these planted trees are some very rare and interesting specimens. They can be found on private estates, public parks, arboretums, and forest plantations. A real tree treat is available to those who will journey to these great tree places.

Each year an increasing number of people go a-camping. When in camp one has unexcelled opportunities to study the native trees. The author has visited many places in Massachusetts. At each were found from 40 to 75 different native trees, and at some a considerable number of introduced trees have been planted. To name and list the trees on and about the camp ground is not only a pleasant pastime but also a profitable undertaking. Rich, indeed, is the boy or girl who can say "I can name all the trees about our camp." "I have named and listed all the trees between Oak lane and Cedarville," "Shoemaker's island is a tree paradise—I found 57 different species there." To know all the trees on a particular plot of ground is an achievement of merit for any boy or girl, and even grown-up folk who can name the trees that help to make our land so beautiful, have a right to feel proud of their accomplishment.

* * * * * *

"Under this oak I love to sit and hear all the things which its leaves have to tell. No printed leaves have more treasures in history or of literature to those who know how to listen."

HENRY WARD BEECHER.

HOW TO STUDY TREES

THE FIRST THING one usually wants to know about a tree is its name. Each tree has two kinds of names—the common name and the scientific name. One of our best known trees has the common name of WHITE OAK. Its scientific name is *Quercus alba.* Some trees have five to ten or more common names. Whoever knows the common and scientific names of a tree has mastered the first step in tree identification.

There are a number of common ways to get acquainted with trees. Some students are fortunate enough to have good teachers who know the trees. When this is true, tree identification is very easy. But there are other less fortunate ones who must study them from books. The study of trees is one of the purest delights of outdoor life. It is so pleasant, so fascinating, and so stimulating that it becomes a pastime of rare delight. To know trees is to love and protect them. In teaching our boys and girls about trees we will place in their possession an unafraid attitude towards the out-of-doors and thus instil into them the duty of preserving tree homes for our cheery bird friends "Whose habitations in the treetops e'en are half-way houses on the road to Heaven."

Fortunate are the boys and the girls who can tell the names of trees, know the quality of their fruit, the fragrance of their flowers, the form of their leaves, the flavor of their twigs, the color of the bark, and the properties of their wood; especially whether the wood is tough or brittle, easy or hard to chop and split into firewood.

* * * * * *

"He that planteth a tree is a servant of God. He provideth a kindness for many generations, and faces that he hath not seen shall bless him."

HENRY VAN DYKE.

* * * * * *

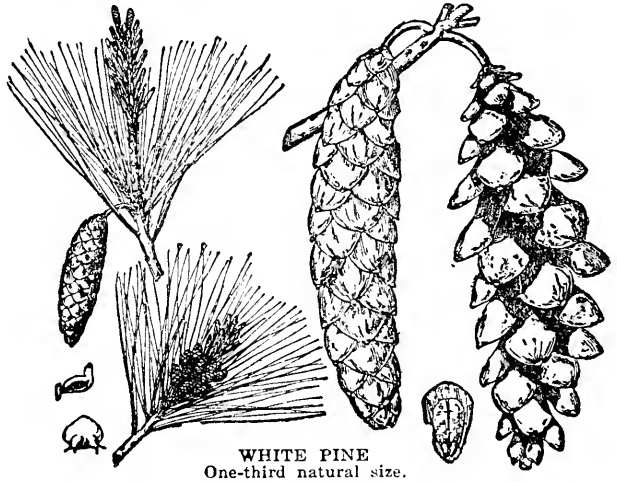
"I have written many verses, but the best poems I have produced are the trees I planted on the hillside."

OLIVER WENDELL HOLMES.

WHITE PINE

Pinus Strobus, Linnaeus

THERE is no tree in the World that surpasses the White Pine in beauty, stateliness, individuality, and usefulness. Reliable records show that the first American house was built of White Pine.



WHITE PINE
One-third natural size.

It is the only evergreen tree native to eastern North America that has soft, slender, flexible, straight, bluish-green leaves grouped in clusters of five. They are 3 to 5 inches long, and persist for 2 years.

The cones are 5 to 10 inches long, short-stalked, narrowly cylindrical, rarely hang long on the trees. The cone-scales are thin, flat, and without prickles.

The trunk is straight, when grown in dense stands is clear of branches for many feet. The lateral branches occur in whorls of 3 to 7, arranged in horizontal layers. Upon falling they leave distinct circles of branch-scars.

The wood is soft, light brown, straight-grained, easily worked. It is used for a wider range of purposes than any other American wood.

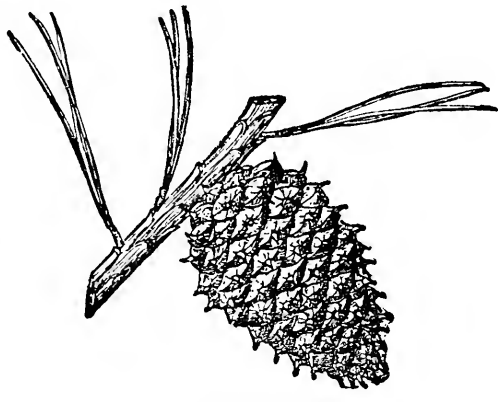
The White Pine is native only to eastern North America. It is found from Newfoundland west to Manitoba and Minnesota, southward to Pennsylvania and Illinois, and along the mountains to Georgia. It is native only to a limited part of northern Ohio, being most abundant on the headwaters of Mohican river. It is reported from Erie, Lake, Cuyahoga, Geauga, Ashtabula, Ashland, Licking, Belmont, Washington, and Jefferson counties. It has also been planted extensively for ornamental and windbreak purposes. Moist, well-drained soils are its favorite home. White Pine is the most important forest tree in eastern North America, and probably in the World.

PITCH PINE

Pinus rigida, Miller

PITCH PINE has more common names than any other eastern pine. Some of them are Jack Pine, Hard Pine, Yellow Pine, Nigger Pine and Black Pine. In pioneer days it was called Torch Pine and Candlewood Pine because the early settlers used pine knots from this tree for torches in their cabins and for traveling out-of-doors at night.

The leaves are 3 to 5 inches long, rather rigid, and occur in bundles of three. Sometimes two needles occur in a bundle. It is the only Eastern pine that produces dense mats of needles along the main stem. This unusual growth is often seen on open-grown specimens.



PITCH PINE
One-half natural size.

The cones are egg-shaped, 2 to 3½ inches long, sometimes occur in clusters and persist for many years. Trees loaded with thousands of cones are common.

The bark is reddish-brown to black and breaks up into irregular plates which peel off in thin scales. It becomes thick early, which makes this tree the most fire-resistant evergreen in eastern North America. The twigs are golden brown, angled in cross-section, stout, brittle. The crown is usually irregular in outline and ragged in appearance.

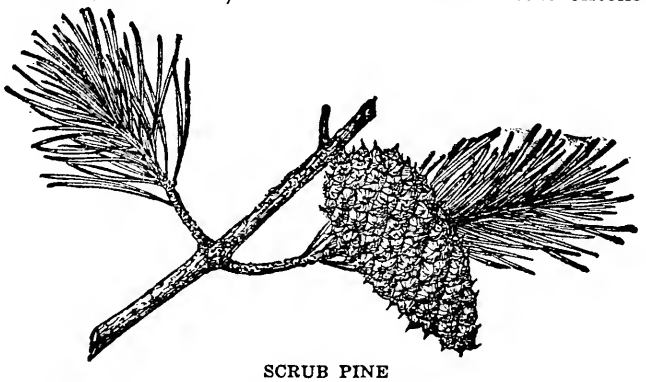
The wood is rather brittle, coarse grained, pale brownish-red with wide sapwood. It is used for railroad ties, mine timbers and general construction work.

Pitch Pine is found from New Brunswick to Lake Ontario and south to Virginia and along the mountains to Georgia. In Ohio this tree is confined to the sandstone region in the southeastern part of the State. It is reported from 13 counties in this section of Ohio. It is usually found on dry, shaly soils on upper slopes and ridges. It is an ordinary tree, rarely exceeding 70 feet in height and 2½ feet in diameter and well adapted to mountain soils. On exposed and windswept places it is usually small and stunted. It deserves good care and protection, for it produces a fair grade of wood, reseeds abandoned fields, and adapts itself to thin and dry soils.

SCRUB PINE

Pinus virginiana, Miller

THE Scrub Pine is a pioneer tree. It is among the first trees to march out and reclaim abandoned fields and other waste places. It is unfortunate in its common name, which implies that it is inferior and undesirable. This is incorrect, for each year its wood is used more extensvely



SCRUB PINE
One-half natural size.

for pulp, shipping crates, and general construction work, and locally it is used as a Christmas tree.

The leaves occur in pairs. They are 1½ to 3 inches long, twisted, spread widely from each other. No other Ohio pine has such short, twisted, widely spread and uniformly distributed leaves.

The cones are narrow, conical, sharp-pointed, 2 to 3 inches long, persist for several years. The cone-scales bear slender prickles.

The twigs are smooth, purplish, tough, usually wavy. On older trunks the bark peels off in thin scales, giving a ragged appearance. It is smoother and redder than that of any other native Ohio pine.

The Scrub Pine is found from southeastern New York, northern New Jersey, north-central Pennsylvania and southeastern Ohio, south to Georgia and Alabama and west to Indiana and Texas. This tree is confined to the unglaciated section of southeastern Ohio, where it locally occurs in pure stands. This tree prefers the rolling uplands between the mountains and the lowlands. In Ohio it is common on ridges and lower slopes with southern and western exposure.

This tree does not become a forest giant. It usually reaches a height of 30 to 40 feet and a diameter of 18 inches. The largest specimen found in the northern part of its range was 82 feet high and 28 inches in diameter at breast-high.

SHORT-LEAF PINE

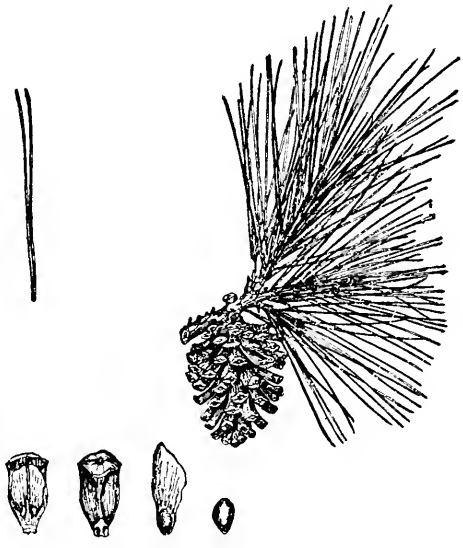
Pinus echinata, Miller

THE Short-leaf Pine, also called Yellow Pine and Hard Pine, is one of the most important trees of the South, extending northward to New Jersey, Pennsylvania, and southeastern Ohio.

The needle-like leaves are slender, flexible, dark-bluish green, 3 to 4 inches long, usually in clusters of 2 or 3, sometimes 4. They persist for 2 to 5 years.

The cones are short-stalked, conical when closed, oval when open, about 2 inches long. Cone-scales are armed with weak prickles.

The bark is reddish-brown, ¾ to 1 inch thick, divides into larger rectangular plates which peel off in film-like scales. The twigs are pale to purplish-brown and circular in cross-section.



SHORT-LEAF PINE

The wood is moderately hard, strong, resinous, yellowish to dark brown. It is used in general construction, manufactured into lumber, boxes, crates and other containers, also mine ties and mine props.

The Short-Leaf Pine ranges from central Pennsylvania, southeastern New York through New Jersey to Florida, west to Kansas and southeastern Texas. It occurs locally in southeastern Ohio, being most abundant in Scioto County. It is a promising tree for reforesting the worn out and abandoned fields within its natural range in Ohio. It has a better form and produces higher quality wood than Pitch Pine. Under favorable conditions it reaches a height of 100 feet, a diameter of 3 feet, and produces clean stems with little taper, which are often as "straight as a gun barrel."

OTHER OHIO PINES

RED PINE—Pinus resinosa, Aiton—also called Norway Pine, is native to the Northwoods. It is at its best in the northern portions of the Lake States, New York, northern New England, and in southern Canada eastward from western Ontario. It is not native in Ohio, nor has it been extensively planted for ornamental purposes. During the past 15 years it has been planted in all parts of the State. Only within recent years has it attained the merit it deserves for forest planting.

The Red Pine may be distinguished by the reddish-brown bark, divided into irregular plates and ridges which flake off in scales. The leaves are slender, occur in clusters of two, and are from 4 to 6 inches long. The cones are about two inches long. No prickles are present on the cone-scales. The trunks grow straight and the wood is fairly heavy, hard and strong, and is used for many purposes for which White Pine is used. The Red Pine grows rapidly, is relatively free from attacks of insects and diseases, and will thrive on a wide range of soils. It is also well adapted for ornamental uses and shelter belts.

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The Scotch Pine—Pinus sylvestris, Linnaeus—a native of Europe, has been planted extensively in Ohio. Large trees occur locally, which were planted many years ago for ornamental and shelter belt purposes. During the past 15 years Scotch Pine has been planted for forestry purposes in all sections of the State. The oldest forest plantation was planted in Fulton county in 1884. When 33 years old the trees averaged 8 inches in diameter and 60 feet in height.

The Scotch Pine can be distinguished from other Ohio pines by its reddish bark on the upper third of the mature stems, and its bluish-green needles which occur in 2's and are 2½ to 3½ inches long. Its conical, often lopsided, 1½ to 2½-inch long cones, which usually point backward, are also distinctive. This tree is easy to plant, grows rapidly, yields good wood, and is sometimes used as a Christmas tree. The tendency to form crooked trunks is the greatest drawback to the use of Scotch Pine for forest planting in Ohio.

AMERICAN LARCH

Larix laricina (Du Roi) Koch

THE American Larch, also called Tamarack, is a northern tree. It stands out prominently among its associates because it sheds all of its leaves in autumn.

The leaves are flat, soft, slender and about one inch long. On the twigs of last season's growth they occur singly; on the spurs of older twigs they occur in clusters of ten or more.

The cones are among the smallest of any American tree. They average two-fifths of an inch in length, bear about 12 scales, and often persist for many years.

The glossy brown twigs are without foliage in winter and covered with numerous stubby spurs. The bark on older trunks is reddish-brown and breaks up into small roundish scales.

The wood is heavy, hard, and durable in contact with the soil. It is used for posts, poles, ties, and in ship building.

AMERICAN LARCH
One-half natural size.

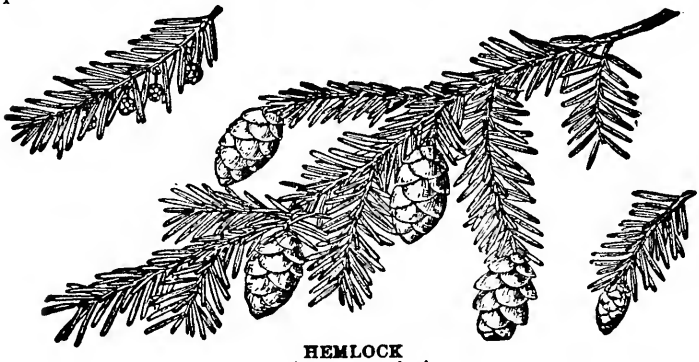
The American Larch is found from Newfoundland south to northern New Jersey and Pennsylvania and west to Minnesota and through British Columbia to Alaska. It occurs in swamps and other wet places locally in the northern part of Ohio. It is most common along borders of glacial lakes and swamps in Summit, Portage and Stark counties. It rarely exceeds 50 feet in height and 2 feet in diameter. Wet places are its favorite home.

The European Larch (Larix decidua Mill.) has been planted rather widely in Ohio. The latter has larger and usually erect cones, stouter and yellower twigs, and longer and more abundant leaves.

HEMLOCK

Tsuga canadensis, (L.) Carriere

THE Hemlock, also called Spruce Pine and Hemlock Spruce, is an important forest tree with a very pleasing and graceful appearance. As an ornamental tree it has few equals and as a timber tree it stands in the front rank.



HEMLOCK
One-half natural size.

The leaves are flat, ½ of an inch long, rounded or notched at apex, dark green and glossy above, with two white lines on lower surface, joined to the twigs by short and slender woody stalks. They are spirally arranged, but appear as if arranged in two flat rows alongside the twigs. A third row of small leaves point forward on the top of the twigs.

The cones are oblong, light brown, ¾ of an inch long, short-stalked. They often persist throughout the winter. The cone-scales are about as wide as long.

The outer bark is reddish-brown and scaly; the inner is cinnamon red. If one takes a pocket-knife and bores into the inner bark and finds it cinnamon red he has a positive distinguishing characteristic of this tree. The twigs are very slender, grayish-brown, at first hairy, and rough when needle-leaves are shed.

The wood is hard, weak, brittle, liable to splinter and difficult to work. It is used for coarse lumber, boxes, crates and pulp, and the bark is rich in tannin.

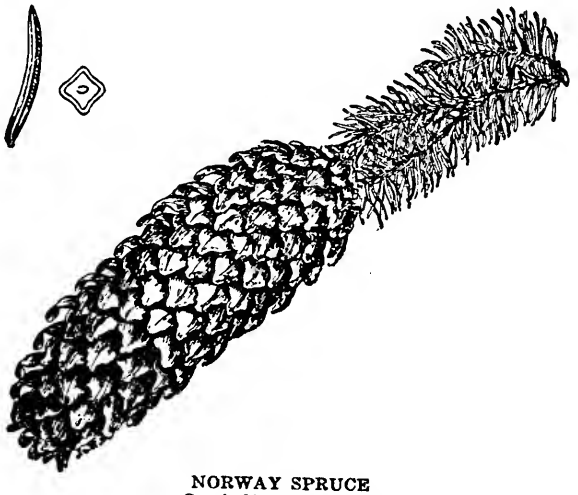
The Hemlock is found from Nova Scotia to Minnesota and south to New Jersey, Pennsylvania and eastern Ohio, and along the mountains to Alabama. This tree occurs locally throughout eastern Ohio, where it is confined chiefly to sandstone soils. It has also been planted extensively for ornamental and windbreak purposes in many parts of the State, and locally for forestry purposes. It is a shade-loving tree and not very windfirm. It usually reaches a height of 60 to 80 feet, but may become 100 or more feet high and 4 feet in diameter.

NORWAY SPRUCE

Picea Abies, (Linnaeus) Karsten

THE Norway Spruce is not native to Ohio, but it has been planted extensively for ornamental and locally for forestry purposes in this State.

The leaves are ½ to 1 inch long, 4-sided, dark green,



NORWAY SPRUCE
One-half natural size.

sharp-pointed, and attached to twigs by short and slender stalk-like projections of bark.

The cones are 4 to 7 inches long, cylindrical, without stalks or very short-stalked, usually hang down from end of branches. The cone-scales are thin, broad, reddish-brown, finely toothed along margin. No other spruce tree, planted widely in Ohio, has such large cones.

The bark on old trunks is roughened by rather large reddish-brown scales. The twigs are light reddish-brown, roughened by projecting leaf-bases. On older trees they often assume a characteristic drooping or weeping habit.

The wood is light, soft, white, straight-grained, easily worked. Heartwood and sapwood are not distinguishable from each other. Used for paper pulp, interior finish, crates and baskets.

