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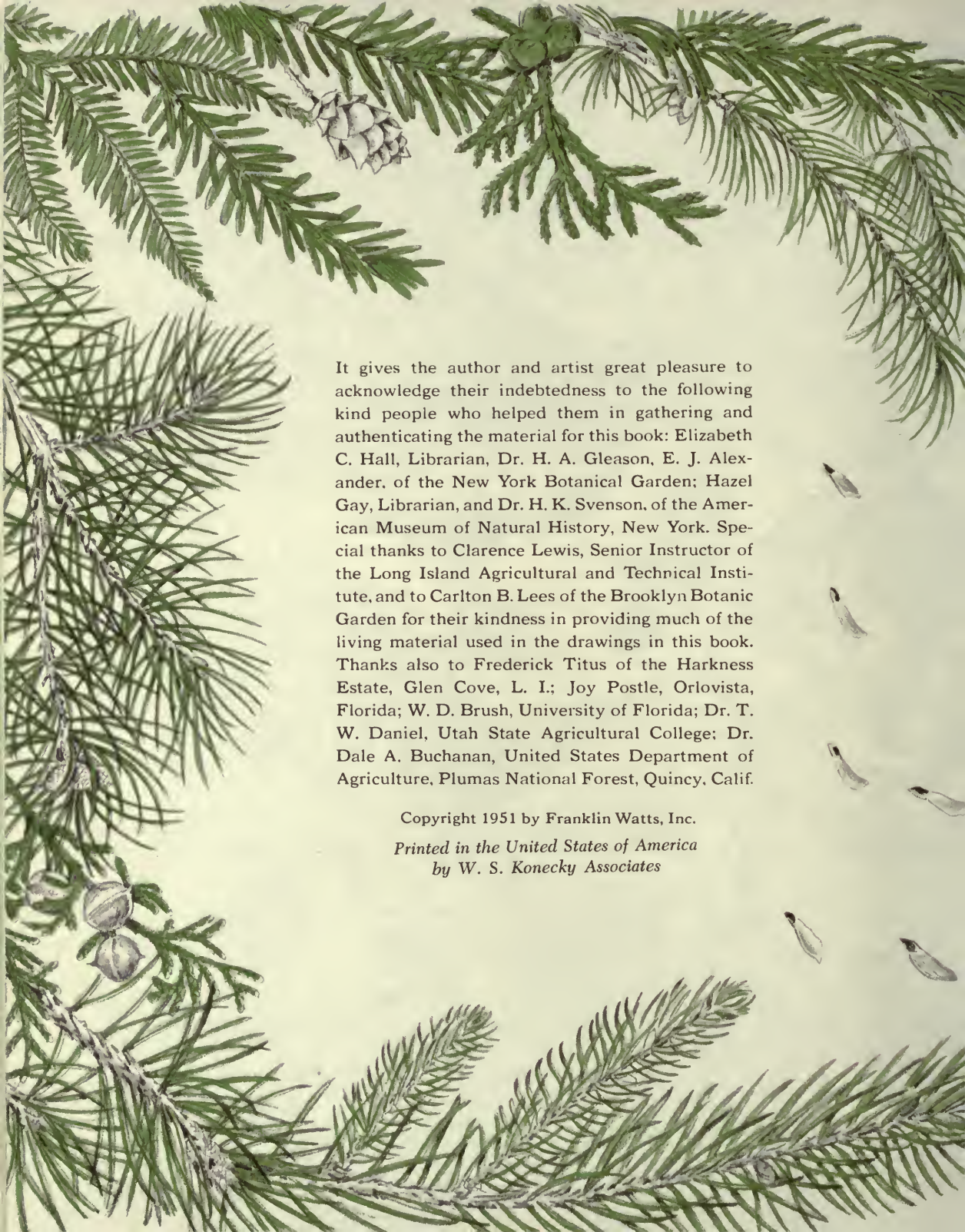


San Francisco, California
2007

THE FIRST BOOK OF
TREES







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THE FIRST BOOK OF **TREES**

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Providence, R. I.

Pictures by HELENE CARTER



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NEW YORK



Twig

Flower



Branch



Winter bud



Leaf



Trunk



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Small maps show natural range of tree



Fruit



TREES

America is a land of trees. They grow almost everywhere in our country. Most of us see them so often that we sometimes forget how important they are. Thousands and thousands of things come from trees. Right this minute you may be sitting in a chair made partly of wood from a tree. You may live in a wooden house. Perhaps you are wearing a rayon blouse. That was made from wood treated in a special way. The paper in this book was made from wood pulp, which comes from trees. You may have a camera and like to take pictures. The film you use was made from wood. Perhaps you had an orange for breakfast this morning. That came from a tree. Apples, nuts, maple sugar, hickory baseball bats...you can think of many things that we wouldn't have if there were no trees.

WHAT IS A TREE?

A tree is a special kind of green plant with a wooden stem that grows upward. This stem is covered with bark and is called a trunk. Most trees have a single main trunk, but sometimes this divides into two or more.

Most trees have branches growing from the big trunk.

Air comes in to leaf through tiny windows in its surface.

Out of air and water, the leaf makes sugar.

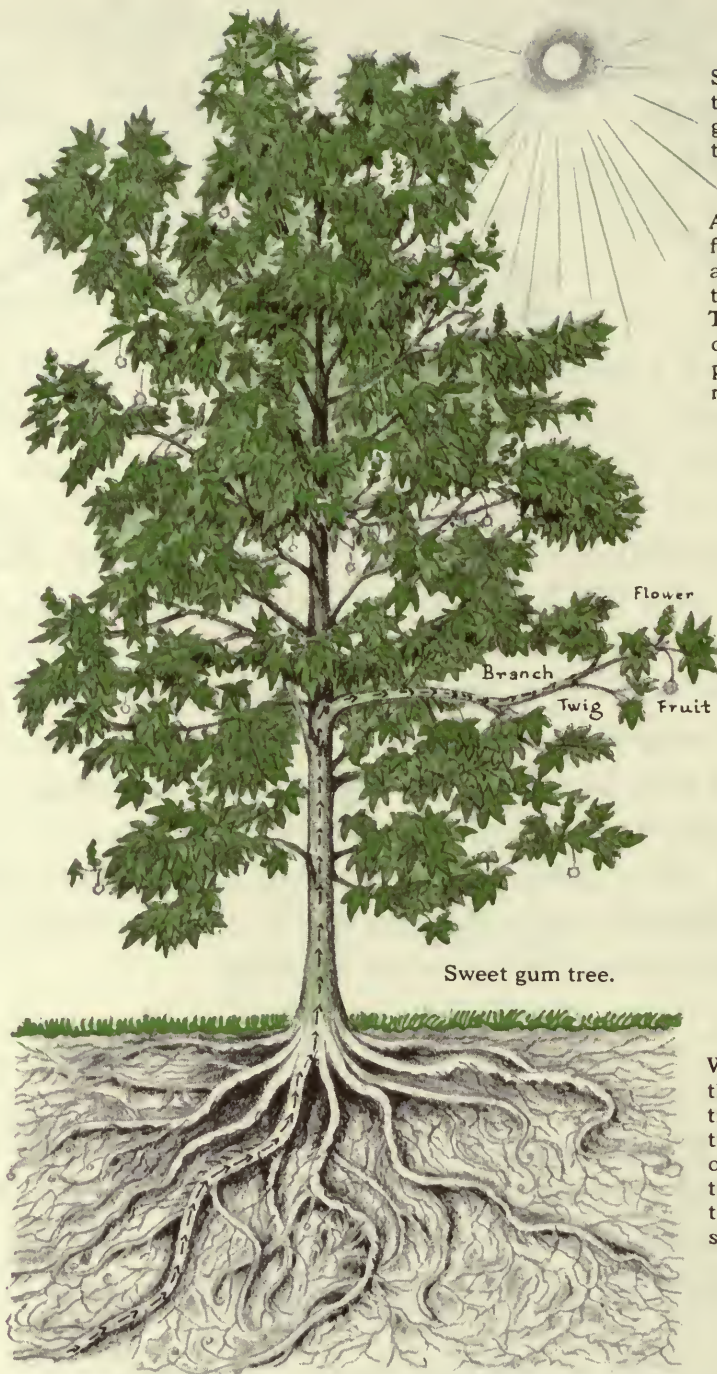
Sugar is changed into wood.

Only green leaves can make food. No animals can make one morsel of food. If the green leaves went on strike we could not live on the earth.

Water is taken from the soil particles by each root hair.

Sunlight falls on the green leaf and gives it the energy to do its work.

A big tree gives off fifty barrels a day as vapor. It moistens the winds. The leaf also gives off oxygen as a by-product of sugar-making.



Water is passed up through the root, trunk, branch and twig into the stem of the leaf and out through the veins to each cell, where sugar is made.

A growing tree, the most wonderful factory in the world

Growing from these are smaller branches, and from these, even smaller twigs. All these spread out into various shapes—a different one for each kind of tree. The twigs hold the buds, leaves, flowers and seeds.

Trees have roots that spread underground in great networks that help to anchor them to the earth and keep them from being blown over.

Trees live a long time. Some may have lived 5,000 years. They go on growing year after year instead of dying each fall when frost comes, as many plants do.

HOW TREES MAKE THEIR FOOD

In one way trees are like all plants with green leaves. They make their own food out of air and water. In the water are little bits of mineral. Imagine being able to make your food from water and the air you breathe.

You are probably wondering what kind of food trees can make. They make sugar. We all know the sugar from one kind of tree: maple sugar. We get it from the tree's sap. Other trees make sugar, too, but we do not use it to eat.

The trees use some of their sugar day by day for their needs. They make the rest into wood.

It is strange to think of a tree making food from only air and water. No one really understands exactly how it does this, but we do know that chemistry helps.

Air and water are made up of little atoms, or blocks, of the very chemicals needed to make sugar.

Air is made of carbon, oxygen and some other substances. Water is made of hydrogen and oxygen. To make sugar you need all three things: carbon, hydrogen and oxygen. The trick is to take air and water apart and put them together again in the right way to make sugar.

This is done in the leaves. Each leaf is a little work-shop. It does its work with the heat from the sun, and only green leaves can do it. The green coloring in leaves is called chlorophyll, a long word that comes from two Greek words meaning "leaf" and "green." Chlorophyll and sunlight are what leaves need to change air and water into sugar.

Leaves get air through many tiny windows all over their surfaces. The water comes from farther away. The little root hairs on the underground roots take in moisture from the ground. The roots and trunk have special tubes just made for passing the water upward. Other tubes pass it out through every branch and every twig until it flows into all the leaves. Each leaf has its own waterways, called veins. They carry water to every part of the leaf.

Now the leaf has all it needs to make sugar. It splits the air and water and rebuilds the chemicals into sugar. Each night, when there is no more sunlight, and the leaf's work is done, it passes the liquid sugar down through other special tubes under the bark to the trunk and roots for storage.

In great chemical laboratories, scientists are trying to discover the leaf's secret. If we could copy it we might take

the leaf-green chlorophyll and make food for ourselves. Up until now only green plants have ever done this.

And while they are doing it they purify the air. Pure oxygen, left over from food-making, flows out of the leaf windows. Out of them, too, comes moisture. The moisture and oxygen air-condition the places where the plants grow. That is why the air in a forest is so pleasant to breathe.

HOW TREES WORK

Each part of the tree has its special job to do. The roots anchor the tree and hold it firmly in the earth. They also store food. The little root hairs collect water to send up to the leaves.

The trunk supports the branches and twigs. It has the tubes that take water up and food down.

The branches hold the twigs. The twigs hold the buds, leaves, flowers and seeds. Notice that each leaf seems to be reaching up for the sun. Each stem bends and twists until its leaf gets all the sunlight it can. If you stand under a tree in summer it makes an almost perfect parasol.

The bark is a waterproof coating that covers the wood of the tree. It helps keep the water inside of the trunk, and protects the food tubes that are just under the bark. Many animals eat bark. Porcupines and beavers strip it off for food. Hungry deer eat it in winter. Then the trunk is unprotected. The food tubes are broken, and often the tree

dies. Sometimes a tree heals over, where bark was stripped off, but an ugly wart or lump is left on the tree.

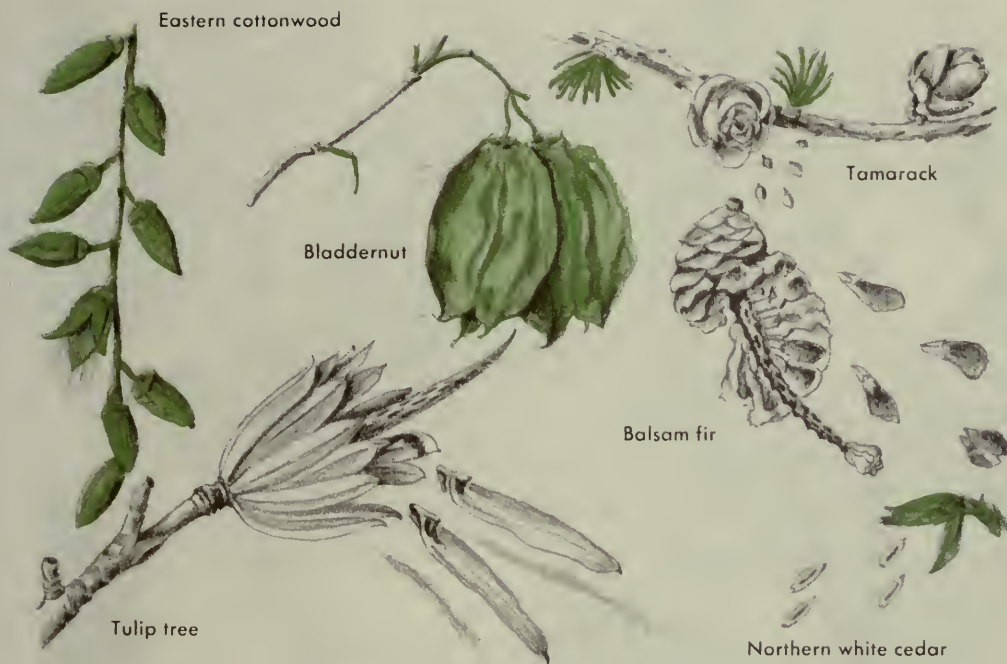
Trees have three kinds of buds: some that make leaves, some that make flowers, and some that make both leaves and flowers. Different trees have different kinds of buds.