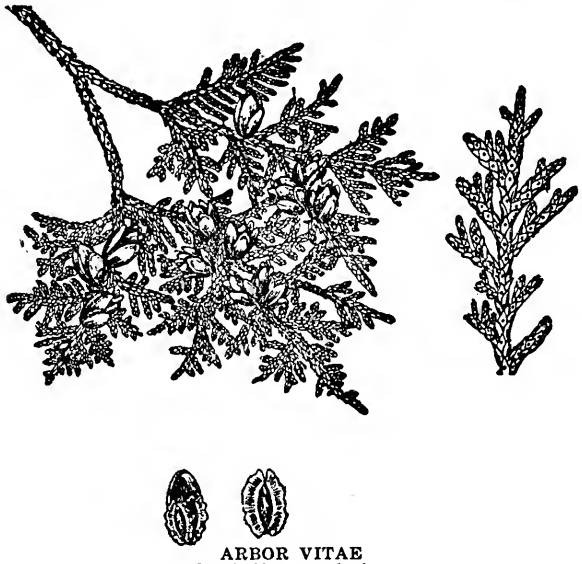
The Norway Spruce is native to middle Europe. It is the principal tree in the famous Black Forest of Europe, prefers rich, moist soil, and is rather tolerant of shade. It has been said that "the Norway Spruce is the best-paying forest tree in the world." During the last ten years approximately one million Norway Spruce have been planted in Ohio for Christmas tree purposes.

ARBOR VITAE

Thuja occidentalis, Linnaeus

THE Arbor Vitae, also called White Cedar and Cedar, is one of the most widely planted evergreen trees in North America. It develops a conical, symmetrical crown and usually reaches a height of 25 to 50 feet.

The leaves are scale-like, ⅛ of an inch long, closely overlap



ARBOR VITAE
One-half natural size.

one another, aromatic when crushed, marked with glandular dots. They are arranged in pairs. Each succeeding pair alternates with the next pair.

The cones are oblong, ½ of an inch long, with 6 to 12 blunt-pointed, reddish-brown scales.

The trunk usually divides near base. The bark is grayish to reddish-brown, usually furrowed, and peels off into thin shred-like strips.

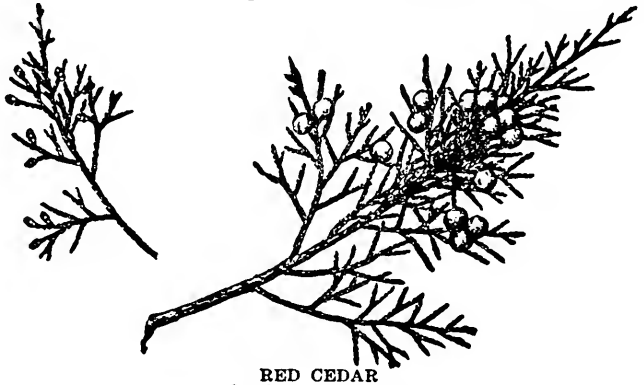
The Arbor Vitae is found from Southern Labrador west to Manitoba and Minnesota and south to North Carolina. In Ohio this tree occurs locally in Adams, Green and Champaign counties. It has been planted extensively for ornamental and windbreak purposes, particularly on lawns and in cemeteries. More than 50 garden varieties of Arbor Vitae are known. Some of them, such as White Arbor Vitae and the Golden Arbor Vitae, are distinguished by their color. Among the commonest forms are the pyramidal, the globose, the juvenile and the pendulous form. Closely related to the American Arbor Vitae is the Oriental Arbor Vitae, also planted extensively throughout eastern North America.

RED CEDAR

Juniperus virginiana, Linnaeus

RED CEDAR is a common household word. In recent years the "red cedar chest" has won its way to a special place in the modern home.

The leaves are of two kinds, namely, scale-shaped and awl-shaped. The scale-shaped are commonest, one-sixteenth of



RED CEDAR
One-half natural size.

an inch long, closely appressed to twigs, four ranked. The awl-shaped are narrow, sharp-pointed, spreading, do not overlap, occur in 2's and 3's.

The fruit is a dark blue berry about ¼ of an inch in diameter. Berries are freely eaten by birds.

The bark is very thin, reddish-brown, shallowly furrowed, peels off in long shred-like strips.

The wood is soft, strong, of even texture, works easily. The heartwood is distinctly red and the sapwood white. This color combination and its pronounced fragrance, supposed to ward off moth and other insects, account for its wide use for clothes chests, closets and for interior woodwork.

The Red Cedar, also called Cedar and Juniper, is found from Nova Scotia to South Dakota, south to Florida and Texas. This tree is generally distributed throughout Ohio, but is rather rare in the north and north-central part of the State. It is abundant on the limestone soils of southwestern Ohio. This tree grows slowly, needs plenty of sunlight, and rarely exceeds 50 feet in height and 18 inches in diameter in the northern part of its range. It has a distinctive narrow, conical crown when growing in the open.

The Common Juniper—Juniperus communis, Linnaeus—is closely related to the Red Cedar. It is a small, shrubby tree, with a wide range of ornamental varieties, planted widely for ornamental purposes. Its awl-shaped leaves occur regularly in 3's and do not extend along the twigs.

BLACK WILLOW

Salix nigra, Marshall

THE Black Willow reaches the largest size and has the widest distribution of any native American Willow. It is the only native willow of timber size, sometimes reaching a height of 80 feet and a diameter of 4 feet.

It can always be distinguished by its simple, alternate, long, narrow, sharp-pointed leaves, 3 to 6 inches long. At the base of the short leaf-stalk round leaf-like appendages often clasp the twigs.

BLACK WILLOW
One-fourth natural size, except 2, 4, 6 and 8 which are enlarged.

The flowers are of two different kinds. Both are arranged in short, stubby spikes. The pollen-bearing and seed-producing always occur on different trees. The seeds are minute, bear dense tufts of long silky down, occur in large numbers in small capsules on drooping tassels.

The bark varies from light brown to dark brown and black. On old trunks it becomes furrowed and peels off in scales. The branches are slender, brittle, somewhat drooping. The buds are sharp-pointed, ½ of an inch long, covered by a single reddish-brown scale.

The wood is pale reddish-brown, used chiefly in boxes, excelsior, charcoal, pulp, and artificial limbs.

The Black Willow occurs from New Brunswick to Florida, west to the Dakotas and southern Mexico. It is generally distributed throughout Ohio along streams and depressions in flood plains. One usually finds it in wet places, but it will grow on dry situations.

PUSSY WILLOW

Salix discolor, Muhlenberg

THE Pussy Willow, probably more than any other tree, tells the people of both city and country when spring is here. During a brief period of spring it gives the chief touch of beauty to the landscape through its fine display of yellow blossoms that are visited by thousands of bees.

PUSSY WILLOW
One-fourth natural size.

The leaves are simple, alternate, elliptic, 3 to 5 inches long, bright green above and silvery white below. A distinctive feature of the leaves is the wavy margins with coarse teeth.

The flowers are of two kinds. Both are arranged in short, stubby spikes. The pollen-bearing and the seed-producing always occur on different trees. They appear before the leaves and tell us when spring is coming. The seeds are produced in large numbers in hairy, long-beaked, light-brown capsules.

The bark is thin, smooth, greenish, rarely scaly. The stout branchlets are marked with orange-colored breathing pores. The buds are alternate, ¼ of an inch long, duck-bill like, flattened on inside, dark reddish purple. The wood is similar to that of Black Willow.

The Pussy Willow is found in moist meadows, and along banks of streams and in other wet places from Nova Scotia south to Delaware and west to Manitoba and Missouri. It is common throughout Ohio, particularly in the northern section. It rarely exceeds 25 feet in height and is of considerable value in landscape work, especially along water courses.

WIDELY INTRODUCED WILLOWS

THREE Willows have been widely introduced into Ohio. They are the Weeping Willow, the White Willow, and the Crack Willow.

The Weeping Willow (Salix babylonica, Linnaeus) a native of Asia, was introduced into the United States in 1702 by a famous botanist named Tournefort. Sometimes this tree is called Napoleon Willow because of its association with the great French general during his exile. It has been planted widely in Ohio. This tree can always be distinguished by its weeping habit. Its long, drooping branches are distinctive, and when young they are tough and pliable, but later become brittle. Its leaves are simple, alternate, 4 to 7 inches long; in shape they resemble the Black Willow and in color those of the White Willow. The Weeping Willow is the most widely distributed of all introduced willows.

The White Willow (Salix alba, Linnaeus), a native of Europe, was brought to America by the early settlers. It is now found from the Atlantic to the Pacific and is given planting preference where erosion and landslides are to be stopped. It is found locally throughout Ohio as an ornamental tree. In some places it has escaped cultivation. This tree sometimes reaches a height of 70 feet and a diameter of 4 feet. The leaves are simple, alternate, 2 to 4 inches long, one-third to two-fifths of an inch wide, finely toothed along edge. When young the leaves are pale green and hairy on both sides, but when mature they are distinctly white only on the lower surface, whence the name White Willow.

The Crack Willow (Salix fragilis, Linnaeus), a native of Europe and northern Asia, has been planted widely in America, especially in the prairie states. It is found locally in Ohio, particularly about the earlier settlements. It is readily distinguished from the White Willow by its yellowish-green twigs and larger leaves, which are 3 to 6 inches long, ½ to 1 inch wide, coarsely toothed along margin. The branches are so brittle that they crack off easily in a slight breeze, whence the appropriate name Crack Willow. After a storm the ground beneath this tree is often completely covered with twigs and branches.

QUAKING ASPEN

Populus tremuloides, Michaux

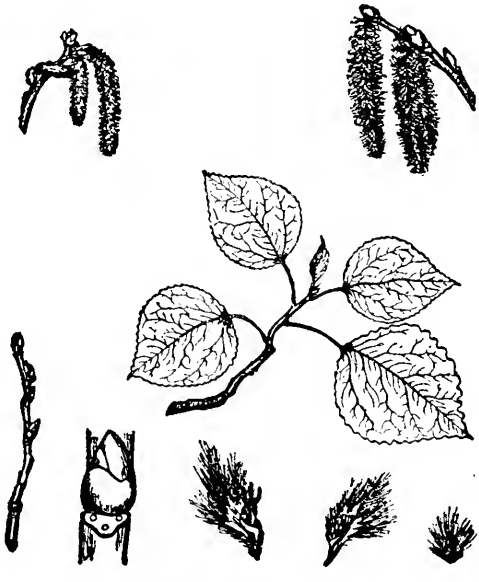
THE Quaking Aspen is also called Trembling Aspen and Small-toothed Aspen. The air must be remarkably still if the foliage is not quaking or trembling.

The leaves are simple, alternate, 1½ to 2½ inches long, nearly round, finely toothed on margin, with leaf-stalks flattened laterally.

The flowers appear early in the spring. Pollen-bearing and seed-producing occur on different trees. Both are arranged in slender drooping tassels.

The fruit is a 2-valved capsule containing small seeds with tufts of fine hairs.

The bark is white or grayish to yellowish-green; on old trunks becomes rough and black. The twigs are smooth, shiny, reddish-brown. The buds are narrow, conical, sharp-pointed, smooth, shiny, appear varnished, covered with 6 to 7 reddish-brown scales.



QUAKING ASPEN

One-fourth natural size, except enlarged flowers and twig.

The wood is soft, weak, not durable, fine in texture, white to light brown. It is used for paper pulp, boxes, crates and wooden dishes.

The Quaking Aspen is the most widely distributed tree in North America. It is a transcontinental tree extending from Newfoundland to Alaska and south to New Jersey, Kentucky, Mexico and California. In Ohio it occurs sparingly in local stands in the northern half of the State, and is rare or absent in the southern half. One usually finds it in waste places, abandoned fields, burnt-over areas or cut-over lands. In some places it prepares the way for more valuable trees.

LARGE-TOOTHED ASPEN

Populus grandidentata, Michaux

THE Large-toothed Aspen, also called Poplar, Popple and Quaking Aspen, is a small to medium-size forest tree rarely exceeding 60 feet in height and 2 feet in diameter.

The leaves are simple, alternate, egg-shaped, 3 to 4 inches long, coarsely toothed along margin. The leaf-stalks are flattened, which makes possible their quaking or fluttering. The flowers are of two kinds. They never occur on the same tree. The pollen-bearing occur in drooping tassels, 1½ to 2½ inches long. The seed-producing are also arranged in tassels which become 4 inches long when mature. The fruit is a 2-valved capsule containing many tiny tufted seeds. The bark on young stems is yellowish-green to white, at first thin and smooth, later becomes thick, rough and black. The twigs are yellowish-brown to reddish, often coated with a woolly, crusty down. The buds are egg-shaped, covered with 6 to 7 light chestnut-brown scales, often coated with a dusty, flour-like woolly substance. Those of the Quaking Aspen are smooth, glossy and varnished-like. The wood is soft, white to light brown, not durable. It is used for paper pulp, rough lumber, boxes, crates and buckets.

LARGE-TOOTHED ASPEN

The Large-toothed Aspen is found from Nova Scotia south to Pennsylvania and along the mountains to North Carolina and west through Ontario to Minnesota. It is common throughout Ohio, occurring most frequently in the southeastern section, where it often grows in thickets, abandoned fields, burnt-over areas and cut-over land. In places it acts as a temporary shelter for more valuable trees.

COTTONWOOD

Populus deltoides, Marshall

THE Cottonwood is one of the most rapid growing trees native to Ohio.

The leaves are simple, alternate, broadly triangular, square at base, 3 to 5 inches long, with long and laterally flattened leaf-stalks.

The flowers appear before the leaves. Pollen-bearing and seed-producing occur on different trees. Both are arranged in drooping tassels.

The fruit is a 3 to 4-valved capsule arranged in drooping tassels and containing numerous small seeds with tufts of fine hairs.

The bark on young trunks is smooth and greenish-yellow, on old trunks becomes ashy-gray to dark brown and deep furrowed. The lateral branches take an upright position. The twigs are stout, yellowish, marked with grayish dots, have prominent ridges below leaf-scars. The buds are large, resinous, glossy, chestnut-brown. Terminal bud is often 5-angled.

COTTONWOOD
One-fourth natural size, except enlarged flowers and twig.

The wood is soft, not durable, white to brown, works easily. Used for paper pulp, boxes and crates.

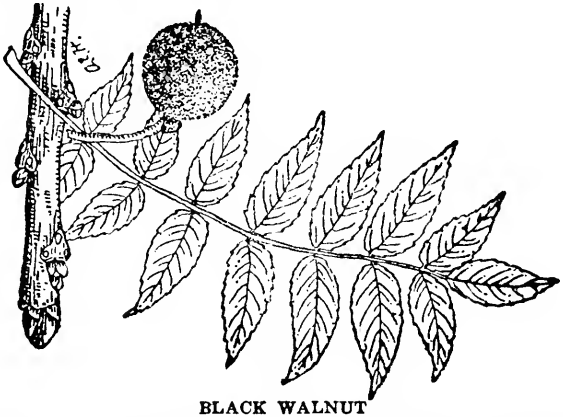
The Cottonwood is found from Quebec south to Florida and west to the Rocky Mountains. This tree occurs throughout Ohio. It is used in reforestation work on lowlands and flood plains. A variety, "Carolina Poplar," was formerly planted along streets and in parks. It has many bad habits. Clogging sewers is one of them.

The introduced Lombardy Poplar, a native of southern Europe, is planted locally in Ohio for ornamental uses. It can be recognized by its narrow and high crown, with almost vertical lateral branches.

BLACK WALNUT

Juglans nigra, Linnaeus

THE Black Walnut is more fortunate than many trees in that it has only a few common names. Throughout its entire range of 650,000 square miles it is called Walnut, Black Walnut or Walnut-tree.



BLACK WALNUT

Leaf and fruit, one-fifth natural size. Twig, three-fourth natural size.

The leaves are alternate, compound, with 13 to 23 leaflets. Leaflets are 3 to 4 inches long, sharp-pointed, toothed along margin, stalkless.

The flowers are of two kinds. Both occur on same tree. The pollen-bearing occur in unbranched, drooping tassels. new growth.

The nut-producing occur in few-flowered clusters on the

The fruit is a round furrowed nut, 1 to 2 inches in diameter with a green, non-splitting, fleshy husk which turns black when mature.

The bark is thick, rough, furrowed, dark brown to grayish-black. The twigs are stout, grayish-brown, bitter to taste, contain gray to light brown chambered pith. The buds are covered with downy scales. Terminal bud is as long as wide. Lateral buds are smaller.

The wood is rich dark brown, hard, strong, splits easily, very durable. Used in furniture, interior finishings, sewing machines, gun stocks, musical instruments, caskets and planing mill products. It is the most costly wood native to Ohio.

The Black Walnut is found from southern New England to Minnesota and south to Florida. It occurs throughout Ohio, reaching its best development on the fertile soils in the western part of the State. The Black Walnut is an important timber tree, producing excellent lumber and fine nuts. It may be used to reforest idle lands adapted to its growth.

BUTTERNUT

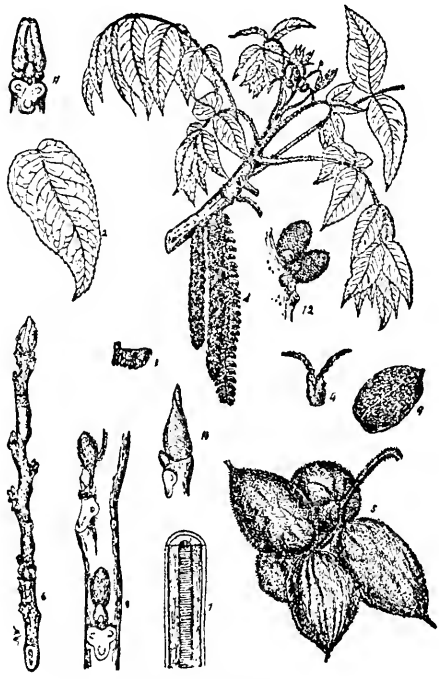
Juglans cinerea, Linnaeus

THE Butternut, also called White Walnut, is a close kin to the Black Walnut.

The leaves are alternate, compound, with 13 to 23 leaflets.

The flowers are of two kinds. The pollen-bearing occur in unbranched, drooping clusters. The nut-producing occur in few-flowered clusters on new growth.

The fruit is an elongated nut with a hairy, sticky, non-splitting husk. The nut is 4 - ribbed, pointed at one end, sharply furrowed over entire surface, and contains a sweet, oily edible nut.



BUTTERNUT

One-fourth natural size, except 3 and 4 which are enlarged and 7, 8, 10, 11 and 12 natural size.

The bark is gray to ashy-white, separates into wide flat ridges.

The twigs are stout, greenish-gray, often downy, contain dark - brown chambered pith. The buds are covered with dense pale down. Terminal bud is ½ to ¾ of an inch long, flattened, blunt-pointed, longer than wide. Lateral flower buds are pineapple-like, often placed one above another.

The wood is soft, not strong, light-brown. Used in furniture, interior finishing, and chests.

The Butternut is found from New Brunswick to Minnesota, south to Delaware and Arkansas and along mountains to Georgia. It is distributed throughout Ohio, but is less common than the Black Walnut. It is also of less commercial importance than the latter. It prefers rich, moist soil, is most frequently met along streams, fences, and roads, and rarely exceeds 50 feet in height and 2 feet in diameter.

SHELLBARK HICKORY

Carya ovata, (Miller) K. Koch

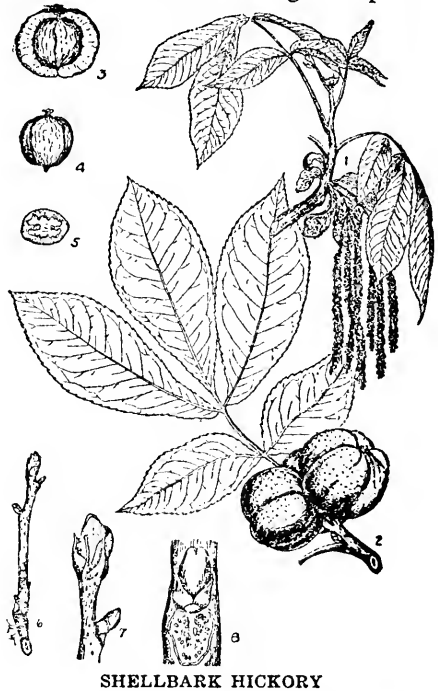
THE Shellbark Hickory, also called Shagbark Hickory, is the largest and the best known of the hickories. It produces the best nuts of all the native hickories.

The leaves are alternate, 8 to 14 inches long, compound, with 5 to 7 leaflets. The three upper leaflets are the largest, the pair nearest the base is usually only about one-half the size of the terminal ones.

The flowers are similar to those of the other hickories.

The fruit is round, 1 to 2 inches long, with husk that splits into four sections from apex to base. The nuts are smooth, white, 4-angled, pointed at the ends. The kernel is large and sweet.

The bark is smooth and light gray on young stems. On old trunks it becomes distinctly shaggy. The twigs are reddish-brown to gray, covered with numerous light dots, usually smooth, sometimes hairy. The buds are egg-shaped, blunt-pointed, about three-fifths of an inch long, covered with about 10 bud-scales.



SHELLBARK HICKORY
One-fourth natural size, except 7 which is natural size and 8 slightly enlarged.

The wood is very heavy, hard, strong, tough, elastic, close-grained. Used chiefly for handles and vehicles.

The Shellbark Hickory is found from Quebec to Minnesota, south to Florida and Texas. It is common to abundant throughout Ohio, occurring chiefly on rich, deep, well-drained soils. Locally it reproduces itself on abandoned fields. This tree, usually reaching a height of 50 to 75 feet and a diameter of 2 feet, should be carefully protected. Closely related to it is the Big Shellbark Hickory, which is common in southern Ohio, becoming rarer northward. Its nuts are larger and harder to crack than those of the common Shellbark.

PIGNUT HICKORY

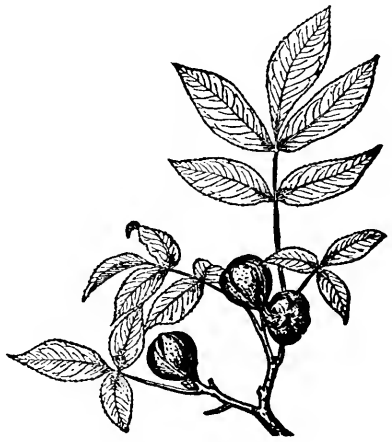
Carya glabra (Miller) Spach

THE Pignut Hickory, also called Black Hickory, Brown Hickory and Tightbark Hickory, is an important forest tree. It produces valuable wood.

The leaves are alternate, compound, 8 to 12 inches long with 5 to 7 leaflets. Leaflets are long, narrow, sharp-pointed, smooth, glossy. They are slightly larger than those of the Bitternut Hickory.

The flowers are similar to those of the other hickories.

The fruit is pear-shaped to spherical, with neck-like projection at base. The husk is thin, often does not split or may split to middle. The kernel is usually small and bitter, and not edible.



PIGNUT HICKORY
One-fourth natural size.

The bark is close-fitting, dark gray, marked with shallow furrows, does not shag off. The twigs are smooth, tough, reddish-brown, marked with pale dots. The buds are oval, blunt-pointed, reddish-brown.

The wood is similar to that of other hickories, but somewhat superior to Bitternut. It is sometimes classified as the strongest and toughest of all the hickories.

The Pignut Hickory is found from Maine to Minnesota, south to Florida and Texas. It is common throughout Ohio, except the west-central part of the State, where it is rare. It is most common on dry ridges and hillsides, but also occurs in moist, fertile, lowland soils. It is a medium-sized tree, frequently reaching a height of 60 feet and diameter of 2 feet.

Closely related to the Pignut is the Mockernut Hickory—Carya alba, (Linnaeus) K. Koch. It is also called Big Bud and White-Heart Hickory, and can be distinguished by its close-fitting, evidently furrowed bark that does not shag off, its stout hairy twigs, its hairy leaves with 7 to 9 large leaflets, its large, round, thick-shelled nut with thick husk and small kernel. The buds are larger than those of any other hickory. While the fruit is large, its kernel is small and not edible. It is common to abundant throughout Ohio.

BITTERNUT HICKORY

Carya cordiformis, (Wangenheim) K. Koch

THE Bitternut Hickory, also called Swamp Hickory and Water Hickory, is usually found in moist to wet locations. One usually finds it in low and fertile situations in rich agricultural valleys, but in southeastern Ohio it also occupies the upper slopes. It is the most handsome of the native hickories.

The leaves are alternate, compound, 6 to 10 inches long, with 7 to 11 leaflets. Leaflets are long, narrow, sharp-pointed, without stalks except the terminal one. They are smaller and slenderer than those of other hickories.

BITTERNUT HICKORY
One-fourth natural size.

The flowers are of two kinds. They occur on same tree. The pollen-bearing occur in drooping tassels, 3 to 4 inches long. The nut-producing occur in few-flowered clusters on new growth.

The fruit is a thin-shelled nut with bitter kernel covered with a thin-shelled husk, which splits to middle into 4 valves. Winged projections mark meeting line of husk sections from apex to middle.

The bark is light gray, rather thin, roughened by shallow furrows, does not scale nor shag off. The twigs are slender, smooth, grayish to orange-brown or reddish. The buds are long, flattened, blunt-pointed, covered by 4 yellowish (sulphur-colored) scales.

The wood is heavy, hard, strong, somewhat brittle. It is inferior to that of other hickories, but used for practically the same purposes.

The Bitternut Hickory is found from Quebec to Minnesota, south to Florida and Texas. It is generally distributed throughout Ohio. This tree may attain a height of 100 feet and 3 feet in diameter. It grows best on rich, moist soil such as is found in the farm woodlot.

RIVER BIRCH

Betula nigra, Linnaeus

THE River Birch is also called Red Birch and Water Birch. It usually occurs on rivers, streams, ponds, swamps and other watery places. The leaves are simple, alternate, egg-shaped, 1 ½ to 3 inches long and wedge-shaped at base. The flowers appear about April, are of two kinds. The pollen-bearing are arranged in drooping tassels, 2 to 3 inches long. The seed-producing occur in small spikes about one-third of an inch long. The fruit is an erect cylindrical spike 1 to 1 ½ inches long. The seeds ripen in early summer with 3-lobe scales. The bark is reddish-brown to cinnamon-red, peels off in large, thick layers. On old trees the bark becomes thick and deeply furrowed. The twigs are reddish-brown and more or less hairy.

RIVER BIRCH
One-third natural size.

The wood is strong, heavy, close-grained, reddish-brown and white sapwood. It is used in the manufacture of woodenware, crates, turnery, pulp and chemicals.

The River Birch extends farther south than any other of our native birches. Its range is from Massachusetts to Minnesota and south to Florida and Texas. In Ohio it is confined to the southeastern part of State, chiefly from Fairfield county southward. Exceptional trees reach a height of 80 feet and a diameter of 4 feet. The River Birch may be called a soldier tree, for it battles fiercely with the overflow waters of swollen streams. It is of inestimable value as a protector of river and stream banks, and is well adapted for ornamental planting.

OTHER OHIO BIRCHES

THE Yellow Birch—Betula lutea, Michaux—also called Silver Birch and Swamp Birch, is one of the most important timber trees of eastern North America, sometimes reaching a height of 100 feet and a diameter of 4 feet. It can be readily recognized by its ragged yellow bark, which peels off in thin, papery scales. On old trunks the bark becomes reddish-brown and roughened with fissures. Its twigs, leaves, flowers and fruit are similar to those of the Black Birch, but the twigs lack the sweet wintergreen flavor, and the fruit scales are smooth and equally lobed, while those of the Yellow Birch are hairy and unequally lobed.

The Yellow Birch is found from Newfoundland to Minnesota, south to Pennsylvania and along the mountains to North Carolina and Tennessee. In Ohio it occurs sparingly to common in Ashtabula, Stark, Summit, Lake, Cuyahoga, Lorain, Wayne, Fairfield and Hocking counties. Rich uplands, borders of streams, swamps and ravines are its favorite home.

* * * * *

THE Black Birch—Betula lenta, Linnaeus—also called Sweet Birch and Cherry Birch, is one of the handsomest of our native birches. The wintergreen flavor of the twigs is an unfailing distinguishing characteristic. Its bark is smooth, shiny, and does not peel off in film-like scales. Birch oil is extracted from its bark and twigs. Its wood is used for furniture, interior finish, chemicals, novelties and fuel. The Black Birch is found from Newfoundland to Ontario, south to Ohio, Indiana and North Carolina. In Ohio, it occurs locally in Fairfield, Hocking, Adams, Scioto, Cuyahoga, Lake, Geauga, Portage, Ashtabula and Wayne counties.

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THE White Birch—Betula alba, Linnaeus—also called European Birch, is native from northern Europe to Japan. Its bark is white, close-fitting, and peels off sparingly. In the eastern United States it is common in cemeteries, along streets, upon lawns and in parks. The varieties of the White Birch commonly found in Ohio are (1) Cut-leaved White Birch; (2) Weeping White Birch; (3) Cut-leaved Weeping White Birch; and (4) Purple-leaved White Birch. This tree has won a prominent place in American landscape work and deserves to be protected and developed. The first memorial tree to Mother was a White Birch, planted on Mother's Day at Reading, Pennsylvania, in 1923. President Coolidge planted a White Birch tree at the White House on Mother's Day, 1924.

AMERICAN HORNBEAM

Carpinus caroliniana, Walter

THE American Hornbeam, also called Ironwood, Blue Beech and Water Beech, is a small, bushy tree usually found along streams and other low and wet places. In appearance it will pass for a little brother of the Beech.

The leaves are simple, alternate, 2 to 4 inches long, ovate, long pointed, finely toothed along margin.

The flowers are of two kinds, both appearing on same tree. The pollen-bearing occur in tassels about 1 ½ inches long; the seed-producing in few-flowered clusters about ¾ of an inch long.

The fruit is a small, prominently ribbed nut about one-third of an inch long, enclosed in a leaf-like, 3-lobed bract, which is usually toothed on one margin of middle lobe. The seed is attached to a leaf-like bract.

The bark is thin, smooth, bluish-green, and marked with distinctive furrows running up and down along the trunk.

AMERICAN HORNBEAM
One-fourth natural size.
Twig section and seed with winged bract, enlarged.

The twigs are slender, reddish to orange, and covered with scattered pale breathing pores. Small buds are about ⅛ of an inch long, covered with 8 to 12 reddish-brown bud-scales.

The wood is heavy, hard and strong. It is sometimes used for levers, tool handles, wedges and mallets.

The American Hornbeam is found from Nova Scotia to Florida and west to Minnesota and Texas. This tree occurs throughout Ohio, becoming abundant locally. It is of little commercial importance. Locally it often occurs in dense thickets, to the exclusion of other more valuable trees.

HOP HORNBEAM

Ostrya virginiana, Miller (K. Koch)

THE Hop Hornbeam, also called Ironwood, has appropriate common names, for its fruit is hop-like and the wood is "hard as iron." It is the only tree native to eastern North America that produces hop-like fruit. An examination of the fruit shows that it is made up of a number of loose papery bags, in each of which is found a little brown nutlet. The seed bags are arranged in clusters usually from 1 to 2 inches long and attached to the twig by a hairy stem.

HOP HORNBEAM
One-fourth natural size.
Twig section and seed with enclosing membrane, enlarged.

The leaves are simple, alternate, 3 to 5 inches long, ovate, long-pointed finely toothed along the margin.

The flowers are of two kinds. Pollen-bearing and seed-producing occur on the same tree. The former occur in drooping tassels about 2 inches long, and the latter are produced in erect clusters. During winter the partly developed pollen-bearing flower catkins occur in clusters of 3 or 4 at the ends of the twigs.

The twigs are delicate and interlacing. The thin grayish brown bark peeling off in narrow, flat scales, and the small reddish-brown buds with four-ranked bud scales are distinctive.

The Hop Hornbeam is widely distributed over the eastern United States. It is found from Cape Breton Island to Florida and west to Minnesota and Texas. It occurs throughout Ohio. It is abundant in the northern and central parts of the State, where it usually occurs on dry, gravelly uplands. It is rarely over 30 feet high and 12 inches in diameter. In some Ohio woodlots it forms dense thickets, to the exclusion of more valuable trees.

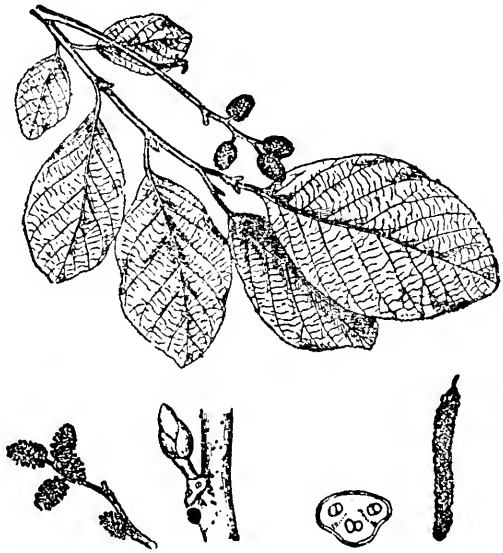
SMOOTH ALDER

Alnus rugosa, (Du Roi) Sprengel

THE Smooth Alder, also called Black Alder, is common along streams and other wet places. It usually remains a shrub, but occasionally becomes 20 feet high.

The leaves are simple, alternate, obovate, rounded at apex, wedge-shaped at base, finely toothed along margin.

The flowers appear before the leaves and are of two kinds. The pollen-bearing occur in drooping tassels 2 to 5 inches long. The seed-producing are greenish to purplish, with scarlet styles. They are about ¼ of an inch long and occur in 2's or 3's at the end of the branches.



SMOOTH ALDER
One-fourth natural size.
Twig section with bud, and leaf-scar enlarged.

The fruit is a structure about ½ cone-like, woody to ¾ of an inch long.

The bark is thin, smooth, often grooved, grayish-green, dotted with numerous brown lenticels and marked with white blotches. The twigs are greenish to grayish brown, dotted with brownish lenticels and marked with leaf-scars with 3 bundle-scars. The buds are alternate, ½ of an inch long, evidently stalked, blunt pointed, covered with 2 scales. The wood is yellowish-brown and marked with broad rays.

The Smooth Alder is found from Maine to Florida and Texas and west to Minnesota. It occurs locally throughout Ohio, but is of no commercial importance.

CHESTNUT

Castanea dentata, (Marshall) Bork.

NO TREE has brought more real joy to boys and girls and grown folks than the Chestnut.

The leaves are simple, alternate, 6 to 8 inches long, sharp-pointed and coarsely toothed.

The flowers appear in June or July. They are arranged in slender, yellowish-white, pencil-like plumes. The seed-producing occur in small numbers near the base of the plumes.

The fruit is a prickly bur with 1 to 5 nuts maturing in September or October.

The bark on branches and small trunks is smooth, brownish and close-fitting: on old trunks becomes grayish-brown and deeply furrowed. The twigs are smooth, greenish to brown, dotted with numerous small white breathing pores. The buds are alternate, ¼ of an inch long, blunt-pointed, covered with 2 to 3 chestnut brown scales.

CHESTNUT
One-fourth natural size.
Twig sections and single flowers enlarged.

The wood is light, soft, not strong, coarse-grained, durable. It is used for posts, poles, ties, general construction, interior finish, and many other uses.

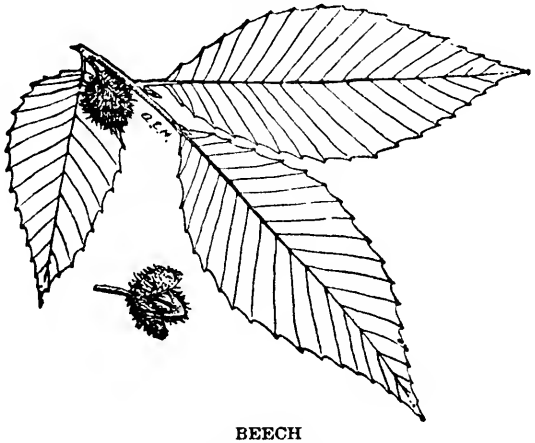
The Chestnut is found from Maine to Michigan, and south to the Carolinas and Georgia and Arkansas. It is common in eastern Ohio, extending westward to Lorain, Crawford, Franklin, Pickaway, Highland and the center of Adams county. The deadly chestnut blight is destroying it rapidly. No remedy is known to control this disease.

BEECH

Fagus grandifolia, Ehrhart

NO hardwood tree is more beautiful or more easily recognized than the American Beech.

The leaves are simple, alternate, 3 to 4 inches long, pointed at tip, wedge-shaped at base, coarsely-toothed along



BEECH
One-half natural size.

margin. When mature they are stiff, leathery, with straight, sunken veins.

The flowers are of two kinds, appear about April. The pollen-bearing occur in stalked round heads; the nut-producing in a few-flowered clusters.

The fruit is a stalked, prickly, four-valved bur, usually produced in pairs, containing triangular, pale brown, shining nutlets with sweet kernel.

The bark is smooth, light gray, often marked with initial carvings. The twigs are slender, dark gray, marked with circle of bud-scale scars. The buds are alternate, slender, conical, sharp-pointed, ¾ of an inch long, 5 times as long as wide, covered with 10 to 20 reddish-brown scales.

The wood is very hard, strong, tough, not durable in contact with soil. It is an excellent fuelwood, and is used extensively in the manufacture of charcoal, chemicals, novelties, woodenware, crates and general construction.

The Beech is found from Nova Scotia to Wisconsin and south to Florida and Texas. It is one of the most common forest trees of Ohio, being most abundant in the Western Reserve. It is abundant in all parts of the State, excepting the southeastern. The beech trees one usually sees about cities are the European Beech (Fagus sylvatica, Linnaeus), which is the parent of the Purple or Copper Beech, the Weeping Beech, and the Cut-leaved Beech.

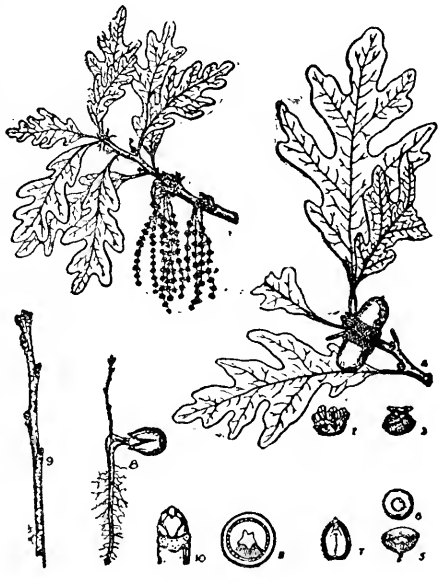
WHITE OAK

Quercus alba, Linnaeus

THE White Oak is the most important hardwood forest tree native to North America. It has held this front rank place since the earliest days of colonization. The original forests of the rich agricultural areas of Ohio were largely made up of this great tree.