Different trees have different kinds of flowers, too. Some, like those on the catalpa and horse chestnut, are large, beautiful and showy. Others are small, dull and not very noticeable. The flowers are male and female. Sometimes the male and female parts are both in the same blossom. Sometimes there are two separate kinds of flowers, male and female, on the same tree — oaks, hickories and birches are among those that are like this. And sometimes the male and female flowers grow on separate trees — willows and poplars are two that are like this. The male flower makes a powder called pollen, which blows onto the female flower, or is carried there by bees and other insects, and starts the making of seeds and fruit. And the seeds and fruit scatter to grow into new trees.

HOW TREES SCATTER THEIR SEEDS

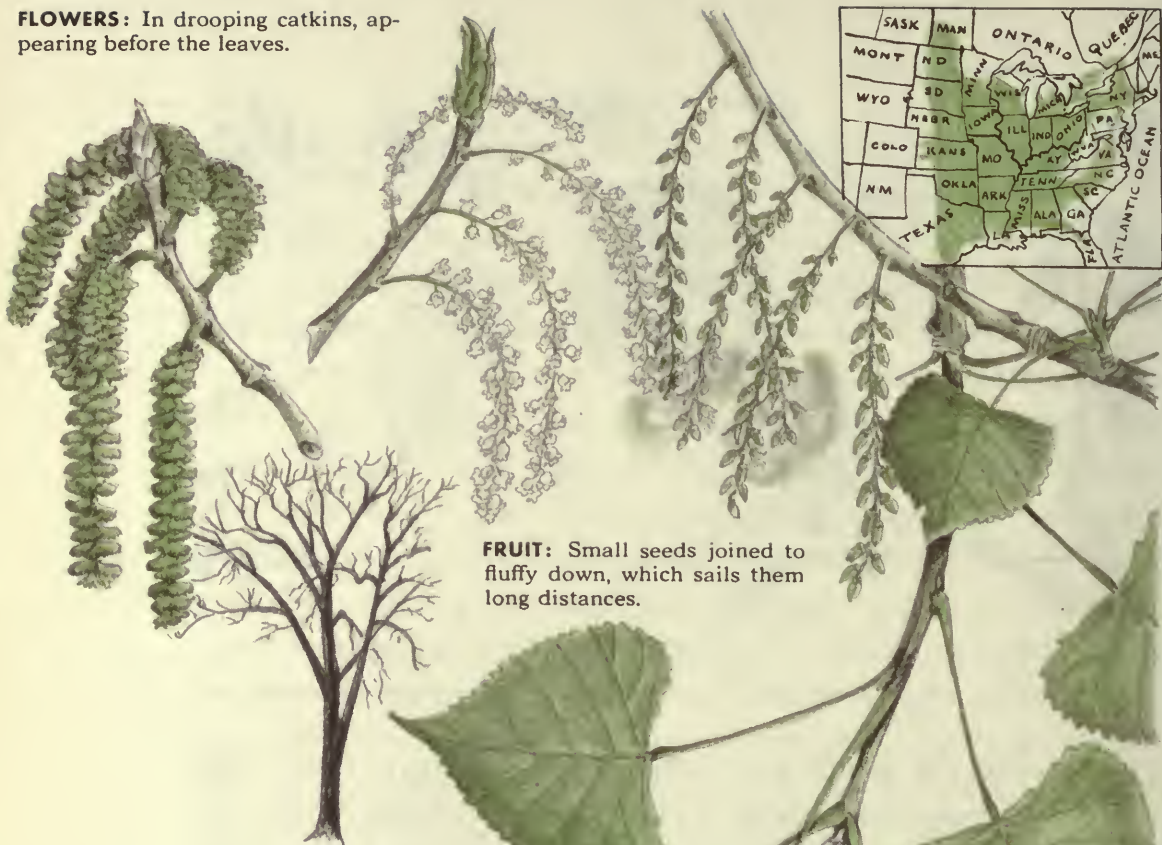
Trees have seeds shaped in many ways so that they will spread as far as possible, to grow.

Some of the seeds have wings to help them float through the air. Maple trees have twin-winged seeds called keys. They look like old-fashioned clock keys.



Cottonwood seeds are covered with white fluff, like cotton, to help them float some distance through the air. The basswood tree has seeds in clusters of little balls, with a sort of airplane rudder on each cluster to carry it away. Some trees, like pines, have their seeds in cones, and each seed has a wing. When the cone opens, the seeds blow away. Bladdernut's seeds float on the water like air-chamber canoes. Many trees have fruits you can eat. These fruits are the tree's way of tempting animals and people to take the seeds and scatter them. Be sure to notice the seeds of trees. They come in surprise packages, very neatly designed. It's fun to watch for them.

FLOWERS: In drooping catkins, appearing before the leaves.



FRUIT: Small seeds joined to fluffy down, which sails them long distances.

EASTERN COTTONWOOD

Populus deltoides

Deciduous. Grows to 100 feet. One of the poplar family, to which the quaking aspen also belongs. Like the aspen, the cottonwood has leaves forever rustling. This is a tree that can endure the prairie heat and cold, and was a blessing to the pioneers on their westward journey. Where no other tree would grow, there was the cottonwood. A fast-growing tree that is used only for very rough lumber.



LEAVES: 4-6 inches long. Simple; alternate. Shiny and green, wide at the bottom, but ending in a sharp point.



FRUIT: Seeds in small balls, formed after flowers. Wing-like leaf is propeller when balls drop from tree.

LEAVES: 3-6 inches long. Simple; alternate. Shaped somewhat like a heart, but with a sudden sharp point at the tip. Yellow in autumn.

FLOWERS: Clusters of small white flowers, hanging on stalks; each stalk joined to a wing-like leaf.

AMERICAN BASSWOOD

Tilia americana

Deciduous. Grows to about 100 feet. Bees love the fragrant flowers of this tree, and make a fine honey from their nectar. The inner bark has a tough fiber that Indians used to make rope and thread. Also called "linden," "lime," and "limetree."



LEAVES: 2-5 inches long. Simple; alternate. With evenly spaced veins branching out from either side of a midrib. Edges toothed like a saw. Yellow in fall.



AMERICAN ELM

Ulmus americana

Deciduous. Grows to about 100 feet, sometimes higher. This graceful tree is the glory of many an old New England village, where elms tower above the houses in shapes like spreading vases. The Iroquois Indians used its bark for canoes, or twisted it for making rope. The strong wood can be scoured to a gleaming white. It makes good lumber for many things, among them shipbuilding, flooring, and furniture.

FLOWERS: Small green and red clusters that develop into seeds, each surrounded by a broad flat wing.

WHEN FALL COMES

In many parts of the world there is a season each year when it is either very cold or very dry. During this season, the trees stop working and wait for warmer or moister weather to come again. And many trees lose their leaves. You remember that all summer long they gave off moisture. If they did this in winter when they can get no water from the soil, they would die. They are "deciduous" trees.

Most trees with broad leaves like maples and elms must drop their leaves in autumn. That is why we have given this season another name: fall.

Before each leaf drops, it seals up the spot where it grew from the twig. It does this with a layer of cork. So, when the leaf drops there is no open wound where it left the tree, but a nicely healed cork scar. This is called a leaf scar.

Each kind of tree has its own kind of scar, always shaped the same way. The horse chestnut has one that looks somewhat like a horseshoe, with little dots that look like nails in the shoe. These dots mark the ends of the tubes that brought water up to the leaf.

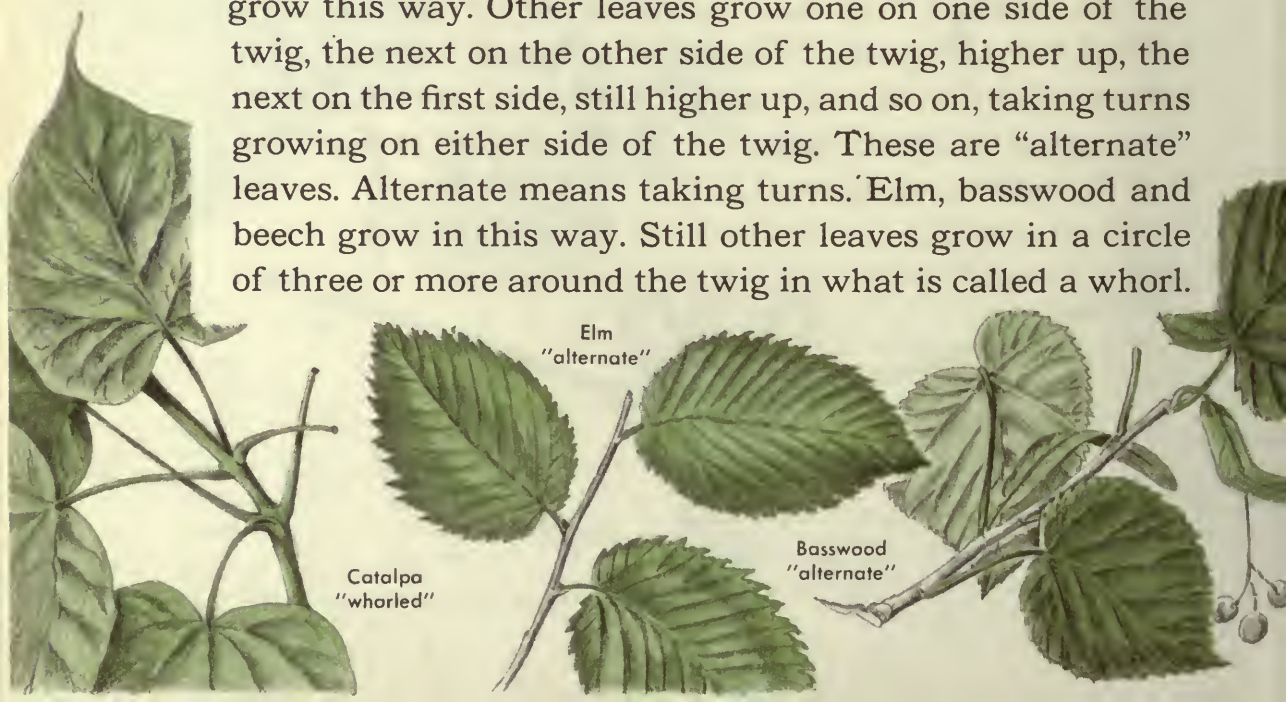


Horse chestnut leaf scar

Before they fall, some leaves turn to brilliant shades of red, yellow and purple. This is because they are stopping work and they no longer have green chlorophyll. Without chlorophyll, leaves fade to yellow. But some kinds of trees that live in cool climates and that are very rich in sugar turn other colors. Oak and maple leaves are often very red, ash are sometimes purplish, and sweet gum may be red and yellow, red and orange, or purple.

LEAVES GROW IN DIFFERENT WAYS

If you look closely at twigs on several different kinds of trees, you'll see that their leaves do not all grow out in the same way. Some of them branch out from the twig in pairs, directly opposite to each other. When they do this they are called "opposite" leaves. Horse chestnut, ash and maples grow this way. Other leaves grow one on one side of the twig, the next on the other side of the twig, higher up, the next on the first side, still higher up, and so on, taking turns growing on either side of the twig. These are "alternate" leaves. Alternate means taking turns. Elm, basswood and beech grow in this way. Still other leaves grow in a circle of three or more around the twig in what is called a whorl.



These are "whorled" leaves. The best-known tree that grows this way is the catalpa. Each kind of tree has its own kind of leaf plan that never changes. That is one way you can tell which tree it is.

A TREE'S BUDS

Leaves don't grow out on twigs just anywhere. There are very exact points where they can grow. We call these points on the twig the "nodes." Nodes are easy to see. In summer there is a leaf at most of them.

Now look just above the place where one of the leaves grows from the twig. Here is an angle that is called the leaf's "axil," or armpit. You can see that the leaf's armpit really is shaped much the way your armpit is, only it faces up instead of down. In the leaf's armpit you will see a little bud on the twig. Some trees may fool you. A sycamore leaf looks as if it has no bud. But just pull the leaf stem off. The bud



Horse chestnut
"opposite"

White ash
"opposite"

is hidden on the twig inside the stem. A sycamore leaf's stem is hollow and fits right over the bud. Walnut and butternut leaves sometimes have more than one bud in each armpit. All these armpit buds are called side buds because they are on the side of the twigs.

Most twigs also have buds at their tips. These are called end buds.

All these buds are very important. They show you where the tree will grow the next year. Nothing can grow out of a branch except from a bud.

WHEN SPRING COMES

After the leaves fall off the trees in autumn these buds lie quiet all winter long. In the spring they start to grow. They may be flower buds, or leaf buds, or they may be mixed buds that will grow both flower and leaf. Flowers and leaves were formed last summer and have been packed away all winter long in the tightly sealed buds. They need only water and the warmth of the spring sun to make them swell and burst from the bud.

New twigs grow from buds, too. They grow from side buds, and, in time, will become branches. The end buds of each twig and branch grow a new little section each year, also. Some grow barely an inch, others many feet in a single year. Wrinkled lines all around the twig mark the place where it started growing each year, as in the sweet gum.

LEAVES: 4-10 inches across, often broader than they are long. Simple; alternate; 3-5 lobes. One of our biggest leaves. The swollen leaf stems hide the buds beneath them.