The leaves are simple, alternate, 5 to 9 inches long, 2 to 4 inches wide. They are divided into 3 to 9, usually 7, blunt-pointed, finger-like lobes. Mature leaves are deep green above and light green beneath.

The flowers appear about May and are of two kinds. The pollen-bearing occur on the old growth in drooping tassels 2 or 3 inches long. The acorn-producing occur in small clusters on the new growth.



WHITE OAK
One-fourth natural size.
Single flowers and twig sections, enlarged.

The fruit is a sessile or short-stalked acorn maturing in one season. The light brown nuts are about ¾ of an inch long, seated in a warty cup, enclosing about ¼ of nut. The nuts are relished by wild animals.

The bark is grayish-white and peels off in numerous loose scales. The early settlers made it into a tea, used in the treatment of tonsilitis. The twigs are smooth, light-gray, dotted with light lenticels.

The buds are alternate, egg-shaped, blunt-pointed, reddish-brown, clustered at end of twigs.

The wood is heavy, hard, strong, close-grained, light-brown, durable. Its uses are interior finish, flooring, furniture, general construction, implements and fuel.

The White Oak is found from Maine to Minnesota and south to Florida and Texas. It is common to abundant throughout Ohio. This tree reaches its best development on rich, moist soil, where it attains a height of 75 to 100 or more feet and 2 to 6 feet in diameter. It should be favored in the farm woodlot.

SWAMP WHITE OAK

Quercus bicolor, Willdenow

THE Swamp White Oak is usually found in swamps, about ponds, and along the banks of streams. In youth it is rather attractive, but with advancing years it becomes ragged and unkempt in appearance.

The leaves are simple, alternate, 5 to 6 inches long, broad, wavy-toothed on margin, dark green above, light green and hairy on lower surface. They are broadest between the middle and the apex.

SWAMP WHITE OAK
One-third natural size.

The flowers and wood are similar to those of the White Oak.

The fruit is a long-stalked acorn that matures in one season. The acorns are about an inch long, usually occur in pairs.

The bark on old trunks is thick, grayish-brown and breaks in long, deep furrows. On the small branches it sheds off in flakes like that of the Sycamore. The twigs are stout, yellowish to reddish-brown. The buds are about ⅛ of an inch long, blunt-pointed, smooth, reddish-brown. Its wood is similar to that of White Oak.

The Swamp White Oak is found from Maine to Michigan and south to Georgia and Arkansas. This tree occurs locally throughout Ohio. It is looked upon with favor in reforestation work in the State. Moist to wet sites are its favorite home. Trees 3 to 4 feet in diameter and 80 feet high are not unusual. The largest specimen of Swamp White Oak ever recorded was the Wadsworth Oak, which was 27 feet in circumference. It was near this tree that Robert Morris and the Seneca Indians made an important treaty in 1797.

BUR OAK

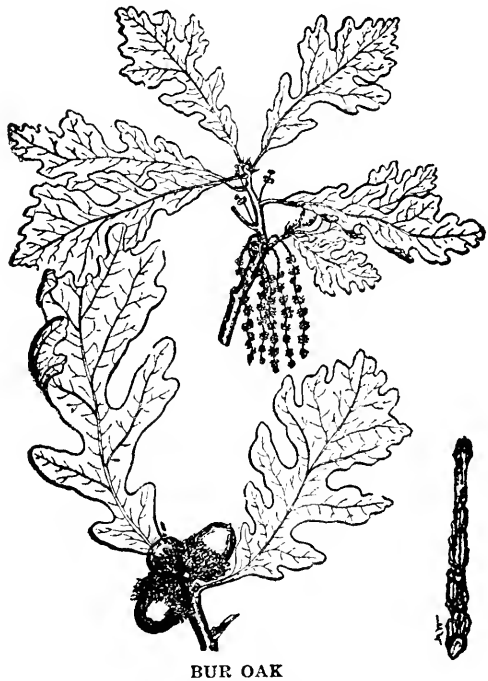
Quercus macrocarpa, Michaux

THE Bur Oak, also called Mossy Cup Oak and Over Cup Oak, is one of the largest of American Oaks. It reaches a height of 100 feet and 5 feet in diameter.

The leaves are simple, alternate, 6 to 12 inches long, 3 to 6 inches wide, shiny and deep green above, pale and finely hairy beneath. Near the middle are deep clefts that almost divide the leaves in two parts.

The flowers and wood are similar to those of White Oak.

The fruit is a large acorn maturing in one season. The nuts are ¾ of an inch long with a white and sweet kernel. The cup covers about half of nut and is bordered by a distinct fringe along margin.



BUR OAK
One-third natural size.

The twigs are stout, yellowish-brown and usually marked with corky winged projections. The buds are alternate, ⅛ of an inch long, blunt-pointed, reddish-brown, clustered at end of twigs. The bark becomes deeply furrowed and has a tendency to peel off in flaky scales.

The Bur Oak is found from New Brunswick and Nova Scotia west to Manitoba and south to Pennsylvania, Kansas and Texas. This tree occurs throughout Ohio, being common in the western part and less frequent in the northeastern and southeastern sections.

The Bur Oak is a valuable timber tree and used sometimes for ornamental planting. It is easy to transplant, grows rapidly, has few insect enemies. Its wood is similar to that of White Oak.

POST OAK

Quercus stellata, Wangenheim

THE Post Oak was given its name in pioneer days when it was used extensively for posts, a use for which it is well adapted on account of its durability.

The Post Oak may be recognized at all seasons of the year. Some of its brown leaves usually hang on until the new crop appears.

POST OAK
One-third natural size.

The leaves are simple, alternate, coarse, stiff, leathery in texture, 4 to 6 inches long. They are dark green and shiny on the upper surface, have a heavy coating of rusty brown hairs on lower surface. Under a magnifying glass the hairs are star-shaped, whence the specific name "stellata." They are usually made up of 5 rounded lobes. The two basal lobes are small, and the three terminal lobes are large and generally squarish in outline.

The fruit is a small acorn maturing in one season. The nut is about ½ of an inch long, dark brown, often striped. The cup is shallow, covered with pale woolly scales, enclosing about one-third of nut.

The bark is darker, rougher and less scaly than that of White Oak. The twigs are stout, hairy and rusty. The buds are alternate ⅛ of an inch long, blunt-pointed, reddish-brown, clustered at end of twigs.

The wood is similar to White Oak and used for the same purposes.

The Post Oak, also called Iron Oak, is found from Massachusetts to Kansas and south to Florida and Texas. In Ohio it is found from Licking county southward. It occurs mostly on the hills of southeastern Ohio. Gravelly uplands, limestone hills and sandy plains are its principal habitat. It is a medium-sized tree, rarely exceeding 60 feet in height and 3 feet in diameter.

CHESTNUT OAK

Quercus Prinus, Engelmann

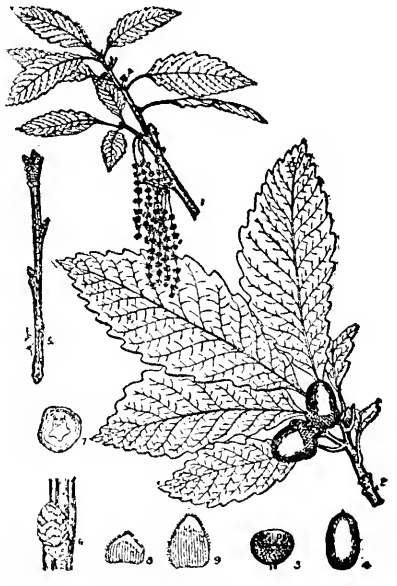
THE Chestnut Oak, also called Rock Oak and Tanbark Oak, is an important forest tree.

The leaves are simple, alternate, stiff, 5 to 9 inches long, 2 to 4 inches wide, coarsely toothed along margin.

The flowers are similar and the wood ranks close to White Oak.

The fruit is a large acorn, maturing in one season. The nut is 1 to 1½ inches long, oval, smooth, glossy, chestnut-brown. The cup is thin, deep, hairy inside, covers one-third of nut.

The bark on young stems and branches is smooth, thin, yellowish-brown. On old trunks it is thick, brown to black, deeply furrowed. The bark ridges are high, sharp and angular. At the bottom of the furrows the bark is cinnamon red. It is rich in tannin.



CHESTNUT OAK
One-third natural size.
Twig section and bud scales, enlarged.

The twigs are slender, angular, orange-brown. The buds are light brown, ¼ to ½ of an inch long, sharp-pointed, and clustered at tip of twigs.

The Chestnut Oak is found from Maine to Ontario, south to Alabama and Tennessee. It reaches its best development in the Alleghenies of Pennsylvania and southward. In Ohio it reaches its best development in the unglaciated southeastern part. It occurs sparingly in Licking and Cuyahoga counties.

A closely related tree occurring in southern Ohio is the Yellow Oak—Quercus Muhlenbergii, Engelmann. This tree, also called Chinquapin Oak, Pigeon Oak and Sweet Oak, is limited largely to the main valleys and the bordering lower slopes. It is most abundant in southwestern, infrequent in southeastern Ohio, and rarely found north of Columbus. . .

RED OAK

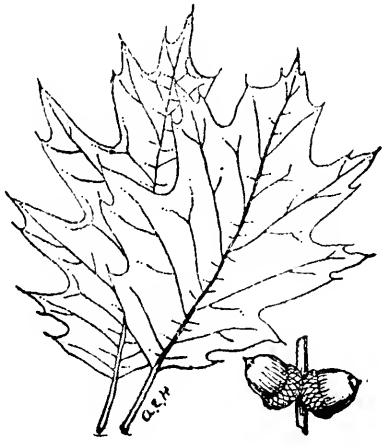
Quercus rubra, Linnaeus

THE Red Oak is one of the biggest, stateliest and handsomest trees of eastern North America. As early as 1740 it was introduced into Europe.

The leaves are simple, alternate, 5 to 9 inches long, 4 to 6 inches wide, 7 to 9-lobed. Lobes are bristle-tipped and separated by clefts that reach halfway to midrib.

The flowers appear with the leaves. The pollen-bearing are arranged in drooping tassels; the acorn-producing occur in few-flowered clusters on new growth.

The fruit is an acorn maturing in two seasons. The cup is wide, shallow, covered with over-lapping reddish-brown scales, enclosing only base of nut. The nuts average one inch long, ½ to ¾ of an inch wide, are flat at base and short-tipped at apex.



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

The bark on young stems is smooth, grayish or brown. On older trunks it becomes rough with furrows separating wide, smooth, grayish to brownish ridges. The lateral branches are straight and ascend at about an angle of 45 degrees. The twigs are smooth and rich brown. The buds are ¼ of an inch long, sharp-pointed, smooth, glossy, reddish-brown, without hairs.

The wood is heavy, hard, strong, light reddish-brown, with light sapwood. It is used for furniture, interior finishing, ties and general construction.

The Red Oak has a wide distribution. It is found from Nova Scotia to Minnesota and Kansas, south to Florida and Texas. It occurs in all parts of Ohio on a wide range of soils. Throughout the State it is being planted for forestry purposes. Moist, porous, sandy to gravelly clay soils are its favorite homes. It is one of the most important timber trees of North America, reaching a height of 150 feet and an age of 300 or more years. It deserves to be planted more extensively for ornamental purposes.

BLACK OAK

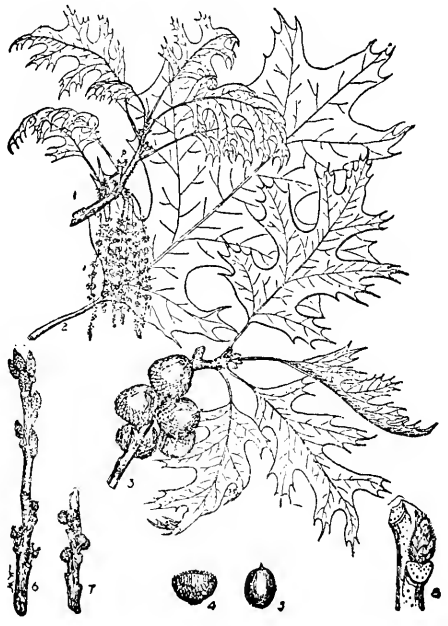
Quercus velutina, Lambert

THE Black Oak is one of the biggest oaks native to the eastern states, reaching a height of 100 feet and 4 feet in diameter. By its bark one can always recognize this tree. Its outer bark is black and its inner bark is distinctly yellow.

The leaves are simple, alternate, 4 to 10 inches long, 3 to 6 inches wide, usually 7-lobed with bristle tips. The lower leaf surfaces are pale green to rusty brown.

The flowers are similar to those of other oaks.

The fruit is an acorn maturing in two seasons. Cups are cup-shaped, light brown, often slightly fringed along margin, enclose ½ of nut. Nuts are ½ to 1 inch long, light reddish brown.



BLACK OAK
One-fourth natural size.
Twig section, enlarged.

The bark on older trunks is black, thick, very rough. Twigs are stout, angular, reddish-brown, often hairy. Buds are large, sometimes ½ of an inch long, angular, covered with a coating of yellowish or dirty-white hairs.

The wood is similar to that of Red Oak.

The Black Oak is found from Maine to Ontario, south to Florida and Texas. This tree is generally distributed throughout Ohio, being most abundant in the southeastern part, and becoming rarer towards the northeast. It is abundant in Fulton, Williams and Lucas counties. It usually occurs on dry, gravelly and shady uplands and ridges.

SCARLET OAK

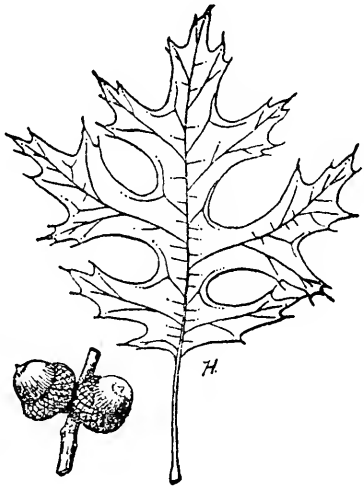
Quercus coccinea, Muench

THE Scarlet Oak, also called Spanish Oak, is the showiest of the American oaks. Its autumn garb of brilliant scarlet red and crimson makes it stand out among all its associates.

The leaves are simple, alternate, 3 to 6 inches long, 3 to 5 inches wide, 5 to 9-lobed. Lobes are bristle-tipped and separated by deep clefts.

The flowers resemble those of other oaks.

The fruit is an acorn, maturing in two seasons. The cup is thin, narrowed at base, often glossy on surface, covers ½ of nut. The nut is three-fifths of an inch long, reddish-brown.



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

The bark on small stems and branches is smooth, thin, light to grayish-brown, becomes rough and irregular on older trunks, sometimes almost black near base. Flat-topped ridges occur between shallow furrows. Inner bark is of pale-coloring. Dead limbs often persist along lower trunk. The twigs are smooth, rather slender, reddish to grayish-brown. The buds are about ¼ of an inch long, covered with a pale wool from apex to middle.

The wood is rather strong, heavy, hard, coarse in texture. It does not have a wide commercial use, but is valuable for fuel, ties and general construction.

The Scarlet Oak is found from Maine to Minnesota south to North Carolina and west to Nebraska. It is common to abundant in southeastern Ohio, becoming less abundant to rare in other parts of State. One usually finds it on dry, sandy soil, but it makes its best growth along moist foothills. Toward its southern limits it becomes 80 feet high and 3 feet in diameter. No other oak can equal the Scarlet Oak in brilliant foliage. It is being used more extensively for ornamental purposes in the eastern states.

PIN OAK

Quercus palustris, Muench

THE Pin Oak, also called Spanish Oak and Swamp Oak, is one of the most attractive oaks native to North America. Its trunk usually remains unbranched and the lateral branches take a horizontal position along the middle of the trunk. At the bottom they are drooping and those at the tip are ascending.

The leaves are simple, alternate, 4 to 6 inches long, 2 to 4 inches wide, 5 to 9-lobed. Lobes are bristle-tipped and separated by deep clefts. They resemble those of the Scarlet Oak, but are coarser and less lustrous.

The flowers are similar to those of other oaks.

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

The fruit is a tiny acorn, maturing in two seasons. The cup is thin, shallow, saucer-shaped, about ½ of an inch across. The nut is light brown, often striped, about ½ of an inch long.

The bark is rather smooth, grayish, or dark-brown. The twigs are smooth, shiny, grayish-brown. The branches are thickly set, with stiff, pin-like twigs, whence its name Pin Oak. The buds are small, smooth, light-brown.

The wood is rather heavy, hard and strong. It warps and checks freely. It is used for fuel, ties and general construction work.

The Pin Oak is found from Massachusetts to Michigan south to Tennessee and Oklahoma. It is common throughout Ohio. Rich bottomland, borders of swamps and river banks are its favorite home. It is a medium-sized tree, reaching a height of 100 or more feet and a diameter of 3 feet. It is reported that sandhill cranes build in the tops of Pin Oaks, near Columbus, about 140 feet high, apparently because they are the tallest trees in the woods. It grows rapidly, produces a fair quality wood, is well adapted for shade, park, and street planting.

SHINGLE OAK

Quercus imbricaria, Michaux

THE Shingle Oak, also called Laurel Oak, is among the unique oaks of eastern North America. At first glance it appears to be an over-size laurel, but a close examination reveals acorns, placing it definitely among the oaks.

The leaves are simple, alternate, 4 to 6 inches long, 1 to 2 inches wide, wedge-shaped at base, sharp-pointed at apex, smooth along margin. Mature leaves are dark green and shiny above and pale below.

The flowers are similar to those of other oaks.

The fruit is a small acorn maturing in two seasons. The nut is egg-shaped, about ½ of an inch long, dark brown. The cup is saucer-shaped, reddish-brown, enclosing almost ½ of nut.

SHINGLE OAK
One-fourth natural size.

The bark is light to grayish-brown, becomes rough with shallow furrows. On young trunks it is smooth and shiny. The twigs are smooth, shiny and dark brown. The buds are about ⅛ of an inch long, chestnut-brown.

The wood is rather heavy, hard and strong. It is used for fuel, shingles, and locally for lumber.

The Shingle Oak is found from Pennsylvania to Michigan, south to Georgia and Arkansas. The most eastern station is near Dorney's Park, in Lehigh county, Pennsylvania. In Ohio it is generally distributed throughout the State, becoming less frequent in the western part. Rich, moist bottomlands are its favorite home, where it may reach a height of 80 feet and a diameter of 3 feet. The attractive form and beautiful foliage of this tree recommend it for ornamental planting. It has a rather poor form and is short-lived. It hybridizes freely with other oaks.

AMERICAN ELM

Ulmus americana, Linnaeus

OF all trees native to North America, the American Elm, also called White Elm and Water Elm, is probably the best known and most admired. For beauty, grace and stateliness this tree has few, if any, superiors. It is planted widely as a shade and ornamental tree.

The leaves are simple, alternate, 4 to 6 inches long, unequally based. The veins run straight from midrib to the doubly-toothed margins.

AMERICAN ELM
One-fourth natural size.

The flowers appear early in spring before the leaves. They are greenish and occur in small drooping clusters.

The fruit is a small seed, surrounded completely by a thin, flat, membrane-like wing. It matures after the flowers and is about ½ of an inch across.

The bark is grayish-brown, rather thick, roughened by shallow furrows, sometimes flaky or corky. The twigs are smooth, reddish-brown, marked with obscure pale breathing pores. The leaf-scars are marked with three distinct bundle-scars. The buds are egg-shaped, usually smooth, covered with 6 to 10 overlapping reddish-brown scales with darker margins.

The wood is heavy, hard, tough, rather durable, dark brown to red, with lighter sapwood. It is used for barrels, agricultural implements, posts, ties, and novelties.

The American Elm has a total range of more than 2,500,000 square miles. It extends from Newfoundland west to the Rocky Mountains, a distance of 3,000 miles, and south to Florida and Texas, a distance of 1,200 miles. It is common throughout Ohio, being most abundant in the northern and northwestern parts. It often reaches a height of 80 to 100 feet and a diameter of 2 to 4 feet.

As a forest tree, the American Elm stands in the front rank. Its wide range, good wood, rapid growth and adaptation to a wide range of soils, suggest good care and protection for this tree.

SLIPPERY ELM

Ulmus fulva, Michaux

THE Slippery Elm, also called Red Elm and Moose Elm, has been a well-known tree ever since the pioneer hunters and early travellers learned that its bark has excellent properties for quenching thirst and staying hunger. The bark is still held in esteem for the treatment of throat trouble, fevers and inflammation.

The leaves are simple, alternate, 5 to 7 inches long, rough, unequally based, doubly toothed on margin.

The greenish flowers appear early in spring before the leaves. They occur in few-flowered clusters along twigs.

The fruit is a small seed surrounded completely by a thin, flat, membrane-like wing. It is about ½ of an inch across and matures shortly after the flowers.

SLIPPERY ELM
One-fourth natural size.
Twig section, leaf-scar and flowers, enlarged.

The bark is dark brown tinged with red, becomes rough and furrowed. Inner bark is slippery, fragrant, mucilaginous. The twigs are grayish and rather rough when mature. The buds are dark chestnut-brown, covered with about 12 hairy rusty-brown scales.

The wood is heavy, hard, tough, dark brown to red, with light sapwood. It is used for barrels, agricultural implements, posts, ties, novelties and many special uses.

The Slippery Elm is found from the Valley of the St. Lawrence, south to Florida and west to North Dakota and Texas. It occurs throughout Ohio. The rich soils of the lowlands, coves, and moist foothills are its favorite home.

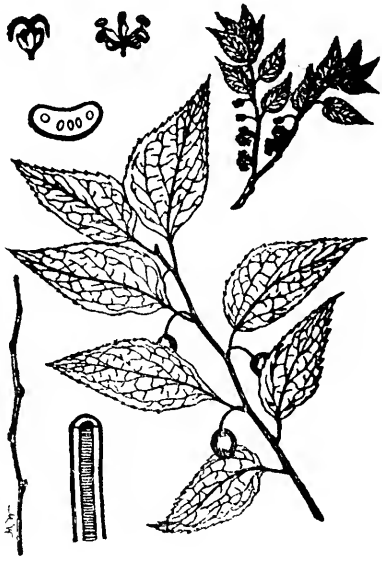
In addition to the two native elms, the English Elm (Ulmus campestris, Linnaeus) has been planted locally throughout Ohio.

HACKBERRY

Celtis occidentalis, Linnaeus

THE Hackberry, also called Sugarberry, Nettle-tree, and Hack-tree, is not important as a timber tree but it produces sweet berries relished by birds, opossums and raccoons.

The leaves are simple, alternate, ovate, 2 to 4 inches long, finely toothed along margin, sharp-pointed, rounded and often lopsided at base, rough on upper surface, with prominent primary veins.



HACKBERRY
One-fourth natural size.
Twig section, flowers and leaf-scar, enlarged.

The flowers are small, greenish and borne on slender stalks. The fruit is a round, dark purple berry about ¼ of an inch in diameter. It matures about September, hangs far into winter, and is eaten freely by birds and other animals.

The grayish-brown bark ranges from smooth, like that of the beech, to very rough. Hard wart-like bark projections are common on medium-sized trees. The twigs are slender, tend to zigzag, and are often grouped in dense clusters known as "witches-brooms." They contain a pith that is made up of thin white plates separated by wide air spaces. This is known as "chambered pith."

The wood is yellowish, rather heavy, and coarse-grained. It is used chiefly for crates, boxes, handles and agricultural implements.

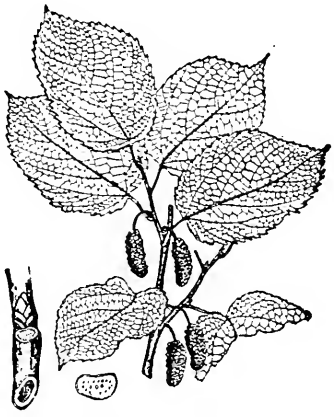
The Hackberry covers a range of 2,000,000 square miles from New England to the Pacific Coast and south to Florida and Texas. It is common in southwestern and western Ohio, becoming rare in the southeastern and northeastern parts. It prefers rich moist soil, is often found near streams, but also occurs on dry rocky bluffs. It is rarely over 50 feet high.

RED MULBERRY

Morus rubra, Linnaeus

THE Red Mulberry, also known as Black Mulberry and more frequently called "Mulberry," came into the limelight in the early days of American history. The early pioneers were inspired with the false hope that it was a new source of food for the silkworm. The outcome was altogether disappointing.

The leaves are simple, alternate, 3 to 5 inches long, roundish, short-tipped, deep green and with deeply sunken veins on upper surface. Some leaves are lobed and resemble an ordinary mitten. The leaf-stalks give a milky secretion upon being squeezed.



RED MULBERRY
One-fourth natural size.
Twig section, natural size. Leaf-scar, enlarged.

The flowers are of two kinds. Pollen-bearing and seed-producing occur in short drooping tassels.

The fruit is a soft, fleshy, dark red to black aggregation of many-seeded berries. They are sweet, juicy, and greatly relished by man, birds, and various other animals.

The bark is rather thin, dark, grayish-brown, begins to roughen about the third year, peels off in thin scales. The twigs are smooth, clean, light greenish-brown, and bear oval, hollowed-out leaf-scars dotted with numerous bundle-scars. The bowl-shaped leaf-scars are helpful in recognizing this tree in winter.

The wood is soft, light, not strong, orange yellow to brown. It is durable in contact with soil, and used chiefly for fence posts.

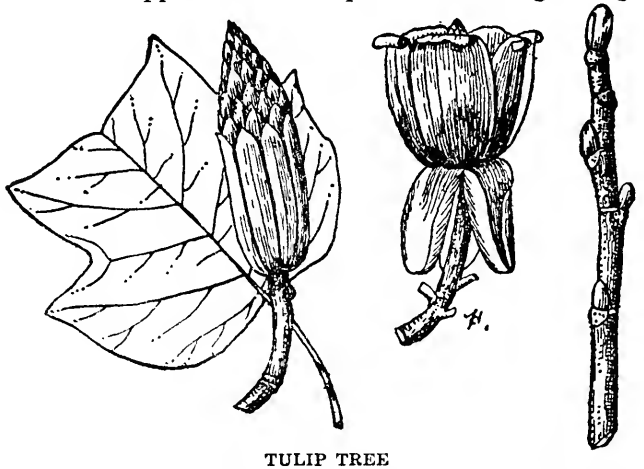
The Red Mulberry, which rarely exceeds 50 feet in height and 2 feet in diameter, is the only mulberry native to North America. It grows from Massachusetts west to Kansas and south to Texas and Florida. It occurs locally throughout Ohio, being common in the southern and northwestern parts and becoming rare in the northern part of the State. Rich moist soils of valleys and foothills is its favorite home. The tree should be protected to insure a food supply for birds.

TULIP TREE

Liriodendron tulipifera, Linnaeus

THE Tulip Tree, also called Yellow Poplar, and Whitewood is one of the most distinctive of American trees.

The leaves are simple, alternate, usually 4-lobed, 4 to 6 inches across, appear to have tips cut off at right angle to



TULIP TREE

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

stem, and are long-stalked. At the base of each leaf-stalk are two leaf-appendages.

The flowers are tulip-like, 1½ to 2 inches deep, greenish-yellow with 3 reflexed sepals and 6 petals.

The fruit is made up of long winged nutlets arranged in light brown, cone-like clusters 2½ to 3 inches long.

The bark when young is smooth, bitter, ash-gray to brown, mottled with light blotches. On old trunks it becomes thick, brown, deeply furrowed. The twigs are smooth, shiny, stout, reddish-brown, marked with pale obscure breathing pores. Complete rings of stipule-scars surround twigs. The buds are smooth, flattened, ¼ to ½ of an inch long, blunt-pointed, reddish-brown, covered with one pair of bud-scales. Within buds are small miniature leaves.

The wood is soft, not strong, light, white-yellowish to brownish, works easily. It is used for furniture interior finishings, woodenware, novelties, house siding and in veneering.

The Tulip Tree is found from Rhode Island to Michigan, south to Florida and Arkansas. It is common throughout Ohio, being most abundant in the southeastern part of the State. Deep, rich, moist soil is its favorite home. It frequently reaches a height of 80 feet and a diameter of 5 feet.

CUCUMBER TREE

Magnolia acuminata, Linnaeus

THE hardiest Magnolia native to eastern North America is the Cucumber Tree. In appearance it suggests a tropical tree for its leaves and flowers are large.

The leaves are simple, alternate, thin, egg-shaped, 4 to 12 inches long, pointed at apex, smooth along margin.

The flowers are large, upright, solitary, bell-shaped about 3 inches long, greenish tinged with yellow, scarcely perceptible among mass of foliage. The fruit is a red cucumber-like mass, 2 to 3 inches long, containing scarlet, pea-size seeds suspended by long slender white threads at maturity.

CUCUMBER TREE
One-fourth natural size.
Seeds and twig sections, enlarged.

The bark is grayish to brown, breaks up into long furrows. The twigs are smooth, shiny, bitter, rather stout, brown, marked with crescent-shaped leaf-scars. The buds are conical, sharp-pointed, about ½ of an inch long, pale silky.

The wood is soft, not strong, brittle, light yellowish to reddish-brown. It is used for the same purposes as Yellow Poplar.

The Cucumber Tree is found from western New York south to Illinois, Georgia and Arkansas. It is found locally throughout Ohio. It is most abundant in the northeastern part of the State. Nearly all has been cut out of the hills of southeastern Ohio. Rich moist woods with abundant sunlight are its favorite home. It reaches a height of 80 to 90 feet and a diameter of 3 to 4 feet. Good wood, rapid growth, few foes are among its principal merits. It is a beautiful tree for lawns and parks.

SASSAFRAS

Sassafras variifolium, (Salisbury) Kuntze

THE Sassafras, also called Sassafrac and Saxifrax, is a distinctive tree. It is recorded that Sassafras bark and roots were among the first cargo shipped from the American colonies. The bark and roots are still used locally in the manufacture of sassafras tea.

The leaves are simple, alternate, egg-shaped, 4 to 6 inches long, usually smooth along margin. Sometimes 2 to 5-lobed leaves are found on same twig with the normal leaves.

The flowers appear with the leaves and are of two kinds. They are greenish-yellow, and arranged in loose, short-stalked clusters.

The fruit is a dark blue, shiny berry borne on a stout red stem. It is excellent bird food.

The bark becomes rough early. On old trunks is reddish-brown, deeply furrowed, separates in thin scales. The twigs are rather brittle, yellowish green, aromatic, sometimes hairy. The inner bark is very mucilaginous. The buds are about 3/5 of an inch long, slightly hairy, greenish, covered with a few bud-scales.

SASSAFRAS
One-fourth natural size.
Single flowers and bud, enlarged.

The wood is soft, brittle, rather durable, aromatic, dull orange-brown, with light sapwood. It is used for posts, rails, furniture, interior finishing, crates, coffins.

The Sassafras is found from Massachusetts to Florida and west to Michigan and Texas. It occurs throughout Ohio. In the southeastern part it is locally abundant. Here it sometimes forms thickets with Sumac and Persimmon. It rarely exceeds 70 feet in height and 3 feet in diameter.

SWEET GUM

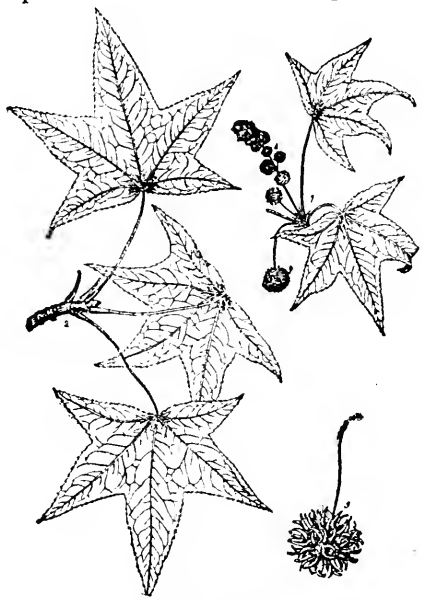
Liquidambar Styraciflua, Linnaeus

THE Sweet Gum, also called Red Gum and Liquidambar, is a handsome tree native locally in southern Ohio.

The leaves are simple, alternate, 3 to 5 inches long, broader than long, star-shaped, six-pointed. In autumn they turn to a pale orange to deep red, and when crushed give off fragrant odor.

The flowers are green and of two kinds. Pollen-bearing are arranged in tassels 2 to 3 inches long. Seed-producing occur in long-stalked heads.

The fruit is a long-stalked round head made up of many capsules each containing many small seeds.



SWEET GUM
One-fourth natural size.

The bark on older trunks is deeply furrowed, grayish-brown, and scaly. On younger trunks it is smoother and dark gray. The twigs are stout, angular, smooth, with corky winged projections. The buds are sharp-pointed, lustrous brown, fragrant when crushed.

The wood is rather hard, strong, reddish-brown, with white sapwood. It is used for boxes, crates, furniture and interior finishing. Large quantities are used in imitation of Circassian Walnut.

The Sweet Gum grows naturally from Connecticut to Florida and as far south as Guatemala. In the swamps of the Coastal Plains it reaches a height of 120 feet and a diameter of 4 feet. In Ohio it occurs locally in Gallia, Lawrence, Scioto, Adams, Brown and Greene Counties. It is being planted extensively as an ornamental tree. This tree has a symmetrical form, grows rapidly, produces unique leaves, and has few enemies.

SYCAMORE

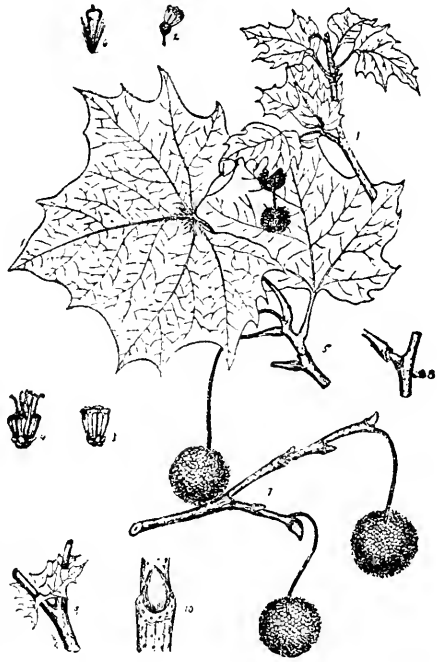
Platanus occidentalis, Linnaeus

THE Sycamore, also called Buttonball, Buttonwood and Plane Tree is the most massive tree of Ohio.

The leaves are simple, alternate, broadly ovate, 3 to 5-lobed, 4 to 10 inches across, bright green above, pale green and white woolly below. The leaf-stalks are about 2 inches long, enlarged and hollowed at base.

The flowers are of two kinds, occur in dense ball-like heads, attached to twigs by long slender stalks.

The fruit consists of tiny seeds, arranged in ball-like heads about 1 inch in diameter, attached to twigs by long slender stalks.



SYCAMORE
One-fourth natural size.
Flowers and twig sections, enlarged.

The bark on old trunks is rather thick, dark brown, peels off in broad scales. On young stems and the upper part of larger trunks it peels off in thin scales exposing white, greenish and yellowish inner bark. The twigs are rather stout, at first green and fuzzy, later grayish to brown and smooth. The buds are about ¼ of an inch long, conical, dull-pointed, smooth, reddish-brown. Terminal bud is absent.

The wood is hard, strong, reddish-brown. It is used for boxes, furniture, novelties, charcoal, chemicals.

The Sycamore is native from Maine to Minnesota and south to Florida and Texas. Moist to wet fertile soil is its favorite home. This tree is generally distributed throughout Ohio along streams and in other moist to wet places, but is not common in the northern part of the State. The Oriental Plane Tree, a close relative of our Sycamore, has been planted in Ohio for ornamental purposes.

PAPAW

Asimina triloba, Dunal

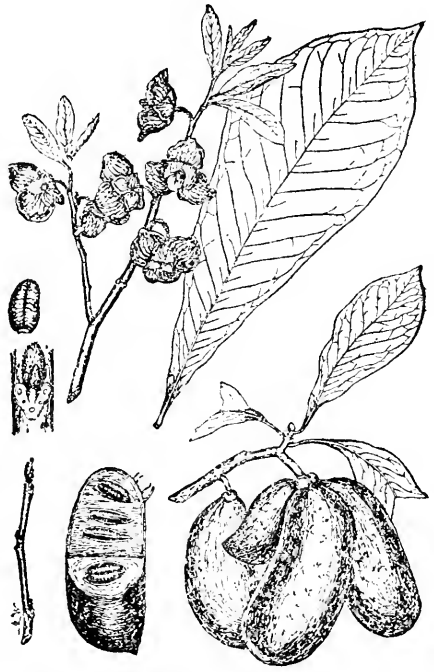
THE Papaw is a dainty tree rarely exceeding 30 feet in height. A mere glance at its broad leaves suggests that it has escaped from the tropics and its fruit resembles a stubby banana.

The leaves are simple, alternate, 4 to 12 inches long, thin in texture, short-pointed, long tapering at base, smooth on margin.

The flowers are large, 1 to 1½ inches wide, solitary, at first green, later reddish, occur below leaves, are borne on short stalks.

The fruit suggests a stubby banana, 3 to 5 inches long, at first green, yellowish to dark brown when ripe, contains many dark brown shiny flat seeds throughout the flesh. It is edible.

The bark is thin, smooth, dark brown, often dotted with light blotches. The twigs are rather slender, smooth, olive brown, enlarged at nodes. The buds are brown, naked, hairy. Terminal bud is large and flattened. Flower buds are round, 1/6 of an inch in diameter, very hairy, dark brown.



PAPAW
One-fourth natural size.
Twig section and bud, enlarged.

The wood is soft, weak, yellowish to brown. It is not used commercially.

The Papaw is found from western New York and New Jersey, south to Florida and west to Michigan and Texas. This tree occurs locally in northern Ohio, and becomes common in the southern part of the State, where it locally forms thickets on waste areas. This tree deserves to be planted ornamentally because of its tropical leaves, unique flowers, and peculiar fruit.