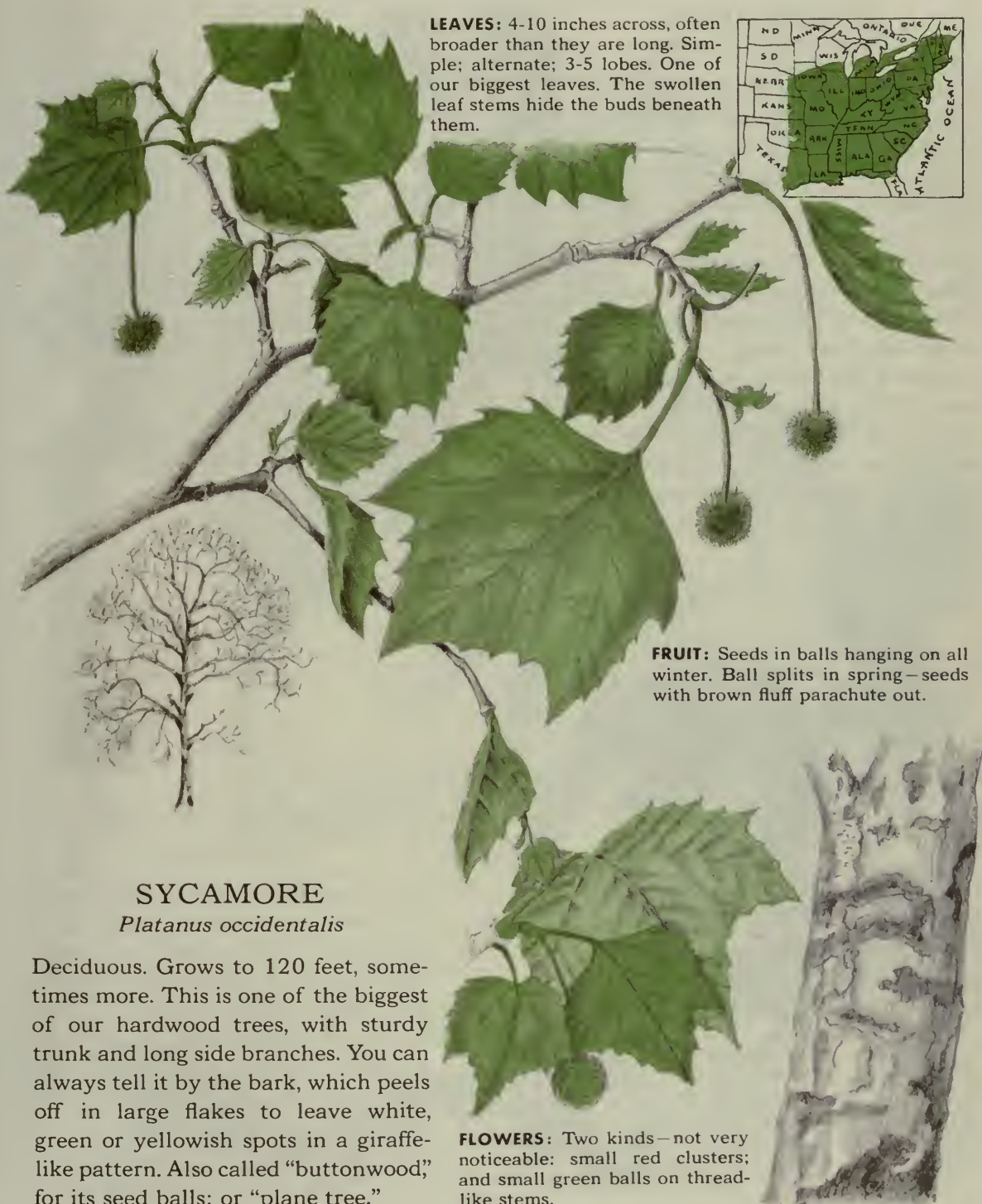
FRUIT: Seeds in balls hanging on all winter. Ball splits in spring—seeds with brown fluff parachute out.

SYCAMORE

Platanus occidentalis

Deciduous. Grows to 120 feet, sometimes more. This is one of the biggest of our hardwood trees, with sturdy trunk and long side branches. You can always tell it by the bark, which peels off in large flakes to leave white, green or yellowish spots in a giraffe-like pattern. Also called “buttonwood,” for its seed balls; or “plane tree.”

FLOWERS: Two kinds—not very noticeable: small red clusters; and small green balls on thread-like stems.



SWEET GUM

Liquidambar styraciflua

Deciduous. Grows to 120 feet. This tree is at its finest in the South, where it is an important lumber tree. Everything about it is striking. Its leaves, star-shaped, and brilliant-colored in fall, may well be the handsomest of any forest tree. The inner wood of the twig is star-shaped, too. The seed balls, hanging on in winter, give the tree an always-decorated look. Especially in the South, the bark gives off a fragrant gum. The tree is also called "liquidambar," for its gum; "red gum," for its reddish heartwood; and "alligator tree" because it sometimes has rough bark that looks like alligator skin.

LEAVES: About 7 inches long. Simple; alternate, or growing in clusters at tips of branches. Star-shaped, 5-7 points; shiny green. Red, yellow, orange or purplish in autumn.



FRUIT: Seeds, some winged, some unwinged, which drop in autumn from brown seed balls. Empty balls often hang on tree all winter, like ornaments.



FLOWERS: Two kinds—clusters of green stalks, 2 or 3 inches long, at end of new growth; and green balls about one inch across, hanging from stems at base of leaves.



FLOWERS: Two kinds—drooping clusters of catkins; and small blooms on short stalks.



FRUIT: A nut with a grooved shell, hard to crack. Nut grows inside thick green husk, sometimes 3 inches around.



BLACK WALNUT

Juglans nigra

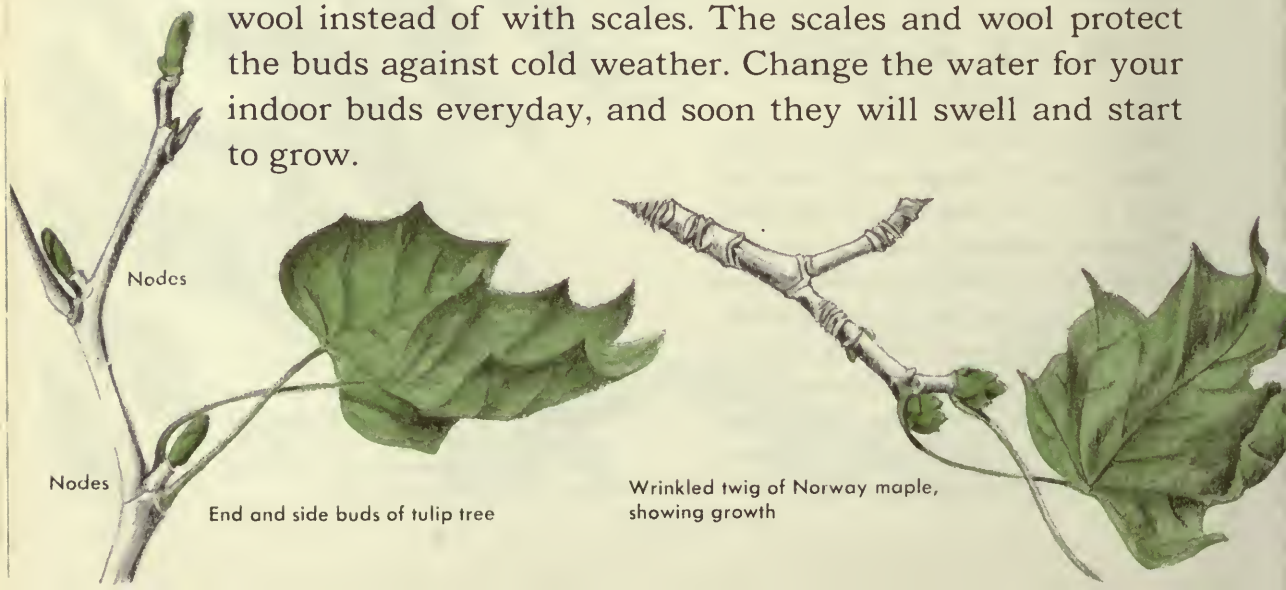
Deciduous. Grows to 100 feet, sometimes more. A magnificent tree that loves rich soils and lots of sunshine. The wood is beautiful, with an unusual grain; it takes a soft, satiny finish. This is one of our best woods for furniture. Black walnut is a favorite for making gunstocks; it is light and seems to resist the shock of gunfire. This tree's bark was often used by the pioneers in making dye: a yellow one.

LEAVES: 1-2 feet long. Compound; each leaf made up of 15-23 leaflets, each about 3 inches long; alternate. Graceful and feather-like.

This is the way that a tree's branches grow longer and spread out each year: They grow a little at the tip, and also branch out from side buds. As a twig or branch grows, its tip moves forward each year.

A branch doesn't grow longer each year between the places where there are buds. It makes new buds at its nodes and tip each summer and lets them lie quiet all winter. Then in the spring it grows from the new buds. Notice the distance between the branches on a tree. Several years from now they will be the same distance apart because a tree grows wider and taller from the tips of its twigs and branches only. It starts new branches from its side buds.

If you want to see how the buds grow, gather some twigs in February or March and put them in some water in a warm, light place indoors. Notice how different the buds are. Some are covered with scales like overlapping shingles. Some of the scales are sticky, like the horse chestnut bud's. Some buds, like the walnut's, are covered with a sort of wool instead of with scales. The scales and wool protect the buds against cold weather. Change the water for your indoor buds everyday, and soon they will swell and start to grow.



End and side buds of tulip tree

Wrinkled twig of Norway maple,
showing growth

THE TRUNK OF A TREE

Trees grow in another way each year. They grow bigger around. To understand the way they do this, you must understand what the trunk of a tree is like. It is round, and covered with a layer of bark. Under the bark is a very thin layer of food tubes all around the tree. These are made of many long little tubes joined end to end, with little sieves between them. They are called "sieve tubes." Through these the food travels downward from the leaves, passing through the sieves from one little tube to the next one.

Farther inside the tree is another collection of tubes through which the water passes upward from the roots to the leaves on the twigs.

Between these two sets of tubes is the important part of the trunk that makes it grow bigger around each year. This is another very thin layer all around the tree. Each spring this little layer starts growing out thicker. It adds new layers of growth to the food and water tubes on either side of it. This makes the trunk bigger all around. The same thing happens in all the branches, too.

The tree does this growing in the spring and early summer. By midsummer the thin growing layer has finished its work and the trunk is through growing till the next year.

Look at the trunk of a tree that has been cut down. You can see how much the tree grew each year. Each year's

layer of growth looks like a double ring on the trunk. There is a ring of light-colored wood that grew in spring when there was plenty of water, and there is a ring of dark-colored wood that grew in early summer when water was scarcer. It is darker because it grew more slowly.

As the tree gets bigger around each year, the older parts in the middle of its trunk and branches become solid wood that cannot grow any more. This is called "heartwood" and is darker-colored than the newer wood around it. The new part toward the outer edge of the trunk is the "sapwood." The part of the tree that makes it bigger around each year is just a thin growing layer not far below the bark.

A TREE'S BARK

Of course, as trees grow bigger around, their bark must grow bigger, too. The very innermost part of the bark keeps making new layers of cork to protect the inside of the tree. As the tree grows larger and larger the outside bark stretches so far that it splits. That is why the outer bark of many trees is so rough and ridged.

Each kind of tree has bark that splits in its own special way. Shagbark hickory bark hangs from the tree in long shaggy strips; sycamore bark peels off in patches; white ash bark cracks into a network of regular little ridges, almost diamond-shaped. Old woodsmen can tell trees apart just by their bark.



LEAVES: 8-14 inches long. Compound, usually made up of 5 leaflets—the three upper ones 4-6 inches long—the lower ones shorter; alternate. Dark green above, paler below.

FLOWERS: Two kinds—clusters of hanging catkins; and small spikes covered with rust-colored down.



FRUIT: A nut enclosed in a thick husk about $2\frac{1}{2}$ inches around. When ripe the husk splits into four parts, showing nut.



SHAGBARK HICKORY

Carya ovata

Deciduous. Grows to 90 feet, often more. It's easy to see how this tree got its name; on older trees the bark splits in great plates, sometimes one foot long, which curl away from the trunk, giving the shagbark a truly shaggy look. Shagbark hickory nuts are sweet, and fine to eat. Its wood is tough and strong and makes excellent handles for tools.

FLOWERS: Two kinds—long catkins and small blooms in spikes.

MOCKERNUT HICKORY

Carya tomentosa

Deciduous. Grows to 90 feet. The shell of this nut looks so big that you expect to find a large kernel inside when you open it. The joke is on you. After all the work of cracking the shell, the kernel is tiny. It mocks and teases you. That's the "why" of its name. Also called "white hickory"—or "bigbud hickory" because the end buds on the twigs are unusually large. This is the toughest of all the tough hickory woods.

LEAVES: 8-12 inches long. Compound, made up of 5, 7, or 9 leaflets, each from 3 to 8 inches long; alternate. Top leaflets are bigger than bottom ones, giving the leaf a top-heavy look. Leaves dark green above, paler below. Yellow in fall.

FRUIT: Small four-cornered nut, inside thick brown husk, 2 inches long.



A TREE'S ROOTS

Like the branches, the tree's roots also grow longer each year at their tips. Right behind the tips grow the root hairs that take in the water to send up to the leaves. Old root hairs die after a while, but new ones keep forming behind the root tips as they grow. Roots also have places where they branch out; and they grow bigger around each year.

HOW TREES TELL THEIR STORIES

Trees furnish many clues to anyone who wishes to do a little detective work to find out their stories. You can only guess at the age of a living tree. A pine may grow a foot thick in 50 years; an oak may take 100 years to grow that large. But by counting the double rings on a tree trunk—a double ring for each year—you can be quite sure of the age of a tree that has been cut down.

Rings aren't always the same width throughout a tree. In rainy years, trees grow fast and make thick rings of new wood; in dry years they don't grow so much and their rings are thin. By looking at the width of the rings you can tell how much the tree grew each year; and which years of its life were rainy and which were dry.

People have been able to discover the ages of old Indian pueblos by the rings in the wooden beams. They matched the rings in these old timbers to rings of trees just like them whose age they knew.



By studying the width of rings in old trees, scientists are also working out a history of the past weather in some parts of the country that are now desert. The wide rings tell them that once rain was more plentiful.

You can tell how old twigs are by looking at the growth scars that are like rings in the bark around them. Each ring counts for one year.

By looking at the twigs and leaf buds of a little tree you can tell quite well what shape it is going to be when it is full-grown. If there are no side buds at all, the tree trunk will not branch. It will grow up straight like a column, with leaves on the top. Palm trees do this.

A tree with side buds will have branches. Sometimes the side branches do not grow very much and the end buds do most of the growing. This makes tall, slender trees like Lombardy poplars.

Other trees have side buds that grow more than their end buds. You can tell these by their round shapes. Each spring, new twigs grow from the side buds. These make the tree spread out. Apple, pear and other fruit trees have side buds that grow as much or more than their end buds. They are round-headed trees.

TELLING TREES APART

Each kind of tree has its own special way of growing, its own bark, buds, flowers, leaves and seeds. You can learn to tell the trees apart if you start noticing these things. Match them to the pictures in this book and you will find out the names of many trees.