WILD BLACK CHERRY

Prunus serotina, Ehrhart

THE Wild Black Cherry, also called Wild Cherry, Black Cherry, Rum Cherry, and Cabinet Cherry is the only native cherry that reaches large tree size. It often attains a height of 75 feet and a diameter of 3 feet.

The leaves are simple, alternate, 2 to 5 inches long, long-pointed, finely toothed along margin, rather thick, shiny on upper surface and paler below.

WILD BLACK CHERRY
One-fourth natural size.

The flowers are white, about ¼ of an inch across, arranged in spikes 3 to 4 inches long.

The fruit is a purplish-black juicy berry, about one-third of an inch in diameter, grouped in drooping clusters.

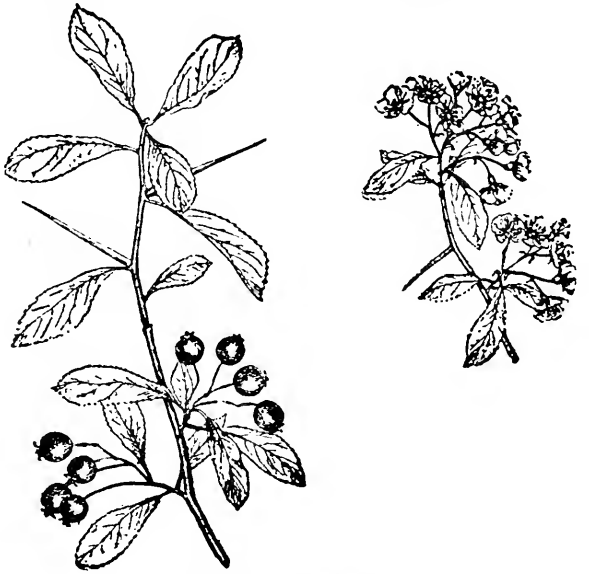
The bark on young trunks is smooth, glossy, reddish-brown marked with conspicuous white, horizontally elongated breathing pores, peels off in thin film-like layers exposing green inner bark. On old trunks it becomes black, rough, breaks up into thick plates. The twigs are smooth, reddish-brown marked with numerous small whitish breathing pores. Twigs and inner bark have bitter taste and unpleasant odor. The buds are about ⅛ of an inch long, smooth, glossy, reddish-brown, covered with about 4 visible scales.

The wood is moderately heavy, hard, and strong, fine-grained, with reddish-brown heartwood. It is durable and used for furniture, interior finishings, tools, ties, implements and high-class panels.

The Wild Black Cherry is found from Nova Scotia south to Florida and west to Kansas and Texas. It is generally distributed throughout Ohio. In the hilly section in the southeastern part of the State it usually occurs on eastern and northern exposures. Rich bottom-lands and moist hillsides are its favorite home. We need its fine wood, the birds eat its fruit, and the bees frequent its flowers. The closely related Choke Cherry also occurs throughout Ohio.

THE HAWTHORNS—Crataegus

THE Hawthorns comprise a big group of small trees. There are more than 30 common species. If one observes their flowers and fruit it is easy to see that they are closely related to the apples, plums and peaches. The most



COCKSPUR THORN
One-fourth natural size.

distinctive feature of their make-up is their stiff thorns on the zigzag branches.

Two common Hawthorns are the Cockspur Thorn and the Scarlet Thorn. The Cockspur Thorn (Crataegus crus-galli, Linnaeus) may be recognized by its long, usually unbranched, chestnut brown thorns, its inversely ovate leaves, and its small nearly spherical buds. The white flowers are grouped in round-topped clusters, and the bright apple-like scarlet fruit persists far into winter. This small tree is common throughout Ohio.

The Scarlet Hawthorn (Crataegus coccinea, Linnaeus) can be recognized by its ovate leaves, and its round, reddish-brown fruit. Both the leaves and the fruit show a tendency to be hairy. The leaves are 5 to 9-lobed, often deep-cleft and finely toothed along the margin. The nearly round chestnut brown buds and the slender, straight thorns are also helpful in recognizing this small tree which is found in meadow pastures, abandoned fields, and waste places generally throughout Ohio. Its abundant bloom, rich scarlet fruit and attractive autumnal foliage recommend it highly for ornamental planting.

SHAD BUSH

Amelanchier canadensis (Linnaeus) Medicus

THE Shad Bush, also called Service Berry, June Berry and Sarvice, is one of the most conspicuous small trees when in full bloom early in spring. The early settlers observed that it was in full bloom when the shad ascended the rivers to spawn.

The leaves are simple, alternate, egg-shaped, 3 to 4 inches long, sharp-pointed, finely toothed along margin, when young finely hairy, later smooth.

The flowers appear just when the leaves start to come out. They are white, slender-stalked, arranged in drooping clusters 3 to 5 inches long.

The fruit is a reddish-purple, sweet berry, about one-third of an inch in diameter, coated with whitish bloom when fully ripe. It matures in June or July.

SHAD BUSH
One-fourth natural size.
Flower, fruit and twig section, enlarged.

The bark is usually smooth, grayish, often marked with black streaks. The twigs are slender, bright green to purplish-brown, smooth. The buds are slender, conical, ¾ of an inch long, 3 to 4 times as long as wide, sharp-pointed, greenish-brown.

The wood is heavy, hard, light to dark brown, checks and warps easily.

The Shad Bush is found from Newfoundland west to Kansas and south to Florida and Louisiana. It occurs locally throughout Ohio. It is usually found solitary or in small clumps. Along the border of forests, along fences, roads and water courses one usually finds this small tree that rarely exceeds 25 feet in height and 12 inches in diameter. Its fine floral beauty recommends the protection of this beautiful tree which also yields delicious berries for man, birds and other animals.

COMMON LOCUST

Robinia Pseudo-Acacia, Linnaeus

THE Common Locust, also called Black Locust, Yellow Locust, and Acacia, is a valuable, and when in full bloom, a beautiful forest tree. It is unquestionably the best-known American pod-bearing tree.

The leaves are alternate, 8 to 14 inches long, compound, with 7 to 21 leaflets. Leaflets are usually odd in number, short-stalked, 1 to 2 inches long.

COMMON LOCUST
One-fourth natural size.
Twig sections, enlarged.

The flowers appear in May or June, are cream-white, fragrant, resemble a pea blossom, are arranged in drooping clusters 4 to 5 inches long. The fruit is a small, dark-brown, thin pod, 2 to 4 inches long, ½ of an inch wide, contains 4 to 8 small brown seeds. The bark on both young and old trunks is reddish-brown, b e comes thick, deeply furrowed.

The twigs are stout, brittle, greenish to reddish-brown, bear two short spines at each node. The buds are small, imbedded in bark, and 3 to 4 occur above each other. The wood is yellowish-brown, very heavy, hard and durable. It is used for posts, insulator pins, ties, fuel and ship-building.

The Common Locust is found from the mountains of Pennsylvania, south to Georgia, west to Iowa and Kansas. It occurs locally throughout Ohio and is abundant in the southeastern part of the State. A large number of thrifty groves occur throughout the State. Locally it has escaped cultivation. The most vigorous growth is made on moist fertile soil. In youth it is a rather attractive tree, especially when in full bloom. Its valuable wood and rapid growth recommend it for planting, especially where the Locust Borer need not be feared.

HONEY LOCUST

Gleditsia triacanthos, Linnaeus

THE Honey Locust, also called Sweet Locust, Thorn Tree and Three-thorned Acacia, is the most beautiful large pod-bearing tree of Ohio.

The leaves are alternate, singly or doubly compound, 7 to 8 inches long. When singly compound they have 18 to 28 leaflets, and when doubly compound have 8 to 14 pinnae each with 18 to 20 leaflets.

HONEY LOCUST
Twig, natural size. Leaves, pod and thorn, One-fourth natural size.

The flowers are greenish, appear about May or June, and are of two kinds. The pollen-bearing are arranged in short tassels; the pod-bearing occur in few-flowered clusters.

The fruit is a thin, flat, more or less twisted, reddish-brown pod, 10 to 18 inches long, containing many small flat seeds and often persist far into winter.

The bark on young stems is smooth, brownish, dotted with many oblong breathing pores. On old trunks it becomes grayish-brown to black and roughened with shallow furrows and firm ridges. The branches and trunk usually bear very distinctive, large, three-pronged sharp-pointed thorns. The twigs are smooth, glossy, greenish-brown. The buds are very small, usually 3 at a node, and placed above one another.

The wood is hard, heavy, strong, reddish-brown with pale sapwood. It is rather durable in contact with soil and used for posts, rails, and general construction work.

The Honey Locust has a rather extensive range from Ontario to Kansas and south to Pennsylvania, Florida and Texas. It occurs locally throughout Ohio, but is most common in the southwestern section. It has been planted in some localities for ornamental purposes. Under favorable conditions it will grow to a height of 80 feet and a diameter of 4 feet. It is a handsome park tree and is growing in favor for ornamental planting.

KENTUCKY COFFEE TREE

Gymnocladus dioica (Linnaeus) Koch

THE Kentucky Coffee Tree, also called Coffee Nut, Nigger Tree, and Mahogany has unusual characteristics. The leaves are alternate, twice and sometimes thrice compound, 1 to 3 feet long, 1½ to 2 feet wide. Leaflets are egg-shaped, about 2 inches long, sharp-pointed at apex, smooth to wavy along margin.

The flowers appear about June and are of two kinds. The pollen-bearing are greenish-white, arranged in clusters 3 to 4 inches long. The pod-producing are greenish-white and grouped in clusters 6 to 8 inches long.

The fruit is a broad, flat, thick, stubby, reddish-brown pod, 4 to 10 inches long, 2 to 4 inches broad. Pods contain 6 to 9 marble-like brown seeds and often persist far into winter.

KENTUCKY COFFEE TREE
One-fourth natural size.
Twig section natural size.

The bark is dark gray to blackish-brown, roughened by long, shallow, furrows. The twigs are very stout, greenish-brown, often covered with a crusty coating, marked with large, broadly heart-shaped leaf-scars and contain wide pinkish to brown pith. The buds are small, downy, almost entirely imbedded in twigs, surrounded by hairy ring of bark, often placed above one another in close formation.

The wood is rather heavy, coarse-grained, light brown to reddish-brown. It is used for posts, rails, and locally for general construction work.

The Kentucky Coffee Tree is found from central New York to Tennessee, west of Minnesota and Oklahoma. It is common on limestone soils of southern and southwestern Ohio. It is rare north of Franklin County, and seldom found in unglaciated section in southeastern part of State.

REDBUD

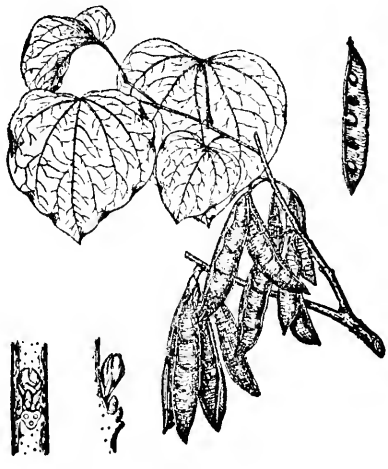
Cercis canadensis, Linnaeus

THE Redbud, also called Judas Tree, is one of the most attractive of our small trees. No native tree has more striking distinguishing characteristics.

The leaves are simple, alternate, heart-shaped, 3 to 5 inches long, pointed at apex, entire on margin.

The flowers appear before the leaves, resemble sweet peas, are brilliant red, occur in numerous clusters of 4 to 8 along twigs.

The fruit is a small rose-colored to light-brown, short-stalked, thin, flat pod, 2½ to 3 inches long, about ½ of an inch wide, contains 4 to 8 light-brown flat seeds.



REDBUD
One-fourth natural size.
Twig sections, enlarged.

The bark is thin, reddish-brown, peels off into thin scales. The twigs are slender, smooth, light-brown, covered with numerous small breathing pores. The buds are small, spherical, ⅛ of an inch across, dark purplish-red, usually occur one above another and often are grouped in small clusters at base of lateral branches.

The wood is heavy, hard, dark reddish-brown with light sapwood. It is of no commercial importance.

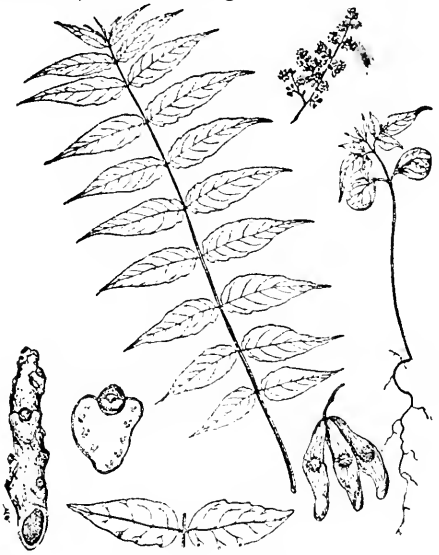
The Redbud is found from Ontario to Minnesota, south to Florida and Arkansas. It is found locally throughout Ohio, except the northeastern part of the State. In southwestern Ohio it is abundant. Rich fertile lowlands and moist hillsides are its favorite home.

It is difficult to tell at which season of the year the Redbud is most beautiful. Its spring robe of brilliant red blossoms is glorious, its summer dress is resplendent, its autumn garb of yellow trimmed with purplish pods is truly beautiful, and its winter appearance is most charming.

AILANTHUS

Ailanthus glandulosa, Desfontaines

THE Ailanthus, also called Tree of Heaven, Chinese Sumac, and Paradise Tree came to this country from China about 150 years ago, and was planted first near Philadelphia. The leaves are alternate compound, with 11 to 31 leaflets, occasionally 3 feet long. Leaflets are 3 to 5 inches



AILANTHUS
One-fourth natural size.
Twig, one-half natural size. Leaf-scar, slightly enlarged.

long, egg-shaped, long-pointed at apex, smooth along margin except for a few teeth near base. They produce unpleasant smell when crushed. Glands are usually present near base of leaflets.

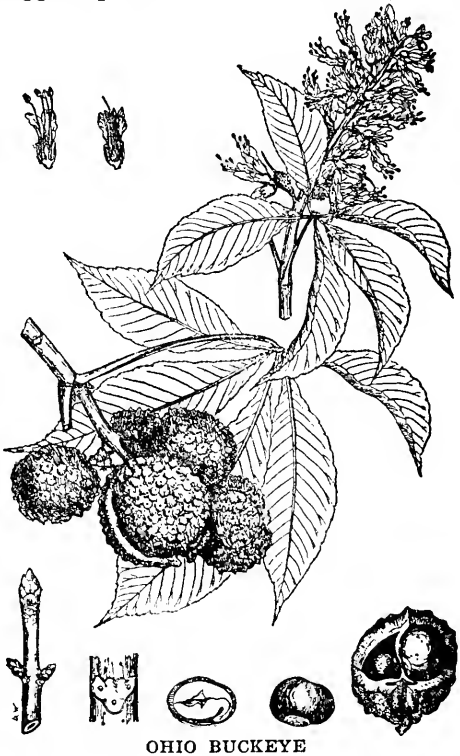
The flowers are small, greenish, of two kinds and arranged in loose clusters. Pollen-bearing and seed-producing occur on different trees. The fruit is a thin winged seed produced in large clusters. The bark on young trees is smooth, thin, light gray. On older trunks it becomes dark gray to black. The twigs are very stout, yellowish-green to brown, covered with a velvety down, marked with ochre-colored breathing pores and large heart-shaped leaf-scars with 8 to 14 groups of bundle-scars. The buds are small, round, reddish-brown. The wood is light, soft, weak, white to pale yellow. It is well adapted to the manufacture of paper pulp. The Ailanthus has been planted in all parts of Ohio. In many places it has escaped cultivation and now forms dense thickets. It is common along fences, in waste places, open woods, and abandoned fields.

OHIO BUCKEYE

Aesculus glabra, Willdenow

THIS is the tree that gave Ohio the distinctive name of "Buckeye State." It is also called American Horse Chestnut, Fetid Buckeye and Stinking Buckeye.

The leaves are opposite, compound, with 5, rarely 7 leaflets. The leaflets are egg-shaped, 3 to 6 inches long. If crushed the leaves are ill-smelling. This is one of the first of our trees to put out leaves in spring.



OHIO BUCKEYE

The flowers are small, yellowish or greenish, with 4 upright petals. They are arranged in upright clusters 5 to 6 inches high and 2 to 3 inches wide. The stamens project beyond the corolla. This is one characteristic by which the Ohio Buckeye can be distinguished from the Sweet Buckeye.

The fruit is a thick, round or pear-shaped prickly or warty capsule, about 1 inch in diameter, containing a large, smooth, shiny brown nut. It resembles closely the fruit of the Common Horse Chestnut. The bark is grayish, breaks into scaly plates. The twigs are stout, ashy-gray to reddish-brown, ill-smelling if bruised. The buds are opposite, 2/3 of an inch long, sharp-pointed, covered with reddish-brown resinous scales. The wood is soft, weak, whitish to pale yellow. It is used for paper pulp, woodenware, artificial limbs, and occasionally as lumber.

The Ohio Buckeye ranges from western Pennsylvania, south to Alabama, west through Ohio to Illinois, Iowa and Oklahoma. It is generally distributed throughout Ohio, becoming less common in the southeastern part. It is usually found in moist flood plains, and locally on dry hills. It is often planted for ornamental purposes.

SWEET BUCKEYE

Aesculus octandra, Marshall

THE Sweet Buckeye, also called Yellow Buckeye, and Big Buckeye, is the largest member of this interesting tree group. It may reach a height of 110 feet and a diameter of four feet.

The leaves are opposite, compound, with 5 and sometimes 7 leaflets. Its leaves, flowers, fruits, bark, twigs and buds resemble those of the Ohio Buckeye. It can be distinguished from the latter by its smoother and lighter colored bark. The capsule of its fruit is smooth while that of the Ohio Buckeye is warty or spiny. The anthers of its flowers remain within the corolla, while those of the Ohio Buckeye extend out beyond the corolla. The entire lower leaf surfaces are more permanently pubescent in this tree than in the Ohio Buckeye, and the buds are non-resinous. The latter characteristic is very helpful in distinguishing this tree from the Horse Chestnut which has very resinous buds.

SWEET BUCKEYE

The wood is light, soft, weak, whitish to pale yellowish. It resembles Yellow Poplar, for which it is often sold. It is used for paper pulp, woodenware, slack cooperage, artificial limbs, and locally for lumber and interior finishing.

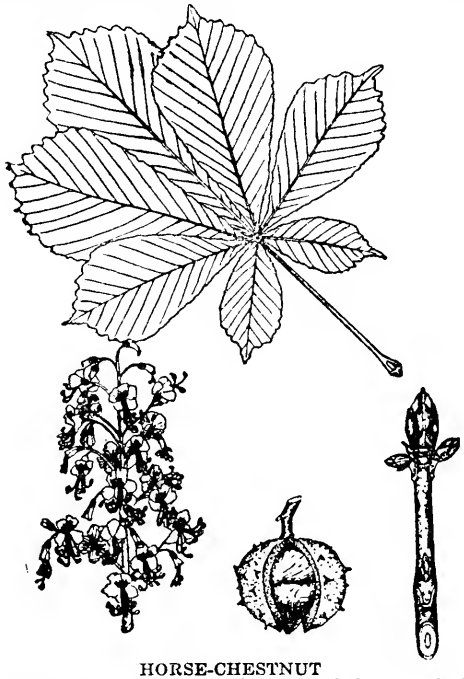
The Sweet Buckeye ranges from western Pennsylvania through southern Ohio, Indiana and Illinois to Iowa and Oklahoma and south to Georgia and Texas. It is confined to southern Ohio extending northward to Monroe and Fairfield counties. Rich bottomlands and lower slopes are its favorite home. It never occurs in pure stands, but is usually found in mixture with other hardwoods. In some sections of Ohio it is planted as an ornamental tree.

HORSE CHESTNUT

Aesculus Hippocastanum, Linnaeus

THE Horse Chestnut has been carried by man from its original home in the mountains of Greece over a considerable part of the civilized world.

The leaves are opposite, compound, with usually 5 to 7 leaflets. The leaflets are 5 to 7 inches long, about 2 inches



HORSE-CHESTNUT
One-third natural size. Twig, one-half natural size.

wide, inversely egg-shaped, arranged in fan-like form.

The flowers appear in May or June, are large, white, with throats dotted with yellow and purple, arranged in upright clusters 8 to 12 inches high. The fruit is a leathery round capsule, about 2 inches across, roughened with spines, and contain 1 to 3 shiny brown nuts.

The bark is dark brown, breaks up into thin plates which peel off slowly. The twigs are stout, reddish-brown, smooth, obscurely dotted with breathing pores, marked with large horseshoe-like leaf-scars each with 5 to 7 groups of bundle-scars. The buds are large, sticky, varnished, reddish-brown. The wood is soft, light, weak, whitish.

The Horse Chestnut is a sturdy, rapid-growing tree, now found in every state of the Union, and widely planted in Ohio for ornamental uses.

STAGHORN SUMAC

Rhus typhina, Linnaeus

THE Staghorn Sumac, also called Velvet Sumac, is the largest of the native Sumacs. Under favorable conditions it reaches a height of 35 feet and a diameter of 8 inches.

The leaves are alternate, 16 to 24 inches long, compound, with 11 to 31 leaflets. Leaf-stalks are hairy. Leaf-scars are U-shaped and contain 3 groups of small greenish bundle-scars.

The flowers are small greenish-yellow, appear about May, occur in pyramid-like panicles 5 to 12 inches long and 4 to 6 inches broad.

The fruit is a small red drupe arranged in conspicuous red heads 5 to 8 inches long and 4 to 6 inches broad.

The bark on old trunks is rough, dark brown; on younger trunks it is smooth, thin, covered with numerous yellowish-brown dots. The twigs are stout, clumsy, covered with a dense coating of velvety hairs, contain a wide, yellowish-brown pith, when cut or bruised they yield a milky sap. The buds are small, round and hairy.

STAGHORN SUMAC
One-fourth natural size.
Leaf-scars, seed, and single flowers, enlarged.

The wood is soft, brittle, rather satiny to touch, orange-colored streaked with green.

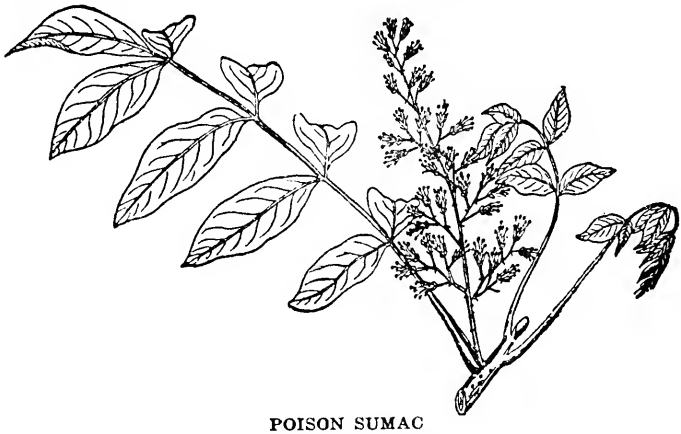
The Staghorn Sumac is found from New Brunswick to Minnesota, south to Georgia and Alabama. It occurs locally in practically all parts of Ohio. Fertile, dry uplands are its favorite home. It is common on abandoned fields and along fence rows. It is highly prized on account of its autumnal foliage and the coloration of its fruit.

POISON SUMAC

Rhus Vernix, Linnaeus

THE Poison Sumac, also called Poison Elder, and Swamp Sumac, differs from the other sumac in that it produces ivory-white fruit.

The leaves are alternate, 7 to 14 inches long, compound with 7 to 13 leaflets. The leaflets are 3 to 4 inches long,



POISON SUMAC
One-half natural size.

narrowly egg-shaped, smooth along margin, dark green and shiny above, pale on lower surface.

The flowers appear in June or July. The pollen-bearing and seed-producing occur on different trees. They are small, yellowish-green, arranged in drooping panicles. The fruit is small, round, glossy ivory-white drupe, arranged in loose drooping clusters. The bark is smooth, somewhat streaked, light to dark gray, marked with elongated dots. The twigs are stout, orange-brown, smooth, glossy. The buds are purplish, about two-fifths of an inch long, sharp-pointed. The wood is soft, brittle, coarse-grained, light yellow.

The Poison Sumac is found from Ontario to Minnesota south to Florida and Louisiana. This small tree is rare in Ohio, occurring in Geauga, Cuyahoga, Wayne, Wyandot, Licking, Fairfield and a few other counties. Swamps, low grounds and moist slopes are its favorite home. This tree is one of our most poisonous plants. Some people are immune from its attack while others are highly susceptible.

The Dwarf Sumac—Rhus copallina, Linnaeus—is another of the non-poisonous Sumacs native in all parts of Ohio, being most common in the southeast part. It rarely exceeds 15 feet in height and may be distinguished by its leaves with winged stalks and leaflets with smooth margins.

SUGAR MAPLE

Acer saccharum, Marshall

THE Sugar Maple, also called Hard Maple and Rock Maple, is probably the best known American hardwood tree. It produces the delicious maple syrup and maple sugar of commerce.

The leaves are simple, opposite, 3 to 5 inches long, coarsely toothed, dark green above and pale below.

The flowers are yellowish-green, appear in April and May with the leaves. Both pollen-bearing and seed-producing occur in drooping, slender-stalked clusters on the new growth.

The fruit is a two-winged maple key. The wings are about an inch long and are almost parallel to each other or slightly divergent.

The bark is grayish to brownish black, roughened with shallow furrows. The twigs are slender, smooth, reddish to orange brown, marked with pale dots. The buds are brown, conical, sharp-pointed, covered with 8 to 10 exposed scales.

SUGAR MAPLE
One-fourth natural size.
Twig one-half natural size; single flowers, enlarged

The wood is heavy, hard, close-grained, light brown to reddish. It is an all-purpose wood, being manufactured into not less than 500 articles of commerce.

The Sugar Maple is found from Newfoundland to Manitoba, south to Florida and Texas. It occurs in every State east of the Mississippi, but is rare in the South. It is generally distributed throughout Ohio, being abundant in the Western Reserve. Under favorable conditions it reaches a height of 100 feet and a diameter of 4 feet. As a timber tree the Sugar Maple rates high in most of its range, as a memorial tree it is among the best, and as an ornamental and street tree it is in the front rank.

SILVER MAPLE

Acer saccharinum, Linnaeus

THE Silver Maple, also called White Maple, Soft Maple and River Maple, is one of the best known American trees on account of its wide natural range and its general use for shade and ornamental planting.

The leaves are simple, opposite, 5-lobed, silvery white on lower surface, divided by deep clefts with rounded bases. The base of the clefts of the Red Maple are sharp-angled.

The flowers are reddish to crimson, occur in compact clusters along twigs early in spring before the leaves appear.

The fruit is a typical two-winged maple key. The wings are 2 to 3 inches long and wide-spreading. The fruit matures in early summer. It falls to the ground shortly after maturing and germinates the same year.

SILVER MAPLE
One-fourth natural size.

The bark on branches and young stems is smooth and gray; on old trunks it becomes grayish brown and separates in thin flakes. The twigs are slender, glossy, reddish-brown, have disagreeable odor if broken, are marked with many light dots. The buds are round, red, covered with 6 to 8 visible scales, clustered in groups along twigs.

The wood is soft to moderately hard, rather brittle, close-grained, light brown with wide, white sapwood. It is used in the manufacture of paper, berry baskets, box-boards and many small household articles.

The Silver Maple is found from New Brunswick to Florida and west to the Dakotas and Oklahoma. It is generally distributed throughout Ohio. Moist to wet soils, stream banks, and borders of ponds and lakes are its favorite home. This tree grows rapidly and may reach a height of 80 feet and diameter of 3 feet. Formerly it was planted extensively for ornamental purposes, but now it is rarely planted for it is short-lived, has many enemies, and suffers much from the wind, snow and ice.

RED MAPLE

Acer rubrum, Linnaeus

AT all seasons of the year the Red Maple, also called Scarlet Maple, Soft Maple, Swamp Maple and Water Maple, is a beautiful red. In autumn it is at its best. Then it stands out among its associates as a flaming torch of scarlet and crimson.

The leaves are simple, opposite, about 3 inches long, 3 to 5 lobed, pale green to whitish on lower surface. The clefts between lobes are shallow and sharp-angled.

The flowers are red, appear early in spring before the leaves, are arranged in numerous small clusters.

The fruit is a typical two-winged maple key. The wings are less than an inch long, and not wide-spreading from each other. The fruit matures in early summer. It falls shortly after maturing and germinates the same year.

RED MAPLE
One-fourth natural size.

The bark on branches and young trunks is smooth and gray; on older trunks is grayish-brown and shags off in small thin plates.

The twigs are smooth, red, marked with light dots. The buds are round, red, covered with 6 to 8 exposed scales, clustered in groups along twigs. They are similar to those of the Silver Maple.

The wood is moderately hard, rather brittle, close-grained, light brown with wide and white sapwood. It is used in the manufacture of paper, berry baskets, box-boards and many small household articles.

The Red Maple is one of the most widely distributed trees of North America. It occurs locally throughout Ohio, but is abundant only in the northeastern counties. Wet to swampy situations, fertile lowlands, and moist hillsides are its favorite home.

The Red Maple has rare beauty, produces good wood and grows to a height of 100 feet and a diameter of 4 feet. For ornamental planting it is superior to the Silver Maple.

ASH-LEAVED MAPLE

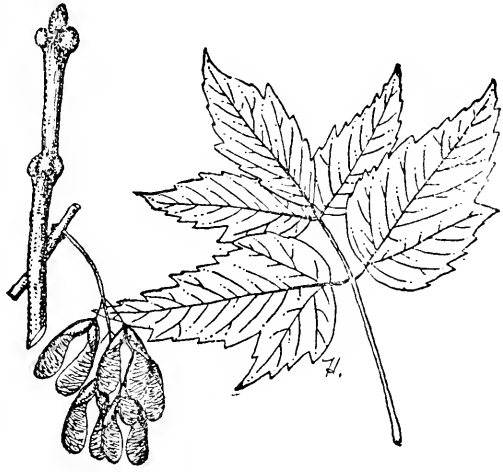
Acer Negundo, Linnaeus

THE Ash-leaved Maple, also called Box Elder and Water Ash, is the only Ohio maple with compound leaves. All other maples have simple leaves.

The leaves are opposite, compound, with 3 to 5 leaflets. Leaflets are 2 to 4 inches long, coarsely toothed. The leaf-scars completely encircle the twigs.

The flowers are yellowish-green suspended on slender stalks in small open clusters. The pollen-bearing and the seed-producing occur on different trees.

The fruit is a typical two-winged maple key, which matures about September, occurs in drooping clusters, often persists far into winter. The wings are 1½ to 2 inches long, and usually incurved.



ASH-LEAVED MAPLE
Leaf, one-third natural size. Twig and fruit, two-thirds natural size.

The bark on branches and young trunks is smooth and grayish-brown; on older trunks becomes dark and breaks up into shallow furrows. The twigs are stout, greenish to purplish green, smooth, often covered with a whitish crusty coating. The buds are rather large, egg-shaped, short-stalked, white-woolly, grouped at nodes in clusters of 2 to 3. The outer pair of bud-scales completely covers the inner pair.

The wood is light, soft, close-grained, creamy white, not durable. It is used in the manufacture of pulp, woodenware, barrels and cheap furniture.

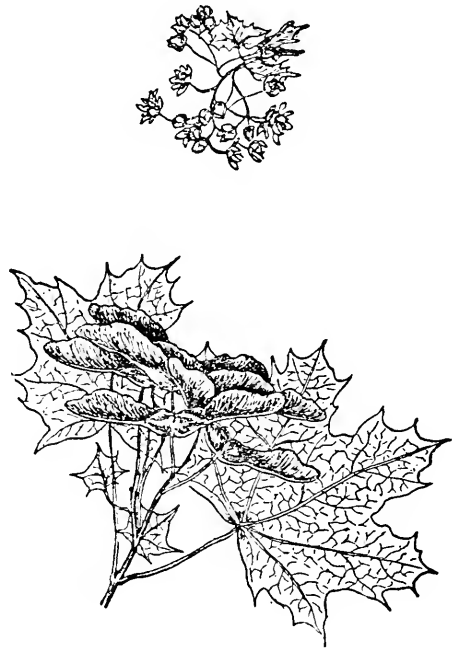
The natural range of Ash-leaved Maple is equalled by few American trees. It covers almost three million square miles from New England to Alberta, south to Florida, Texas and Mexico. It occurs throughout Ohio but is not common in the southwestern quarter of the State. In many places it has escaped cultivation. Wet to moist sites along streams and borders of lakes and ponds are its favorite home.

NORWAY MAPLE

Acer platanoides, Linnaeus

THE Norway Maple is one of the most popular street trees in the United States. There are very few towns and cities in which this tree is not found. It comes to us from Europe where it is found from Norway to Switzerland.

The leaves resemble those of the Sugar Maple but are deeper green in color and firmer in texture. One characteristic by which it can always be distinguished is the presence of milky sap in the leaf-stalks. If pressed or twisted the leaf-stalks always yield a few drops of milky sap. In early spring the yellowish-green flowers arranged in clusters along the twigs are distinctive. In winter the large, red, blunt-pointed glossy buds are a sure means of identification. In late summer the large fruit keys with wide-spreading wings ripen and may hang on the tree for months.



NORWAY MAPLE
One-half natural size.

The Norway Maple has many merits as a street tree. It is hardy, rather free from disease and insect attacks, retains its leaves longer than the native maples, and endures well the smoke, dust and drought of the city. It has been widely planted as an ornamental tree throughout Ohio.

Another European maple has been planted locally in Ohio. It is the Sycamore Maple (Acer Pseudo-platanus, Linnaeus). It can be distinguished easily by its firm, 3 to 5-lobed leaves with sharply toothed margins, and its large, blunt-pointed green buds. The fruit keys are smaller than those of the Norway Maple. It does not thrive on all kinds of soil.

BASSWOOD

Tilia americana, Linnaeus

THE Basswood is a tree of many names. Among them are Linden, Lynn, Lime-tree, White-wood, Beetree and Whistle-wood.

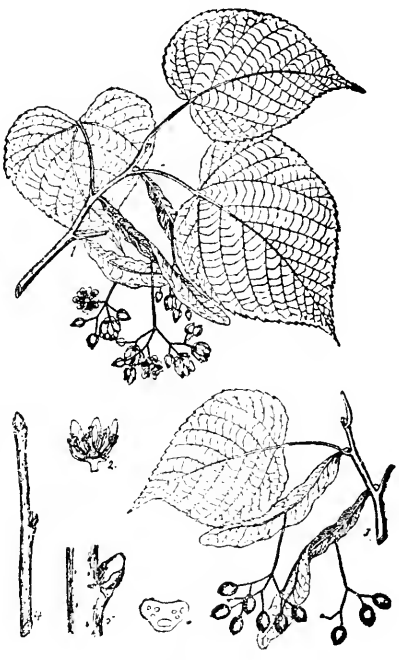
The leaves are simple, alternate, egg-shaped to round, 4 to 7 inches long, firm in texture, toothed along margin, unequally heart-shaped at base, tufts of rusty hair often occur in axils of veins.

The flowers appear in June or July. They are small, yellowish-white, sweet, fragrant, 5 to 20 in a cluster, attached to a wing-like bract by a slender stalk.

The fruit is a woody nut-like berry about the size of a pea. It usually occurs in small clusters attached to a wing-like bract by slender stalks, often persists far into winter.

The bark on young stems is smooth and dark gray, on older trunks it becomes thick and clearly furrowed.

The twigs are smooth, shiny, rather stout, bright red. The buds are egg-shaped, 2-ranked, stout, blunt-pointed, usually deep red, with 3 visible bud-scales.



BASSWOOD
One-fourth natural size.
Twig, one-half natural size. Flower, leaf-scar and twig section, enlarged.

The wood is light, soft, light-brown to nearly white. It is used in the manufacture of paper pulp, crates, furniture, kegs, pails, berry baskets.

The Basswood is found from New Brunswick to Manitoba, southward to Georgia and Texas. It is common throughout Ohio. In the southeastern part of the State it is confined to stream basins, ravines and coves. Rich, moist bottomlands and hillsides are its favorite home. It reaches a height of 70 to 80 feet and sprouts freely. It is a handsome shade tree, transplants easily, grows rapidly, and produces useful wood.

FLOWERING DOGWOOD

Cornus florida, Linnaeus

THE Flowering Dogwood is among the best-known trees of eastern North America.

The leaves are simple, opposite, 3 to 5 inches long, 2 to 3 inches wide, smooth or wavy along margin, often clustered at end of twigs. In autumn they become a beautiful red.

The flowers appear about April in greenish clusters surrounded by large white bracts.

The fruit is a scarlet berry about three-fifths of an inch long, arranged in clusters of 2 to 5.

The bark on young stems is smooth, light brown to reddish-gray; on old stems becomes reddish-brown and divides into squarish blocks.

The twigs are usually smooth, red, tinged with green, often glossy. The flower buds are goblet-like, about two-fifths of an inch in diameter. The wood is hard, heavy, strong, reddish-brown to pinkish, with light sapwood. It is used for tool handles, shuttles, golf stick heads.

FLOWERING DOGWOOD
One-third natural size.

The Flowering Dogwood is found from Massachusetts to Michigan, Florida and Texas. It is common throughout Ohio. In many places it is the most conspicuous member of the understory of the forest.

BLACK GUM

Nyssa sylvatica, Marshall

THE Black Gum, also called Sour Gum, Tupelo, and Pepperidge, is at its best in autumn when the entire crown is often clothed with a complete garment of flaming red. In winter when the foliage is off it has a strikingly picturesque form. The stem often continues from the base to the tip without dividing. In young and middle-aged trees the top branches take an upright position, the lower ones droop, while those along the middle stand out horizontally.

The leaves are simple, alternate, 2 to 5 inches long, oval, blunt-pointed, wedge-shaped at the base, smooth along margin.

The twigs are smooth, grayish-brown, and dotted with crescent-shaped leaf-scars each marked with three distinct bundle-scars. The buds are reddish-brown and scattered alternately along twigs.

BLACK GUM
Leaves and fruit, one-third natural size. Twig, natural size. Bud and leaf-scar, enlarged.

On young trunks the bark is smooth to scaly. It breaks into squarish reddish-brown to black blocks on older stems.

The fruit is a dark blue fleshy berry about two-thirds of an inch long. Each berry contains a single hard-shelled seed. Several berries usually occur in a slender-stalked cluster. Some birds eat the berries freely.