Perhaps you already know that the acorn is from an oak, and you'd never mistake it for a hickory nut. The white birch has a papery bark you couldn't forget.

In winter, even leaf scars help you tell the trees apart. White ash has a scar like a half moon. Catalpa's is round like the mark of a signet ring. Winter buds are different for each tree, too.

But the very easiest way to tell trees apart is by their leaves. You can soon learn to recognize them.

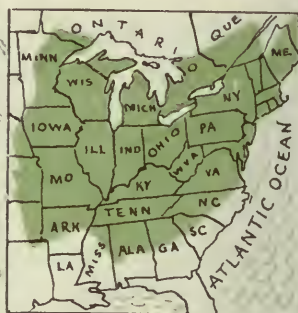
NORTHERN RED OAK

Quercus borealis

Deciduous. Grows to 90 feet. The Latin name for the oaks is "quercus," which comes from an old word meaning "beautiful tree." Like the other oaks, this one deserves the name. It is a well-shaped tree with wide branches spreading into a crown of leaves. Twigs and bark are reddish brown, and heartwood and inner bark are often reddish. Its acorns are bitter, not good to eat.

FRUIT: Acorns 1-1½ inches long, rising high from shallow cups.

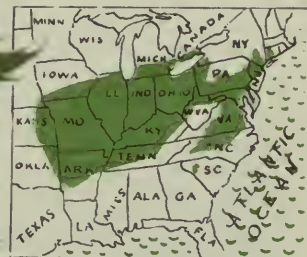
FLOWERS: Two kinds—long drooping catkins; and small greenish blooms on spikes.



LEAVES: 5-9 inches long. Simple; alternate. Leaves have 5 to 11 lobes, each with a bristle at its tip. Dark green on top, paler underneath. In fall, leaves are red or russet.



FLOWERS: Two kinds—long brown catkins; and tiny roundish flowers on stalks at base of leaves.



LEAVES: 3-6 inches long. Simple; alternate. Shining green on top, paler underneath. Red in autumn. Cut out into 5 or 7 lobes with bristles at their tips.

PIN OAK

Quercus palustris

Deciduous. Grows to 85 feet, sometimes taller. This is a more slender tree than many of the oaks, and its main trunk grows up very straight through the center, instead of spreading into large branches. Many short branchlets, a little like pins, grow from the bigger branches. These can be seen easily in winter; they gave the tree its name. The pioneers made them into wooden pins, which they used instead of nails in building. This fine tree is often planted for ornament.



BLACK OAK

Quercus velutina

Deciduous. Grows to 80 feet, sometimes more. There are ways to tell this oak from the others. Its winter buds are covered with a light brown down, and its young leaves are hairy. This may be why it has a Latin name coming from the word for "fleece." Also, the inner bark is orange yellow. In early days, the pioneers made a dye from it. The branches of this tree divide to make a spreading shape, very noticeable in winter, when its crooked branches show in outline against the sky.



LEAVES: 3-6 inches long. Simple; alternate. Shiny and dark green above, paler underneath. Red in autumn. Leaves usually have 7 lobes, each with a bristle at its tip. Leaves on one tree may be of various shapes, some more deeply cut out than others.

FRUIT: Acorns $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long, either on short stalks or without stalks. Bitter, not good to eat.



FLOWERS: Two kinds — clusters of long catkins; and small blooms on short stems.

FLOWERS: Two kinds—clusters of slim catkins; and small spikes.



LEAVES: 1-4 inches long. Simple; alternate. Older leaves are leathery and lightish green. Young leaves have bristly edges.

CANYON LIVE OAK

Quercus chrysolepis

Evergreen. Grows to 80 feet, sometimes taller. This oak lives on dry canyon bottoms, or open slopes; its shape and size depend on where it is. In narrow canyons, it is tall and slim, reaching for the sun. In open places, it is short and broad, spreading out sideways to make a tree sometimes over 100 feet across. In high places, it grows almost like a shrub. The acorn cups, often covered with yellow down, give this tree another name: "yellow-cup oak." Still another name is "California live oak." It is slow-growing, but lives as long as 300 years.



FRUIT: Acorns, $\frac{1}{2}$ -2 inches long, either on very short stalks, or with no stalks at all.



LIVE OAK

Quercus virginiana

Evergreen. Grows to about 50 feet. A beautiful tree that branches out a little above the ground so that it often is wider than it is tall. Its huge trunk holds up a great weight. In the far South, Spanish moss hanging from its branches makes it even lovelier. The wood is strong and very heavy. In Louisiana, Mississippi and Texas is the Live Oak Society which people have formed of trees that are at least a hundred years old. A tree in Louisiana is its "president." Each tree has its protector. This tree's acorns were eaten by Indians.

FLOWERS: Two kinds—yellow drooping catkins; and small flowers on spikes.

FRUIT: Shiny dark brown acorns about one inch long, growing on stalks that sometimes hold as many as five.



LEAVES: 2-5 inches long. Simple; alternate. Shining dark green above, paler and downy beneath. Edges are slightly rolled under. Leaves stay on tree for about 13 months, then turn brown and drop, as new leaves push them off.





FRUIT: Shiny brown acorns, $\frac{3}{4}$ -1 inch long. Birds and animals eat this sweet-flavored nut.



FLOWERS: Two kinds—clusters of drooping catkins; spikes of small blooms.



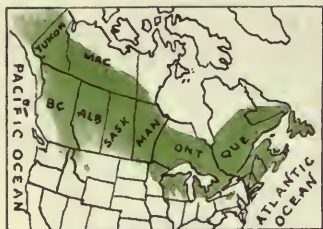
WHITE OAK

Quercus alba

Deciduous. Grows to 80 feet, sometimes taller. The mightiest of our mighty oaks—a big, strong, branching tree that sometimes lives for hundreds of years; trunk may be six or eight feet around. One of the trees that the early pioneers used, not only in building but in other ways. Indians taught them to boil the acorns and prepare them as food. The settlers learned to plant their corn when the young oak leaves were the size of a mouse's ears—just as the Indians did. And they used the bark in tanning leather. Many of our wooden ships were made of white oak. This is still one of our most useful trees for lumber; it is used in many ways.

LEAVES: 5-9 inches long. Simple; alternate; with 5-9 rounded lobes on each leaf—no bristles at tips. Shiny green above, paler below. Red in autumn.





FRUIT: Like a cone, packed full of tiny seeds. A little over an inch long.

FLOWERS: Two kinds—hanging clusters of brown catkins; small green cones, standing upright.



CANOE BIRCH

Betula papyrifera

Deciduous. Grows to 75 feet. This is one of our loveliest trees, with gleaming white bark and graceful branches. The bark is waterproof and peels readily from the tree. The Indians made canoes of it, used it in making dishes and baskets, for covering tepees, and for kindling their fires. Also called "paper birch," because of its thin paper-like top bark..

LEAVES: 2-3 inches long. Simple; alternate. Round at base, with sharp tips and toothed edges.



FLOWERS: Two kinds—drooping yellow catkins, 2-3 inches long; or upright greenish catkins ½-1 inch long.

FRUIT: Little cones, ¾ inch long, on stalks. Drop winged seeds in fall.

GRAY BIRCH

Betula populifolia

LEAVES: 2-3 inches long. Simple; alternate, growing singly or in pairs. Triangle-shaped, with pointed tips and toothed edges. Shiny green on top, paler underneath. Yellow in fall.

Deciduous. Grows to 30 feet. Very quick to spring up in burned-over places or abandoned fields with poor soil. For this reason often called “poverty birch” or “old field birch.” A slender, graceful tree, with leaves that flutter almost as steadily as the aspens do. Looks a little like the paper birch—you’d know they belong to the same family.



LEAVES: 8-12 inches long. Compound, made up of 5 to 9 leaflets, each 3 to 5 inches long; opposite. Dark green above, paler beneath. Turn many tones of yellow and purple in fall.

FRUIT: Hanging clusters of winged seeds, each wing 1 to 2 inches long, and shaped like an oar. Ripen and fall in autumn.

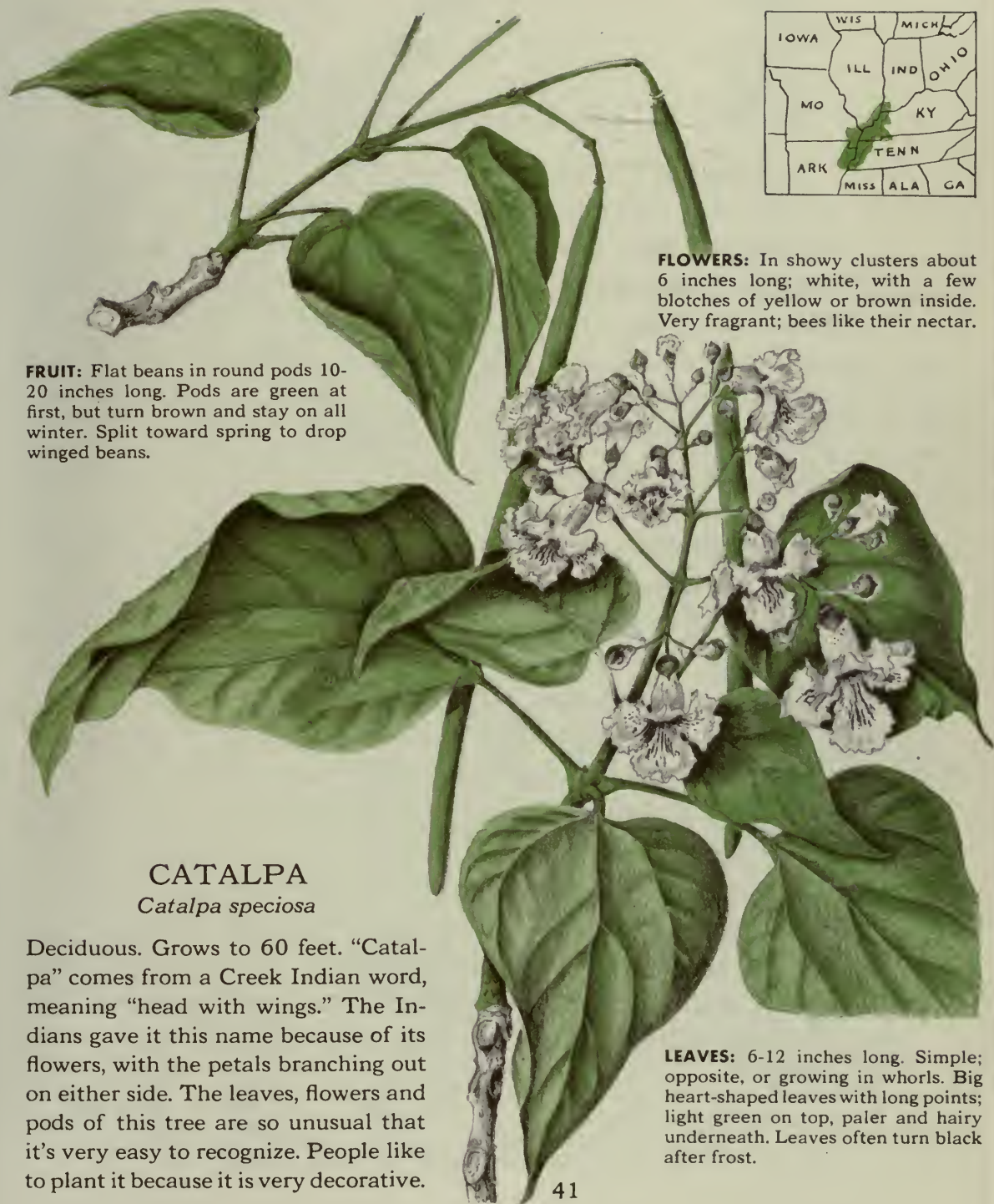
WHITE ASH

Fraxinus americana

Deciduous. Grows to 80 feet. A fine spreading tree, lovely in the spring with the tinted mist of its flowers, and glowing in the fall with the unusual colors of its leaves. Its wood is light yet strong, and is used for making baseball bats, other sporting equipment, furniture and many things.



FLOWERS: Small tufts, appearing before leaves in spring.



FRUIT: Flat beans in round pods 10-20 inches long. Pods are green at first, but turn brown and stay on all winter. Split toward spring to drop winged beans.

FLOWERS: In showy clusters about 6 inches long; white, with a few blotches of yellow or brown inside. Very fragrant; bees like their nectar.

CATALPA

Catalpa speciosa

Deciduous. Grows to 60 feet. "Catalpa" comes from a Creek Indian word, meaning "head with wings." The Indians gave it this name because of its flowers, with the petals branching out on either side. The leaves, flowers and pods of this tree are so unusual that it's very easy to recognize. People like to plant it because it is very decorative.

LEAVES: 6-12 inches long. Simple; opposite, or growing in whorls. Big heart-shaped leaves with long points; light green on top, paler and hairy underneath. Leaves often turn black after frost.

THE EVERGREEN TREES

There are two sorts of trees: those that lose their leaves in autumn and those that keep them all winter. The trees that keep their leaves are the evergreens. Some of these have broad leaves, but most of them have thin leaves like needles. Trees with this kind of leaf are called needle-leaved trees. Needle-leaved trees do drop their leaves sometime, but most of them do not do it all at once. Most of them wait until after new needles grow before the old ones drop off. So these trees are never bare. Some needle-leaved trees keep their leaves for several years.

Evergreen trees have leaves that are covered with a thick wax. This keeps them from losing much water in winter when the ground is frozen or dry, so they do not need to drop.

Most needle-leaved trees have cones to hold their seeds. You probably have seen pine cones. Most needle-leaved trees have cones something like these, in different sizes and shapes. Pine, spruce, hemlock and fir trees have cones, their leaves are needles, and they are evergreens. But all their needles are different.

Pines have long thin needles that come fastened together at the bottom in little bundles of from two to five. Each kind of pine has its own special number of needles in a bundle. White pines have five. Longleaf pines have three.

NEEDLES: 8-18 inches long; 3 in a bundle. Grow in long drooping clusters at ends of branchlets.



LONGLEAF PINE

Pinus palustris

Evergreen. Grows to about 100 feet. Also called "longstraw pine," for its shining long needles. It grows only in the South, where it is an important lumber tree. Not only do we get wood from it, but we make turpentine and resin from its pitch.