The wood is very tough and cross-grained. It is hard to work, warps easily, and is not durable in contact with the soil. Farmers have disliked the wood ever since they attempted to split it for rails. In the hard coal mines it is used for rollers carrying ropes and cables.

The Black Gum is found from Maine to Florida, west to Michigan and Texas. It occurs throughout Ohio, but is most common in the eastern half of the State. The best growth is made in wet places. This tree rarely exceeds 60 feet in height and 2 feet in diameter.

SOURWOOD

Oxydendrum arboreum (Linnaeus) De Candolle

THE Sour-wood, also called Sorrel Tree and Sour Gum has appropriate common names for its foliage is very sour. Its scientific name "Oxydendrum" means acid tree.

The leaves are simple, alternate, 5 to 7 inches long, 1 to 2¼ inches wide, very smooth, long-pointed at apex, smooth to finely toothed along margin. The flowers are small, white, and urn-shaped; arranged in racemes 6 to 8 inches long at end of twigs; appear from June to July. The fruit is a 5-sided, 5-valved capsule. It often persists far into winter. The bark is grayish and roughened by deep furrows, on old trunks often tinged with red. The twigs are yellowish-green to reddish-brown, marked with numerous raised breathing pores. The buds are small, partly imbedded in bark, covered with several opposite reddish scales.

SOURWOOD

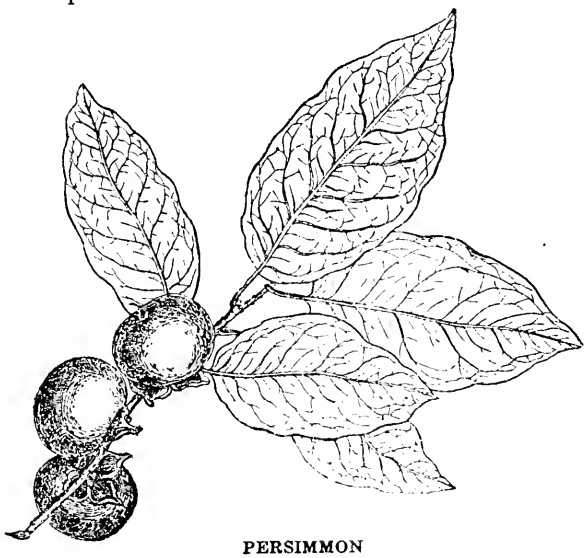
The wood is heavy, hard, reddish-brown with lighter sapwood. It is used for homemade sled runners, mine props, charcoal, tool handles, and fuelwood.

The Sour-wood ranges from southwestern Pennsylvania, southern Ohio and southern Indiana to Florida and western Louisiana. In Ohio it is found only from Fairfield county southward and eastward from Adams county.

PERSIMMON

Diospyros virginiana, Linnaeus

THE Persimmon is best known by its fruit, which is the largest berry produced by any American forest tree. There is no better way to get acquainted with this tree than to try to eat its fruit before it is ripe. Its harsh puckery taste draws the lips and chokes the throat.



PERSIMMON
One-half natural size.

The fruit is a reddish-yellow pulpy berry, one to one and one-half inches in diameter. The bitterness disappears with age and frost action. The leaves are simple, alternate, oval, shiny, 4 to 6 inches long, sharp-pointed, smooth along margin. The twigs are reddish-brown, with rather large pith. They bear broadly egg-shaped buds, are marked with half-moon shaped leaf-scars with only one bundle-scar. The bark is deeply furrowed, breaks into dark gray to black squarish blocks separated by furrows that are cinnamon-red along the bottom.

The yellowish to white flowers appear in May.

The wood is hard, heavy and strong. The heart-wood is brown to black; the sapwood is wide and white to yellowish. It is used for golfstick heads and shuttles.

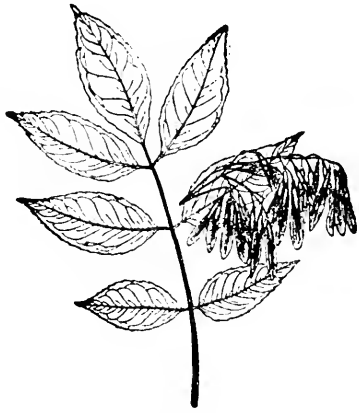
The Persimmon is found from Rhode Island to Florida, west to Kansas and Texas. It thrives best on the light sandy soil of the warm South. In Ohio this tree occurs south of the latitude of Columbus. It is frequent in the counties drained by the Ohio river. It rarely exceeds 50 feet in height and 18 inches in diameter.

WHITE ASH

Fraxinus Americana, Linnaeus

THE White Ash is the most beautiful and useful of our native Ashes. It stands among the most important forest trees.

The leaves are opposite, about 10 inches long, compound, with 5 to 9 leaflets. Leaflets are 3 to 5 inches long, evidently stalked, smooth or obscurely toothed on margin, smooth and dark green above, silvery white below.



WHITE ASH
One-fourth natural size.

The flowers are of two kinds. The pollen-bearing occur in dense reddish-purple clusters, the seed-producing in rather open pinnacles.

The fruit is a winged seed, 1 to 2 inches long. The wing is long, narrow, attached to the end of seed. The seeds are grouped in loose drooping clusters.

The grayish-brown, and rather thick bark soon becomes rough, dividing into diamond-shaped fissures. The twigs are smooth, grayish-brown. flattened at nodes, marked with scattered pale dots. The buds are opposite, egg-shaped, dark brown, blunt-pointed. Terminal buds are larger than the laterals.

The wood is very heavy, hard, tough, elastic, with light sapwood and brownish heartwood. It is used widely, particularly for athletic equipment, agricultural implements, tools, furniture, interior finishings.

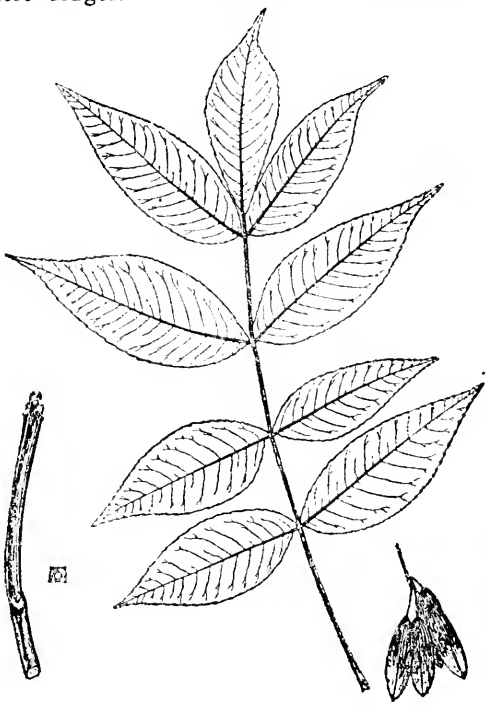
The White Ash is found from Nova Scotia to Minnesota, and south to Florida and Texas. It is common in all parts of Ohio, except the southeastern part. In the Western Reserve it is abundant. Fertile, moist soils, such as is found in moist woods, meadowlands, borders of lakes and streams are its favorite home. It becomes a large tree, often 70 to 80 feet high and 3 feet in diameter, grows rapidly, is easily propagated.

Closely related to the White Ash is the Biltmore Ash, Fraxinus biltmoreana, Beadle. The twigs and axils of leaves of the latter are velvety pubescent, at least when young. It is also reported that the bark furrows earlier and deeper than in the White Ash.

BLUE ASH

Fraxinus quadrangulata, Michaux

THE Blue Ash is perhaps the easiest of all our native ash trees to recognize. At all seasons of the year it can be identified by its four-sided twigs with four ridges projecting out from the bark. On very vigorous shoots corky wings extend out from these ridges. In summer its inner bark yields a blue coloring if mixed with water, whence its name Blue Ash.



BLUE ASH

The leaves are opposite, greenish-yellow, compound with 7 to 11 leaflets borne on very short stalks or sometimes stalkless. The veins, midribs and leaflet stalks are permanently pubescent. The rest of the leaf is generally smooth.

The fruit is winged to the base. The wing completely surrounds the seed. It resembles that of the Black Ash.

The bark is light gray, scaly or flaky, not fissured. It is similar to that of Black Ash.

The wood is intermediate in quality between that of White Ash and Black Ash and is generally sold as White Ash.

The Blue Ash ranges from southern Ontario to Iowa and south to northern Alabama and Arkansas. It is common on the limestone soils of southwestern Ohio, becoming rare north of the latitude of Columbus and east of Adams and Licking counties. Limestone hills, intervales and uplands are its favorite home. This tree reaches a height of 100 feet and a diameter of 3 feet, but is becoming too scarce to be of great commercial importance.

BLACK ASH

Fraxinus nigra, Marshall

THE Black Ash is a tree of the swamps or other moist places. The early settlers called it Hoop Ash and the Indians called it Basket Ash.

The leaves are opposite, 10 to 14 inches long, compound, with 7 to 11 leaflets. The leaflets are 3 to 5 inches long, finely toothed along margin, all are stalkless except the terminal one.

The flowers are similar to those of White Ash.

The fruit is a winged seed similar to that of White Ash, but is broader winged, notched at apex, and the wing completely surrounds flattened seed.

The bark is thin, grayish, very shallowly furrowed, peels off in powdery to corky fine scales. The twigs are smooth, stout, light-gray. The buds are opposite, black, sharp-pointed.

BLACK ASH
One-fourth natural size.

The wood is soft, to moderately hard; rather coarse-grained, with white sapwood and dark brown heartwood. It is used for baskets, hoops, furniture, interior finishings.

The Black Ash is found from Newfoundland to Manitoba, south to Virginia and Arkansas. It is common in northern and southwestern Ohio, becoming rare in the southeastern part. This tree, which usually has a slender stem, may reach a height of 60 to 80 feet.

The only other ash tree found in Ohio with black buds is the European Ash—Fraxinus excelsior, Linnaeus. Its buds are larger, jet black and decidedly round pointed. The leaves are not so large as those of the Black Ash and the leaflets are usually stalked.

OTHER OHIO ASH TREES

THE Red Ash—Fraxinus pennsylvanica, Marshall—is also called Swamp Ash and White Ash. It is a medium-sized tree which, as a rule, is not separated from the White Ash, excepting in books. The best way to distinguish this tree is by its velvety pubescent twigs which are present at all seasons of the year. In autumn and early winter the winged fruit is also helpful in recognizing it. The wing usually extends along the seed for at least one-half its length. The seed end is less than half so wide as the flattened wing. This tree ranges from Quebec to Manitoba and south to Florida. It occurs locally throughout Ohio. Its wood is similar to that of White Ash and goes on the market under this name. A number of horticultural varieties have been developed for ornamental use.

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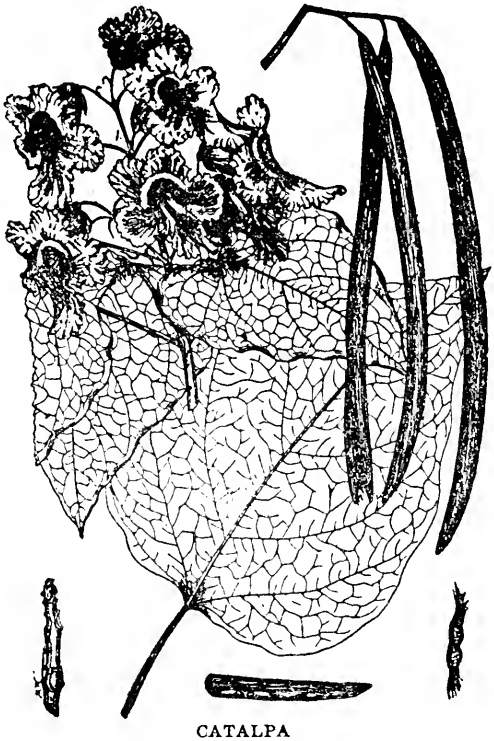
The Green Ash—Fraxinus lanceolata, Borckhause—is also called Swamp Ash and White Ash. By many tree specialists this tree is classified as a variety of the Red Ash. Its principal distinguishing characteristic is its smooth twigs. They lack the velvety pubescence of the Red Ash, and the wings of its seeds extend along the body for more than one-third of its length while the wings of the White Ash seed are attached only to the end of the seed. The wood is similar to that of White Ash and is generally used for the same purposes. This tree ranges from Lake Champlain to the Saskatchewan and south to the Gulf of Mexico. In some places in the West it is the dominant ash. It has helped change the treeless prairies into a land of shaded roads, protected homesteads, and beautifully bordered streams. In Ohio this tree occurs generally throughout the State, but is less common in the southeastern part. Low ground, stream banks and swamps are its favorite home. It is sometimes planted as an ornamental tree.

CATALPA

Catalpa speciosa, Warder

THIS Catalpa, also called Catalfa, Hardy Catalpa, Indian Bean and Cigar Tree, was formerly planted widely on account of its reputed rapid growth, and its very durable wood. The leaves are simple, opposite or 3 may occur in a whorl, heart-shaped at base, long taper-pointed, 6 to 10 inches long, 4 to 5 inches wide. The odor of bruised leaves is not fetid.



CATALPA

The flowers appear in May or June, are white with yellowish and purplish spots within, arranged in large erect clusters 8 to 10 inches high. The lower lobe of the corolla is notched. The fruit is a long, bean-like capsule containing many flat-winged seeds. It often persists far into winter. The bark on old trees is fissured and ridgy, dark grayish-brown. The twigs are stout, smooth, yellowish-brown, marked with large leaf-scars. The buds are very small, less

The wood is durable, light brown, with satiny surface and kerosene-like odor. It is especially well suited for fence posts and rails. The Hardy Catalpa was originally native from southwestern Indiana to southeastern Missouri and northeastern Arkansas. Insect and frost damages have checked the growth of many plantations. The Hardy Catalpa has been planted rather widely in Ohio, but it holds little promise for the future. An occasional specimen tree does well. Thrifty trees develop straight trunks and reach large size in the forest. Another Catalpa—Catalpa bignonioides, Walter—a native of the southern states, is less hardy, remains smaller, and its stem is usually less straight.

A TREE RECORD

EVERY boy and girl that studies trees will find it interesting to keep a record of every different kind that can be found. In years to come this tree record will be a precious possession, and serve as a pleasant reminder of days among the trees. In any locality one should find 25 different trees and in many places 50 or even more can be found.

List the trees you have met on your hikes, about the camp, or along the roadside on this sheet and opposite each tree name enter the page of this booklet upon which it is described. The boy or the girl who can fill up all the following blank spaces will know more than twice the number of trees required to pass the tree test in scouting. To know 25 trees means that you are acquainted with about one-third of all the common trees of Ohio. This is an accomplishment of which you will have a right to feel proud. Today is the best time to begin your tree record.

	NAME OF TREE	DESCRIBED ON PAGE
1.	.....	.....
2.	.....	.....
3.	.....	.....
4.	.....	.....
5.	.....	.....
6.	.....	.....
7.	.....	.....
8.	.....	.....
9.	.....	.....
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11.	.....	.....
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23.	.....	.....
24.	.....	.....
25.	.....	.....

Date.....

Name.....

TREE TESTS

THE best way to find out if you really know trees is to organize a tree test among your friends. I know of no more delightful out-of-doors pastime for a group of boys or girls than to go out among the trees and actually find out who can come out on top in a tree-naming contest. The first thing to do is to select a leader, if you do not already have one. He will select the trees for the test. After you have examined the first test tree carefully, you will write your answer in the blank space following the number one in the blank tree tests that follow. Then, the leader will select a second tree and you will write your answer in the second blank space following the number two, and so on until your first test of ten trees is completed. As soon as a test is completed the test sheet of all who took part in the contest is corrected, and then you will know just how well you know the trees. For thirteen years the author of this booklet conducted tree tests in the open, and he remembers them as the most pleasant feature of all his teaching experience.

TREE TEST—I.

NAME OF TREE

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....
10. .....

TREE TEST—II.

NAME OF TREE

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....
10. .....

Name.....

INSPIRATION IN TREES

By CHARLES LATHROP PACK,

President, American Tree Association

TO the trees the poet and the orator have turned all through the ages for some of their finest word settings. One that has great appeal is that of the Rev. Francis E. Clark, founder of the Christian Endeavor Societies of the world, who refers to "the Creator as the Great Tree Maker."

THEN, TOO, there is the sentiment the Father of Arbor Day, J. Sterling Morton, left in the wonderful memorial grove he planted in Nebraska when he arranged for a tablet, among the trees he loved, which says: "If ye seek my monument look around you."

TREES, man's best friend, the friend without whom existence is impossible, picture life in all its variety. Look at the wind-swept coast and there you will find struggling for existence among the rocks, the trees. Thus does man, buffetted by the winds of fortune, struggle. You will find the trees clinging to river banks in their endeavor to hold those barriers in place against the flood time. Again you will find the trees mothering the springs and protecting them from the ravages of the sun that they may feed first the rivulet, then the stream that at last becomes the mighty river of commerce.

WE can look back through the ages and find that when the trees have gone, civilizations have disappeared. Nature is the great teacher, and when man violates her laws he must pay a terrible penalty. Nature works slowly, but her decisions and ends are sure as the coming and going of the sun. To Nature's laws man must give heed if he continues to inhabit the earth, for all life is bound up in her mandates.

WE see this enthralling mystery of life everywhere; in the seed that becomes the apple blossom; the flower that gives its nectar to the honey maker; in the roots of the tree that, buried, nevertheless gives back ever renewing life as a reward to those who plant. Kilmer pen-pictured this in that immortal verse about the "tree that looks at God all day and lifts its leafy arms to pray."

TURNING to the tree and the part it plays in man's existence we find it the corner stone of his existence because of the part the forest products play in commerce.

THEODORE ROOSEVELT expressed it well when he said: "A people without children would face a hopeless future: a country without trees is almost as helpless; forests which are so used that they cannot renew themselves will soon vanish, and with them all their benefits. When you help to preserve our forests or plant new ones you are acting the part of good citizens."

WE live by example. So in planting trees we set a fine example to others, for they see what you have done and thus the message of the trees is spread.

THAT this is of the utmost importance is set forth by Mrs. John Dickinson Sherman, President of the General Federation of Women's Clubs, when she says: "There can be no more important educational work than turning the attention of the new generations to the importance of trees. On every hand we will see this importance if we will but look. The thing is to get us to look."

A CAMPAIGN of education must be carried on all the time on behalf of trees because the trees cannot speak for themselves.

WE must get more people to consider the beauty of trees; the value of trees; the economic situation bound up in trees; all the trees mean to us.

CAN you imagine this country without trees?

IF the planting of a tree carries you into the world beyond its beauty, into the world of service all trees perform, then the tree has, indeed, opened up a world of thought into which all must enter, for the vast economic problem is a national one. If the tree then succeeds in doing this it has, after all, spoken more loudly than any of us can speak for them. So may all of us, as Theodore Roosevelt pointed out, become "good citizens," and may there be new millions in the tree planting army.

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JAMES A. MURRAY
Baltimore, Md.

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Forestry Almanac

Tree Habits, How to Know the Hardwoods

The Forestry Primer

The Forest Poetic

Town Forests

Tree Planting Book

Forestry Legislative Survey

Common Trees of New Jersey

Common Trees of New York

Common Trees of Massachusetts

Common Trees of Indiana

Common Trees of Ohio

Common Trees of Michigan

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