CONES: 6-10 inches long, with thin scales, each curving back a little at the tip.



PINYON PINE

Pinus edulis

Evergreen. Usually 15-20 feet high. The Spanish explorers first called this tree "piñon"—Spanish for pine nut—because of its seeds. Tree is found in high, dry places, and often grows in scraggy, crooked shapes.



NEEDLES: 1-1½ inches long. Two in a bundle. Dark green.



CONES: 1-2 inches long. Scales open when ripe to drop wingless seeds that are good to eat.



NEEDLES: 5-10 inches long; usually in bundles of 3. Dark green.

CONES: 3-5 inches long; often in clusters. Stand upright on tree until ripening, then turn down to drop long-winged seeds which the wind carries away.

PONDEROSA PINE

Pinus ponderosa

Evergreen. Grows to 200 feet. A big straight tree that often grows high in the mountains. The Indians scraped out its inner bark for food. Also sometimes called "western yellow pine" because young trees have a yellowish bark. Valuable as lumber.



CONES: 1-2 inches long, with a prickle at the end of each scale. Often grow in clusters, and sometimes stay on the tree for years.

NEEDLES: About 2 inches long; 2 in a bundle. Yellowish green, somewhat twisted.

LODGEPOLE PINE

Pinus contorta

Evergreen. Grows to 80 feet. A needle tree often seen in the northern Rocky Mountains. Called lodgepole pine because the Indians made poles of it for their lodges and tepees. They also made its bark into baskets, and scraped its inner bark to make bread. One variety grows in small twisted shapes along the West Coast and in swamps, but the tree grows tall and straight in the mountains.





NEEDLES: 5-9 inches long; 3 in a bundle. Pale green, slightly twisted and sharply pointed.

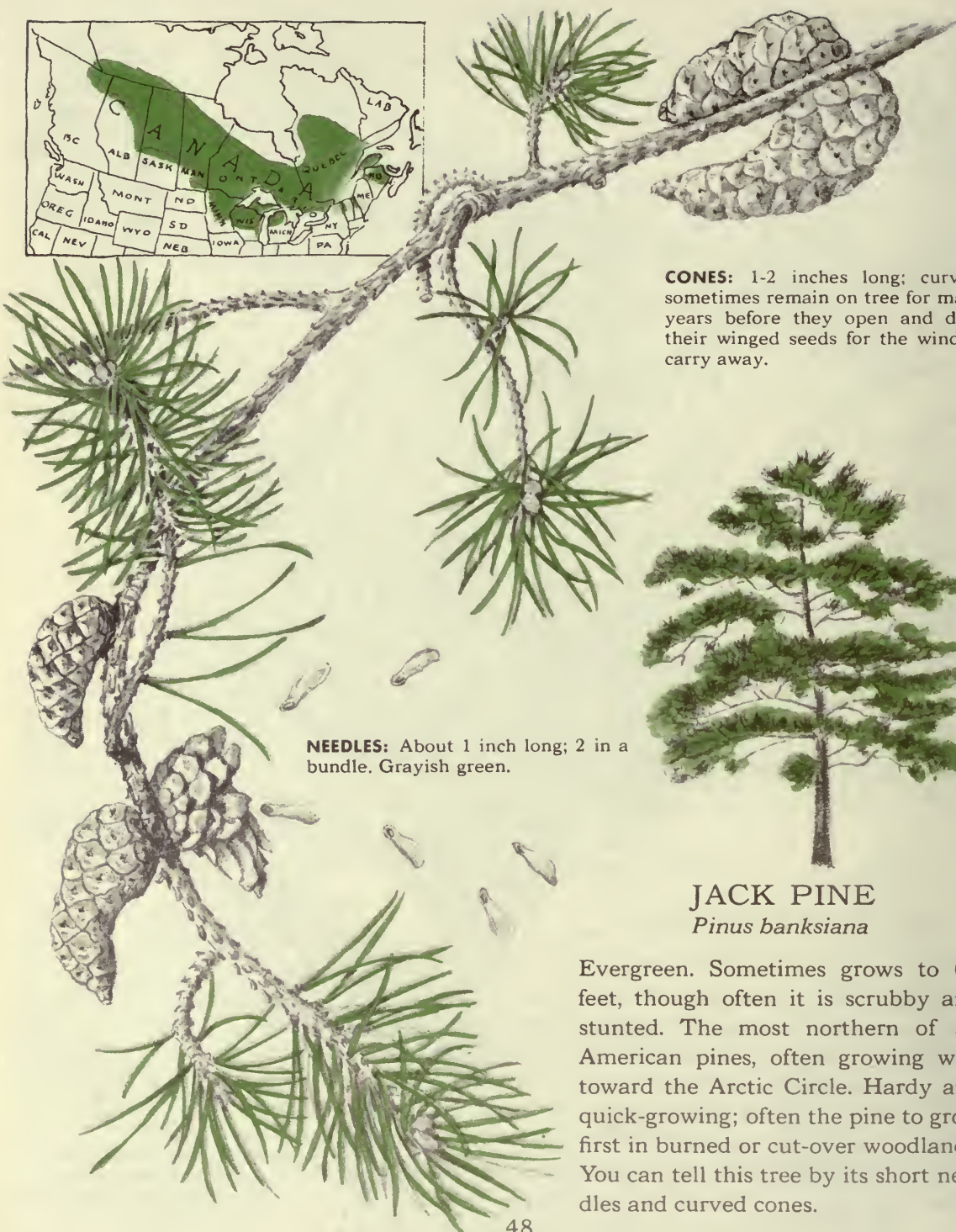


LOBLOLLY PINE

Pinus taeda

Evergreen. Often grows to 100 feet. This tree has a tall, straight trunk covered with cinnamon-colored bark. It often grows in moist hollows called "loblollies." Also called "old field pine" because it grows in abandoned fields. Is used for lumber and for making paper.

CONES: 3-6 inches long; somewhat egg-shaped. Each cone scale has a three-cornered spine as a tip.



CONES: 1-2 inches long; curved; sometimes remain on tree for many years before they open and drop their winged seeds for the wind to carry away.

NEEDLES: About 1 inch long; 2 in a bundle. Grayish green.



JACK PINE

Pinus banksiana

Evergreen. Sometimes grows to 60 feet, though often it is scrubby and stunted. The most northern of all American pines, often growing well toward the Arctic Circle. Hardy and quick-growing; often the pine to grow first in burned or cut-over woodlands. You can tell this tree by its short needles and curved cones.

PITCH PINE

Pinus rigida

Evergreen. Grows to 50 feet. The only three-needled pine in the northeastern states. Often seen in sandy places such as Cape Cod, in Massachusetts. Pitch flows out when the bark is broken. So full of pitch that its knots were used by the pioneers as torches. A scraggy tree that often grows in lopsided shapes.

NEEDLES: 3-5 inches long; 3 in a bundle. Often grow at almost right angles to twigs.

CONES: 2-3 inches long; stubby; joined close to stem, usually in clusters of 3. Old cones sometimes stay on tree for years.



WESTERN WHITE PINE

Pinus monticola

Evergreen. Grows to 100 feet or more. A tree of the mountains, where it grows tall and straight and very slender. Its long cones and silvery color give it two other names: "silver pine" and "finger-cone pine." A fine tree for lumber.

NEEDLES: 2-4 inches long; 5 in a bundle. Bluish green, often silvery.



CONES: 6-10 inches long. Slender; hanging down from branch.

EASTERN WHITE PINE

Pinus strobus

Evergreen. Grows to 100 feet, sometimes more. This tree is part of our history. Masts for sailing ships were made from it, and ships' figureheads carved from its wood. One of the first flags of the American Revolution had a white pine pictured on it.

NEEDLES: 3-5 inches long; 5 in a bundle.



CONES: 3-5 inches long. Hanging on short stalks. Drop winged seeds.



Eastern white pine tree

When you see an evergreen with needles fastened in bundles you can be sure it is a pine. Always count the number in each bundle. This is an important clue for telling what kind of pine the tree is. The cones are another clue. No two kinds of pines have cones exactly alike. Pitch pine cones are short and egg-shaped. White pine cones are long and thin.

Spruce trees have short needles that are four-sided. If you cut through a spruce needle, the cross-section is square, like sandwich bread—only it is much smaller, of course. Spruce needles are the only ones that are square like this. They come separately on the twigs, not in bundles. They

grow round and round the twig in a spiral. Each spruce needle grows on a very tiny stem. This becomes woody after a while. It stays on the twig after the needle drops off. and makes the twig look rough and prickly. Spruce cones always hang down from the twigs, when full-grown.

Hemlocks have very short, flat, two-sided needles that grow separately on either side of the twigs. They have neat white lines on their undersides. They have tiny stems like the spruce, and also leave rough twigs after they fall. Hemlocks are feathery, graceful trees with small cones.

Firs have flat, two-sided needles that grow separately on the twig. Fir needles do not have real stems like spruce and hemlock. They sit right on the twigs. When they fall they leave the twigs clean and smooth, but tiny round scars show where the needles once grew. They make the fir twigs look as if they might have had chicken pox. Fir cones stand straight up on the top side of the twigs.

There are two needle trees that are different from all the rest. They have cones but are not evergreens. They drop their needles each fall. They are the larch, one kind of which is called the tamarack, and the bald cypress.

Some evergreens that we call cedars have leaves that are not separate needles. They are small scaly leaves that overlap one another, like shingles on a roof. The twigs make green sprays of these scaly leaves.



BLUE SPRUCE

Picea pungens

Evergreen. Grows to 90 feet. A beautiful tree that grows wild only in a small part of the Rocky Mountains, but which people plant widely because of its pleasing pyramid shape and its unusual bluish needles. Grows slowly, but may live 400 years. Also called "prickly spruce," because of its sharp needles.

NEEDLES: $\frac{1}{2}$ -1 $\frac{1}{4}$ inches long. Silvery gray or bluish green. Stiff and sharply pointed; growing all around branchlets.

CONES: 2-4 inches long; hanging down at ends of twigs near top of tree.



NEEDLES: 1/2 inch long. Grow from all sides of twig, curving in toward it. Needles are sharp, and the twig is as prickly as a porcupine.



RED SPRUCE

Picea rubens

Evergreen. Grows to 80 feet, sometimes more. The reddish-brown color of buds, new twigs, cones and bark gives this tree its name. Red spruce is an especially fine wood for making musical instruments. Something about it helps make the tones of the music sweet and full.

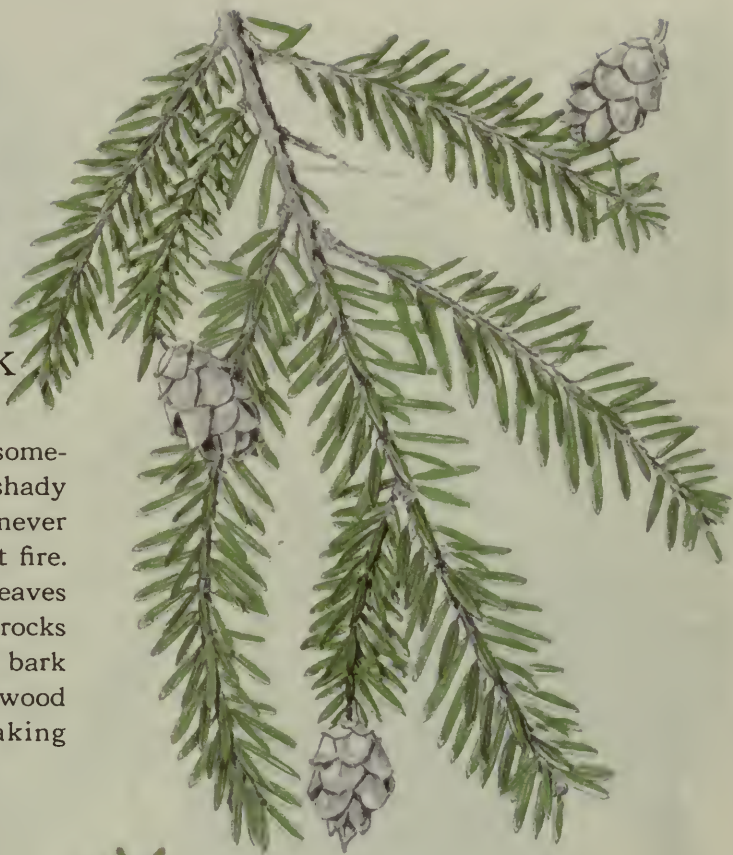
CONES: 1-2 inches long. Hanging down from bough.



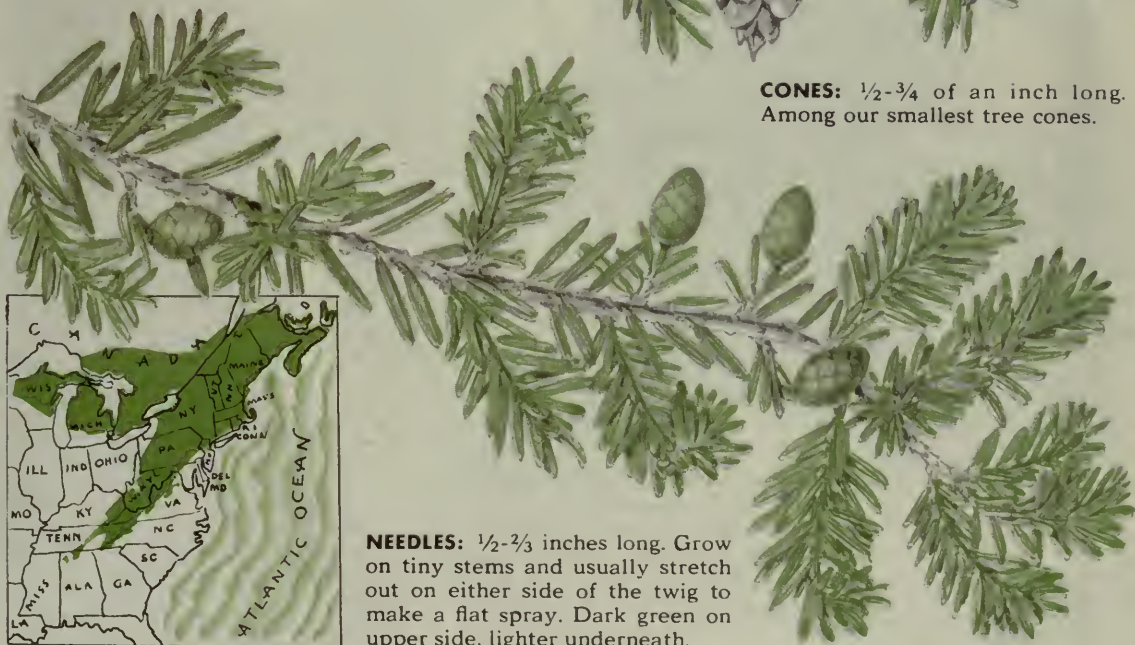
EASTERN HEMLOCK

Tsuga canadensis

Evergreen. Grows to 80 feet, sometimes more. A tree that likes shady forested places when small, so never is the first to grow after a forest fire. This is a very ancient tree; fossil leaves and cones are found in very old rocks of America and Asia. Hemlock bark is useful in tanning leather. The wood is used for lumber and in making paper.



CONES: $\frac{1}{2}$ - $\frac{3}{4}$ of an inch long. Among our smallest tree cones.



NEEDLES: $\frac{1}{2}$ - $\frac{2}{3}$ inches long. Grow on tiny stems and usually stretch out on either side of the twig to make a flat spray. Dark green on upper side, lighter underneath.



NEEDLES: $\frac{3}{4}$ to $1\frac{1}{4}$ inches long. Grayish green with two pale bands on under side. Grow spirally on twig.

DOUGLAS FIR

Pseudotsuga taxifolia

Evergreen. Grows to 250 feet. A fine majestic tree that is a puzzle — not really a fir, but it doesn't fit into any other evergreen family. In forests it has a long bare trunk, but in open spaces, branches grow to the ground. Used for posts, masts, lumber. Small ones are good decorative trees and lovely Christmas trees.



CONES: 2-4 inches long. Hanging down from branch. Each cone scale has a little three-pointed leaf growing from it. The leaves look like hind feet and tails of mice diving into holes.

NEEDLES: $\frac{1}{2}$ -1 $\frac{1}{2}$ inches long. On coneless branches, spread out flat on either side of twig; on branches with cones, swept up toward top of twig.

BALSAM FIR

Abies balsamea

Evergreen. Grows to 75 feet. One of the favorite evergreen trees. Woodsmen cut the tips of its twigs to make springy balsam beds for sleeping. Deer and moose browse on its needles in winter; grouse eat the seeds. Balsams make beautiful Christmas trees, and their needles stay on a long time.

CONES: 2-4 inches long. Stand straight up on branches at top of tree.





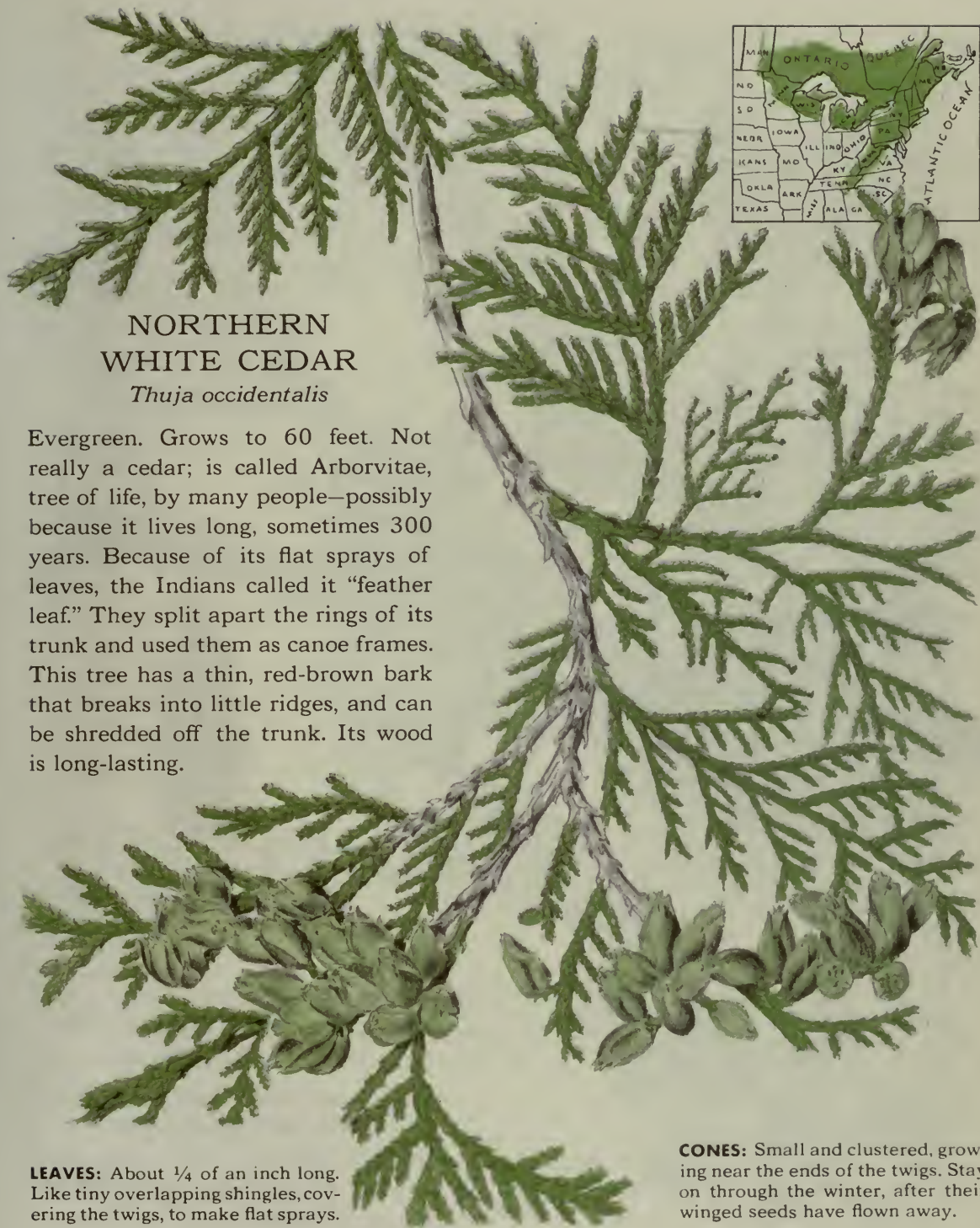
WHITE FIR

Abies concolor

Evergreen. Grows to 120 feet. A towering tree of fine shape that is used for lumber in its native West, but is planted in the East for ornament. Grows quite fast, and does well, even in shady spots.

NEEDLES: $\frac{3}{4}$ -3 inches long. Reach up from the twig like little fingers. On older trees, the needles take on a whitish look. This fact and the pale bark give the tree its name.

CONES: 3-5 inches long. Stand up straight from the topmost branches.



NORTHERN WHITE CEDAR

Thuja occidentalis

Evergreen. Grows to 60 feet. Not really a cedar; is called Arborvitae, tree of life, by many people—possibly because it lives long, sometimes 300 years. Because of its flat sprays of leaves, the Indians called it “feather leaf.” They split apart the rings of its trunk and used them as canoe frames. This tree has a thin, red-brown bark that breaks into little ridges, and can be shredded off the trunk. Its wood is long-lasting.

LEAVES: About $\frac{1}{4}$ of an inch long. Like tiny overlapping shingles, covering the twigs, to make flat sprays.

CONES: Small and clustered, growing near the ends of the twigs. Stay on through the winter, after their winged seeds have flown away.



NEEDLES: $\frac{1}{2}$ - $\frac{1}{3}$ of an inch long. Grow singly but in whorls of three around the twig. Very prickly.

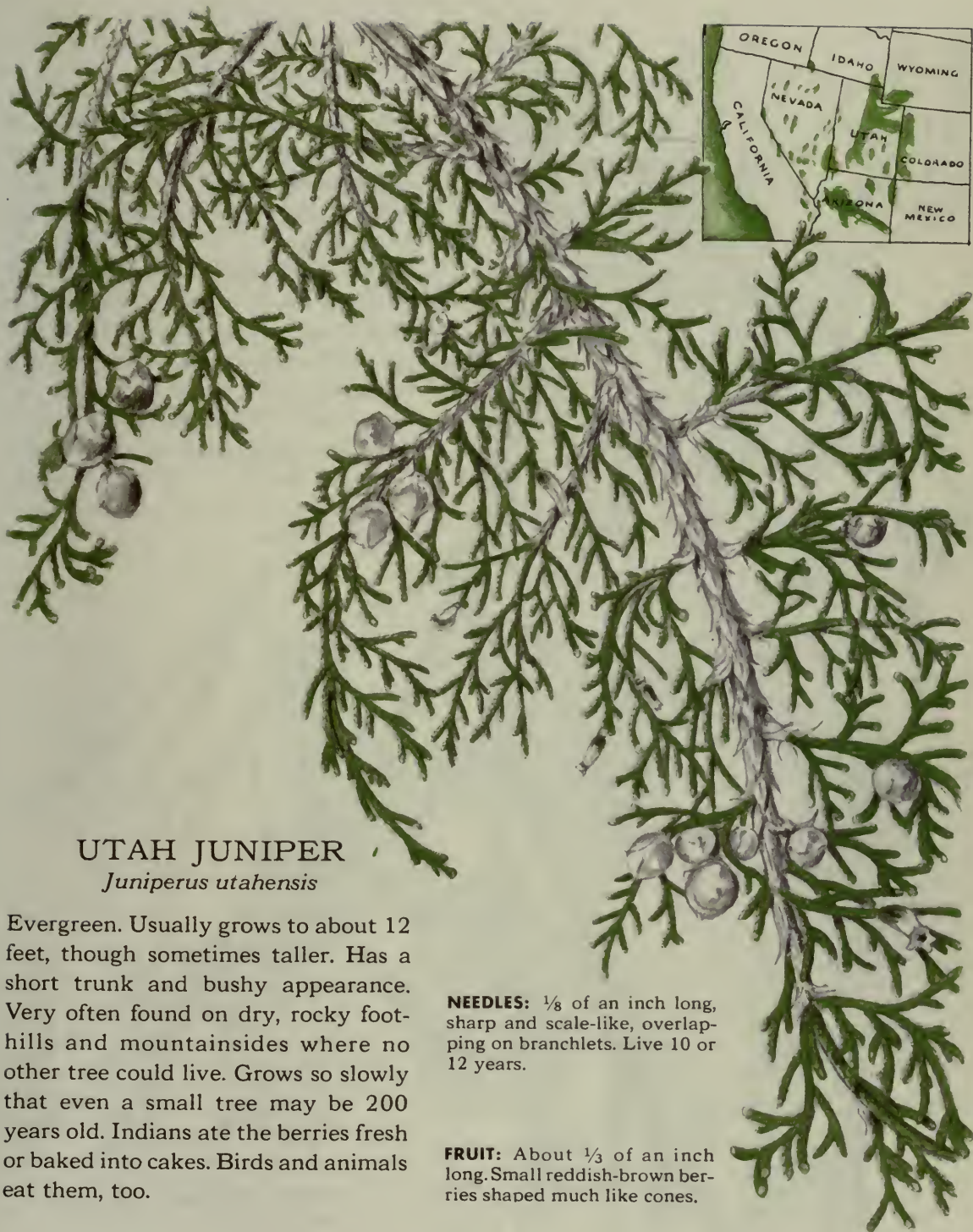
FRUIT: Small, roundish, blue berry, about $\frac{1}{4}$ inch broad.



COMMON JUNIPER

Juniperus communis

Evergreen. Sometimes grows to 20 feet, but is often found in pastures as a saucer-shaped shrub—so it has an old English name: “fairy circle.” Birds like to eat the berries.



UTAH JUNIPER

Juniperus utahensis

Evergreen. Usually grows to about 12 feet, though sometimes taller. Has a short trunk and bushy appearance. Very often found on dry, rocky foothills and mountainsides where no other tree could live. Grows so slowly that even a small tree may be 200 years old. Indians ate the berries fresh or baked into cakes. Birds and animals eat them, too.

NEEDLES: $\frac{1}{8}$ of an inch long, sharp and scale-like, overlapping on branchlets. Live 10 or 12 years.

FRUIT: About $\frac{1}{3}$ of an inch long. Small reddish-brown berries shaped much like cones.



GIANT SEQUOIA

Sequoia gigantea

Evergreen. Grows to 300 feet. The giant sequoia is the oldest tree on earth, and one of the largest. For, while the redwood is often taller, the giant sequoia is a bulkier tree. Its trunk may measure over 30 feet around. Some of these trees have lived to be over 4,000 years old. They are rather scarce, since they grow only in big groves on the western slopes of the Sierra Nevada Mountains, over 4,000 feet above sea level. The trunks rise high before the branches begin, and the trees have the majestic look of great pillars.

NEEDLES: All one kind— $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, sharply pointed but scale-like. Overlap on branchlets.



CONES: 2-3 inches long. Somewhat egg-shaped.

REDWOOD

Sequoia sempervirens

Evergreen. Grows to 350 feet — our tallest tree. Long before the Glacier Age, the redwoods covered most of the northern part of the world. Now they live only where the moist fogs roll in from the Pacific Ocean. This seems to be the one climate they like. A scientist gave them their scientific name, *Sequoia*, in honor of the Cherokee Indian chief, Sequoyia, who worked out an alphabet for his people. Some redwoods have lived almost 1,500 years. They are among the oldest trees in the world.



NEEDLES: Two kinds — some $\frac{1}{2}$ -1 inch long, standing out on either side of the twig, to make flat sprays; some like small scales, overlapping on branchlets.



CONES: About an inch long, at ends of twigs.





FLOWERS: Two kinds: Round, redish cone-shaped blooms; or small yellow clusters.

CONES: Less than an inch long, with thin, rounded scales.



TAMARACK

Larix laricina

Deciduous. Grows to 60 feet. The Iroquois Indians called this tree "ka-neh-tens," meaning "the leaves fall," because it loses its needles in the autumn. Indians used its thread-like roots for sewing together pieces of birch bark, in making canoes. Often grows in swampy land. It is one of the trees that will grow far into the cold North. Its wood has many uses as lumber. Also called the "American larch."

NEEDLES: About an inch long, growing in clusters at the end of tiny, stubby twigs, or sometimes growing singly. Needles drop in fall.



NEEDLES: About an inch long, growing either in little rosettes, or when older, in short sprays. Not ever-green, these needles drop every fall.

CONES: 1-1½ inches long. Egg-shaped, with a slender little leaf coming out from under each cone scale.



WESTERN LARCH

Larix occidentalis

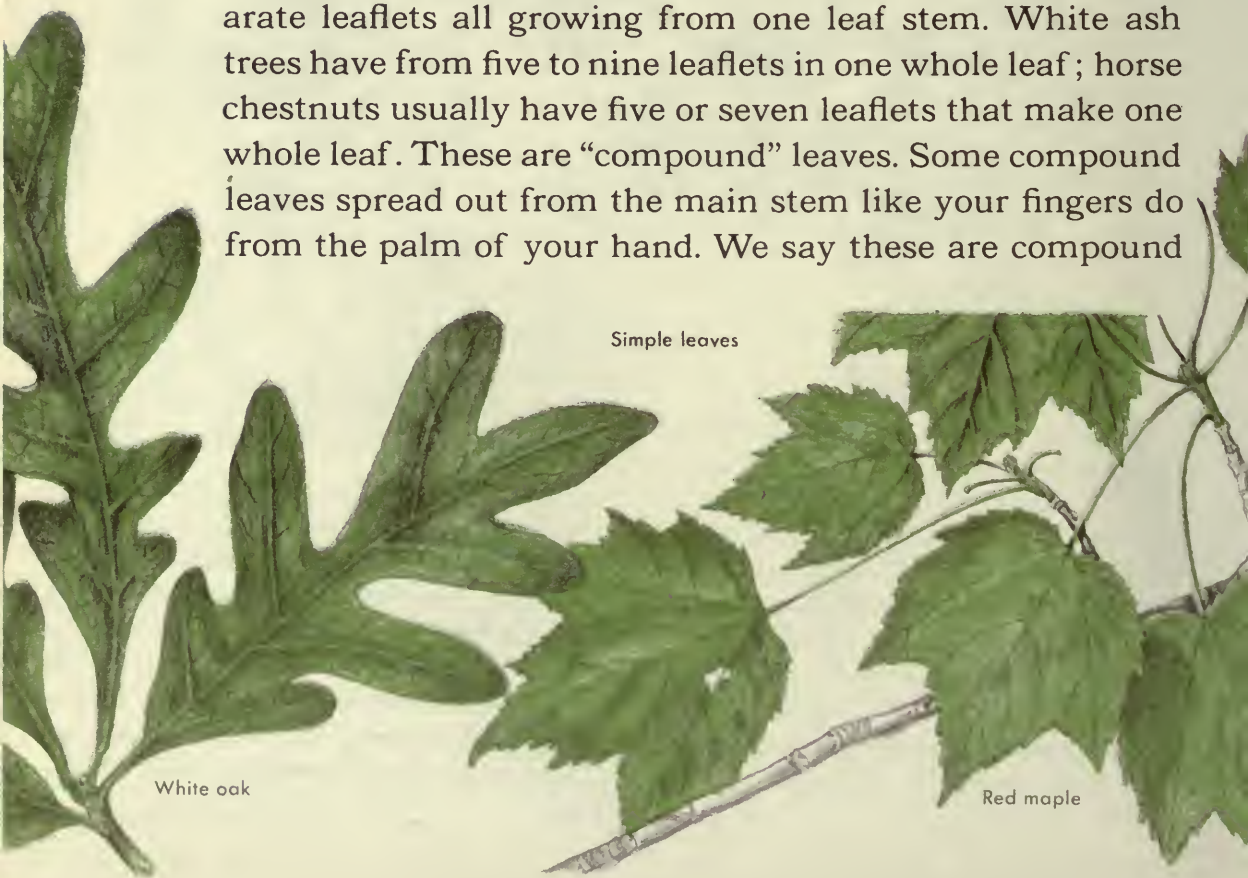
Deciduous. Sometimes grows to 200 feet. The biggest of the larch family, this tree grows in mountain places. A tall, unusually slender tree, with a pointed top and a trunk as straight as a ship's mast, this is one of our grandest cone-bearing trees. It often lives to be 700 years old. Its wood lasts well as lumber, and is used for many things.

THE BROAD-LEAVED TREES

The trees that lose their leaves each fall are called the broad-leaved trees, to show that they have wider leaves than the needle trees. Broad-leaved trees have leaves of many different sizes and shapes that have several different ways of growing. The way they grow is one of the important clues you can use in telling the tree.

Some leaves grow all in one piece. These are called “simple” leaves. They are easy to tell. Maples and oaks have simple leaves.

But there are other leaves that have several parts—separate leaflets all growing from one leaf stem. White ash trees have from five to nine leaflets in one whole leaf; horse chestnuts usually have five or seven leaflets that make one whole leaf. These are “compound” leaves. Some compound leaves spread out from the main stem like your fingers do from the palm of your hand. We say these are compound



Simple leaves

White oak

Red maple



Honey locust

Ailanthus

Compound leaves

like a palm. Horse chestnut leaves grow this way. Others spread out on either side of their stem the way the little parts of a feather do. We say these are compound like a feather. Ash leaves grow this way. Some compound leaves have dozens of leaflets. Just look at the black locust, the honey locust, and the ailanthus, or tree of heaven.

When the leaflets in compound leaves are large you may think they are separate leaves. But look for the bud in the leaf's armpit. You will find that the leaflets have no buds. The bud is only in the armpit of the whole leaf. By finding the bud you can tell where the leaf begins, and can tell whether it is simple or compound. After you have noticed the leaves on trees for a while you will know which ones have simple leaves and which ones have compound ones; and it will help you to know the different trees when you see them.



FLOWERS: Big, showy clusters standing upright, 6-12 inches high; white with red and yellow markings. Appear after leaves in spring.

LEAVES: To 8 inches long. Compound, made up of 5 or 7 leaflets, 4-8 inches long; opposite. In spring, these leaves unfold rapidly from big buds.



COMMON HORSE CHESTNUT

Aesculus hippocastanum

Deciduous. Grows to 70 feet. Travelers brought the horse chestnut to the United States in the 1700's. It probably came from Greece. Now it is planted over much of our country—one of our prettiest and most interesting trees. In spring, the flower clusters are like candles on the branches. The leaves dropping off in the fall make scars which have been likened to horseshoes, the little raised dots around the edges resembling nail marks. The big shiny winter buds have a sticky covering like varnish.

FRUIT: One or 2 shiny brown nuts with big round white scars, in each prickly bur that splits into 3 parts to drop the nuts in the fall.

FLOWERS: Small and greenish, growing in large clusters.

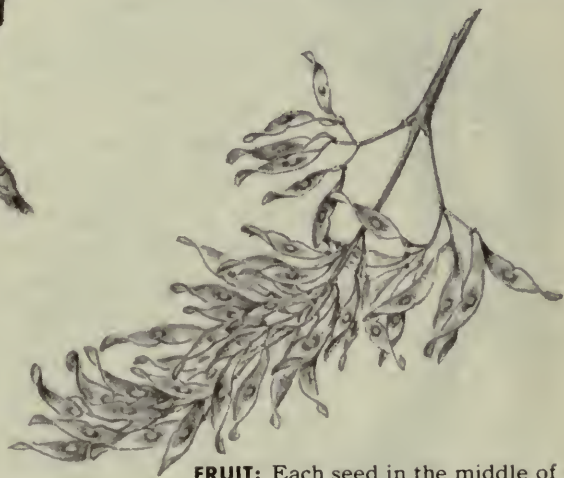


LEAVES: 1-3 feet long. Compound, made up of 11-25 leaflets; alternate.

AILANTHUS

Ailanthus glandulosa

Deciduous. Sometimes grows to 60 feet. This tree is an immigrant from China, but is now thoroughly at home here. We often find it in cities—in dumps and places where no other tree could live. It grows rapidly; a branch may grow as much as 8 or 10 feet in a single season. In winter, without its sweeping leaves, the tree looks stiff and dead. Also called the “tree of heaven.”



FRUIT: Each seed in the middle of a curiously twisted wing. Wings in large bright orange or red clusters.

FRUIT: Seeds in pods 8-18 inches long. Pods hang on into the winter, turning brown and gradually twisting out of shape.

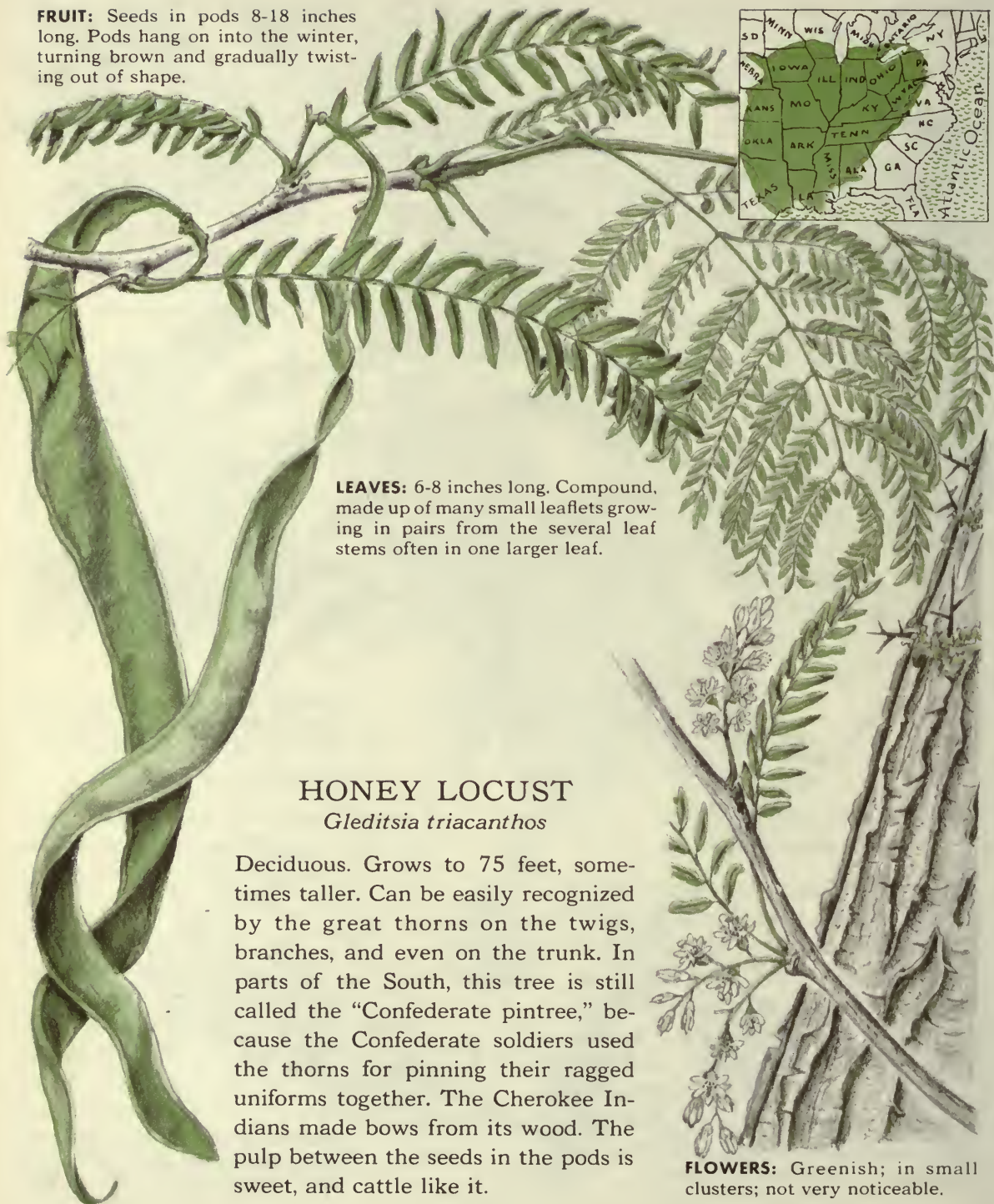
LEAVES: 6-8 inches long. Compound, made up of many small leaflets growing in pairs from the several leaf stems often in one larger leaf.

HONEY LOCUST

Gleditsia triacanthos

Deciduous. Grows to 75 feet, sometimes taller. Can be easily recognized by the great thorns on the twigs, branches, and even on the trunk. In parts of the South, this tree is still called the "Confederate pintree," because the Confederate soldiers used the thorns for pinning their ragged uniforms together. The Cherokee Indians made bows from its wood. The pulp between the seeds in the pods is sweet, and cattle like it.

FLOWERS: Greenish; in small clusters; not very noticeable.





LEAVES: 6-14 inches long. Compound, made up of 7-21 leaflets, each up to 2 inches long; alternate.

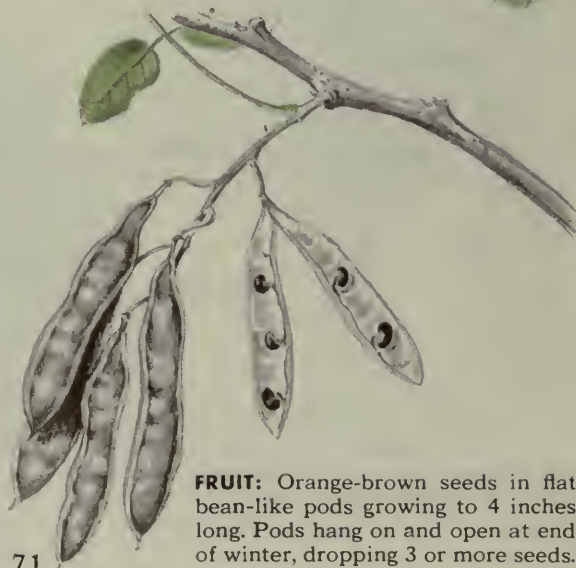


FLOWERS: White, and shaped like those of a pea. Droop in loose clusters. Blossom in mid-spring. Very fragrant.

BLACK LOCUST

Robinia pseudoacacia

Deciduous. Grows to 80 feet. A very pretty tree, with its fragrant clusters of flowers and its feathery leaves. But beware of the short thorns on the twigs. The leaves are sensitive, and droop slightly on rainy days and in the evening. This tree grows easily and is found far from its native homeland.



FRUIT: Orange-brown seeds in flat bean-like pods growing to 4 inches long. Pods hang on and open at end of winter, dropping 3 or more seeds.

SUGAR MAPLE

Acer saccharum

Deciduous. Often grows to 100 feet or more. Indians taught the pioneers to make syrup and sugar from this tree's sweet sap. Instead of boiling it down as we do, the Indians froze it and took off the sweet ice; or they boiled it by dropping hot stones into the wooden sap troughs. Also called "hard maple" or "rock maple." Its wood is tough and strong. Good for lumber.



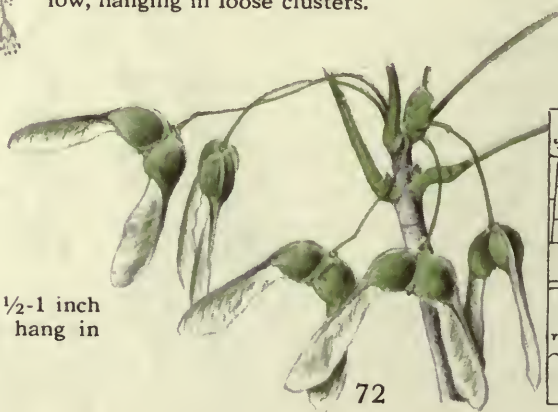
LEAVES: 3-5 inches long. Simple; opposite. Dark green above, paler below. Gorgeous shades of yellow, orange or red in autumn—a true glory.

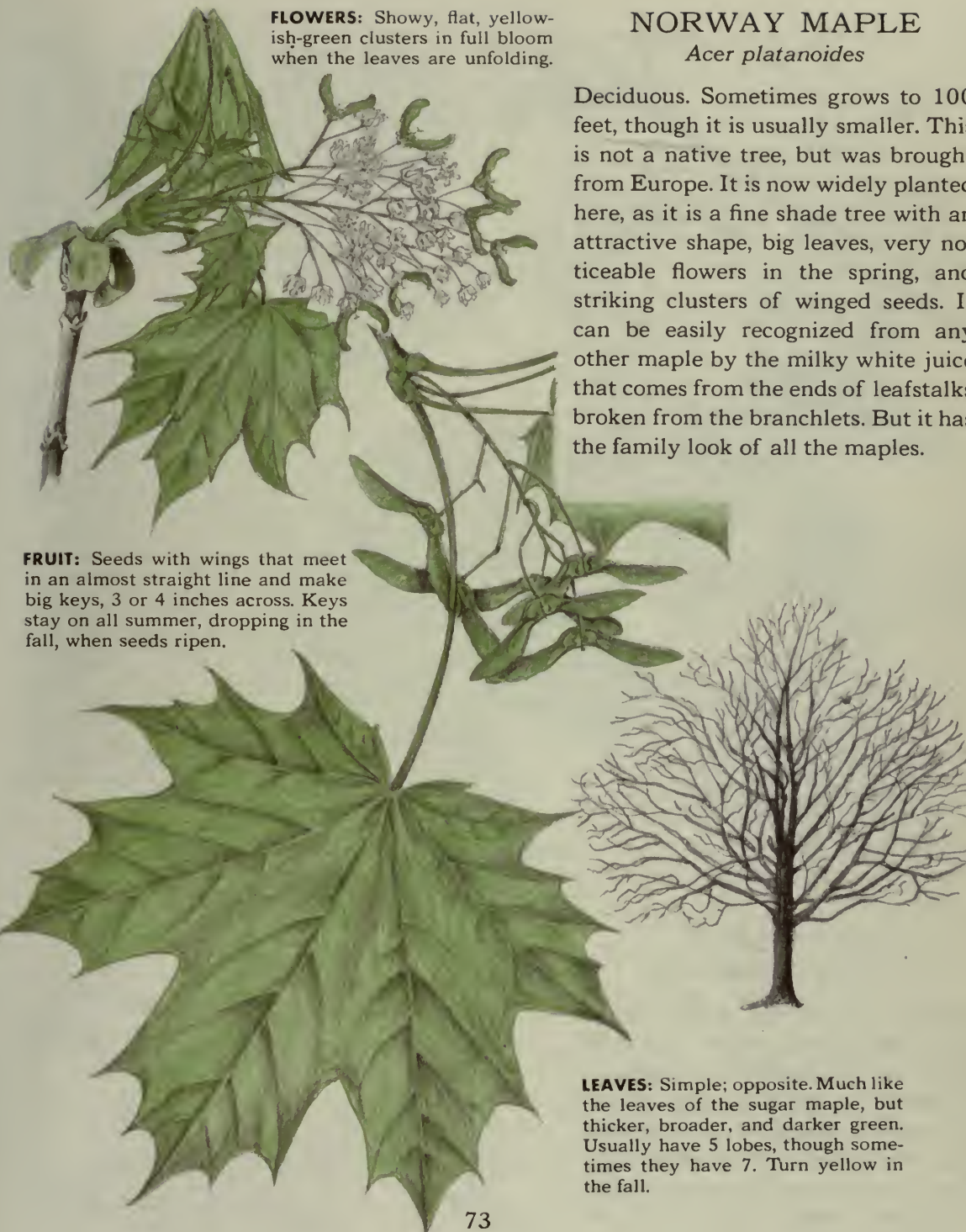


FLOWERS: Small and greenish yellow, hanging in loose clusters.



FRUIT: Seeds with wings, 1/2-1 inch long, forming keys which hang in clusters.





FLOWERS: Showy, flat, yellowish-green clusters in full bloom when the leaves are unfolding.

NORWAY MAPLE

Acer platanoides

Deciduous. Sometimes grows to 100 feet, though it is usually smaller. This is not a native tree, but was brought from Europe. It is now widely planted here, as it is a fine shade tree with an attractive shape, big leaves, very noticeable flowers in the spring, and striking clusters of winged seeds. It can be easily recognized from any other maple by the milky white juice that comes from the ends of leafstalks broken from the branchlets. But it has the family look of all the maples.

FRUIT: Seeds with wings that meet in an almost straight line and make big keys, 3 or 4 inches across. Keys stay on all summer, dropping in the fall, when seeds ripen.

LEAVES: Simple; opposite. Much like the leaves of the sugar maple, but thicker, broader, and darker green. Usually have 5 lobes, though sometimes they have 7. Turn yellow in the fall.



FRUIT: Winged seeds making small red keys; in clusters drooping on long stalks.



RED MAPLE

Acer rubrum

Deciduous. 60-90 feet. A tree that is truly named. Buds are red in winter; flowers and leaves are bright in spring; leafstalks are reddish in summer; and the autumn foliage is scarlet. Also called "swamp maple" because it often grows in wet places. This colorful tree is a pleasure to see.

LEAVES: 2-6 inches long. Simple; opposite. Bright red as they unfold in the spring; and scarlet in the fall.



FLOWERS: In red and yellow clusters, with the red more noticeable than the yellow. Appear before leaves.





LEAVES: 3-6 inches long. Simple; opposite. Five slender lobes, deeply cut and sharply toothed. Pale green above, silvery below. Pale yellow in fall.



FRUIT: Winged seeds that make keys 2 inches long, drooping on stalks. Ripen and drop in late spring.



SILVER MAPLE

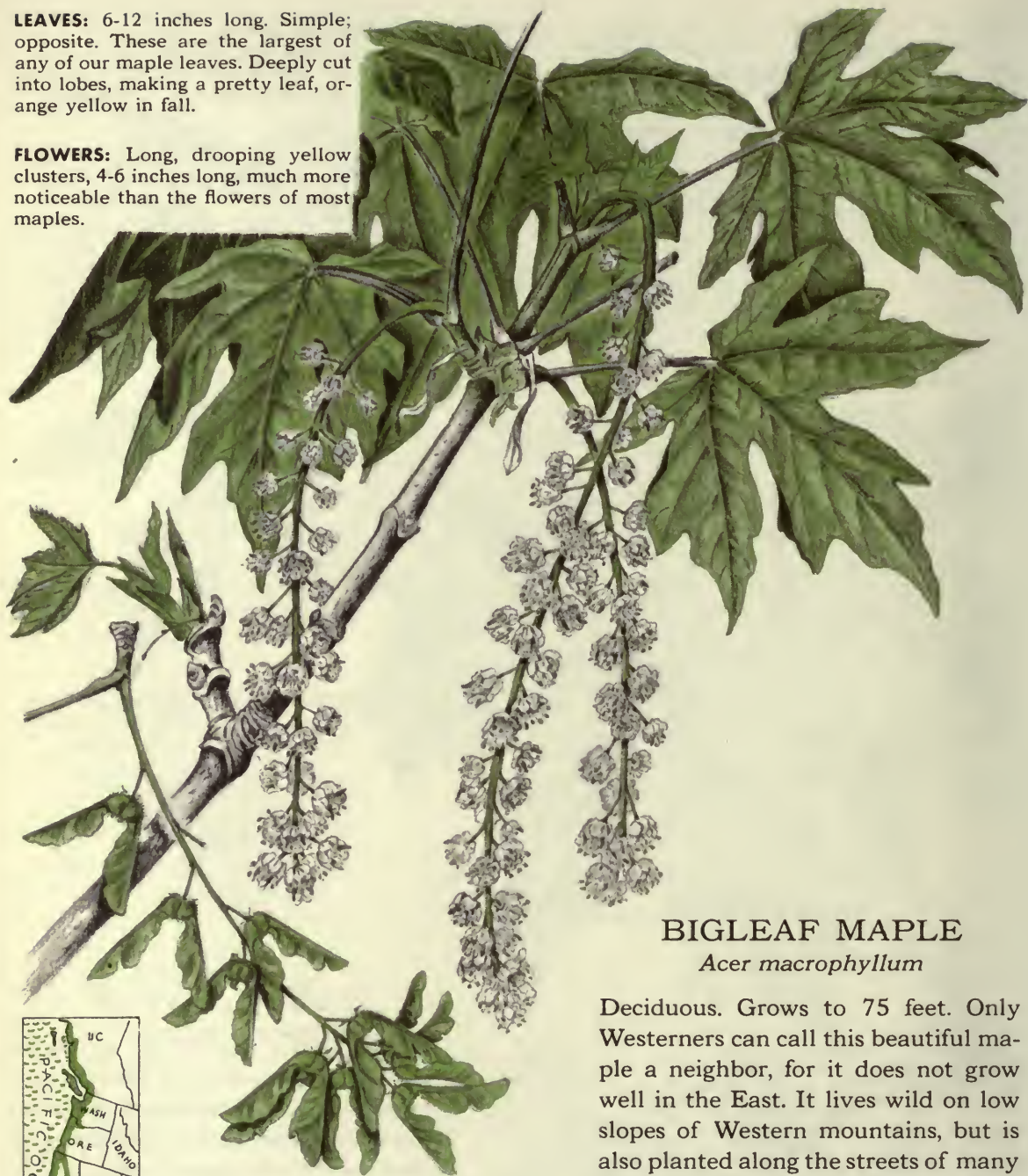
Acer saccharinum

Deciduous. Grows to 80 feet, sometimes taller. The lower branches droop to make a graceful tree with a two-toned look as the leaves twist in the breeze, showing first their silvery undersides, then their green topsides. Very fast-growing.

FLOWERS: In greenish-yellow clusters, appearing long before leaves.

LEAVES: 6-12 inches long. Simple; opposite. These are the largest of any of our maple leaves. Deeply cut into lobes, making a pretty leaf, orange yellow in fall.

FLOWERS: Long, drooping yellow clusters, 4-6 inches long, much more noticeable than the flowers of most maples.



BIGLEAF MAPLE

Acer macrophyllum

Deciduous. Grows to 75 feet. Only Westerners can call this beautiful maple a neighbor, for it does not grow well in the East. It lives wild on low slopes of Western mountains, but is also planted along the streets of many cities. An important lumber tree. Also called "Oregon maple" and "broad-leaved maple."



FRUIT: Seeds with wings $1\frac{1}{2}$ -2 inches long, making large keys that often hang in clusters.

TREES ARE SPECIALLY BUILT

You must have noticed that the same kinds of trees don't grow everywhere. A pinyon pine never grows in a wet swamp. And a swamp maple tree doesn't grow in a dry desert.

This is because each kind of tree needs its own special amounts of sunlight and water and heat, and a special kind of soil. It can't grow where it doesn't get what it needs.

Trees that grow in very dry places have to be built so that they can get along with very little water; and they have to make the most of what they do get. If they had big thin leaves, these would give off quite a lot of water through their little leaf windows. That would be a waste. So trees in dry places grow with small leaves that have very thick skins and are often protected with scales or with a thick wax. They give off less water this way.

The pinyon pine has tough needles coated with wax, and it has roots that fit it for living in the dry rocky mountain places of the Southwest. It couldn't live in a low, wet place.

Maples have thin leaves that give off quite a lot of water. Maple roots like soil that is quite moist. Maples couldn't live in dry deserts where the specially built desert trees are completely at home.

Bald cypress trees like to live in the southern swamps. They sometimes grow in several feet of water, and have



LEAVES: $\frac{1}{2}$ - $\frac{3}{4}$ of an inch. Look like feathery needles, spreading on either side of twig. Drop in fall.



CONES: Purplish and small, about one inch around. Have winged seeds under their scales.

FLOWERS: Two kinds: Flat purplish clusters, 3-6 inches long; and small blooms near ends of branches.

BALD CYPRESS

Taxodium distichum

Deciduous. Grows to 100 feet, sometimes more. Millions of years ago, this tree lived in many places. Now it grows only in the southern United States, where there are many cypress swamps. For this tree often grows with its roots in water. You can tell it by its strong, heavy trunk, grooved like a pillar, and by the strange "knees" it sends up above the water as anchors to keep the tree from blowing over. These knees may take air to the roots, too. Not only do cypresses shed their needles in fall; they shed twigs, too, and in winter look dead.

queer trunks that are swollen around the bottom. These support the tree, which has roots that do not go very deep. Bald cypresses also grow odd bumps around their roots. These bumps are called knees. They probably help keep the tree from tipping over. Very few are blown down, even by high winds.

Many needle-leaved trees grow well in the far north where the growing season is short. Their needles do not lose water in the long winters. Then, too, they are pointed trees. Hemlock, fir and spruce trees are shaped so that snow slides off them quite easily, and doesn't break their branches. Spruce can grow far north toward the Arctic circle.

Some of the needle trees can live on mountains, away up to the timber line. This is a line high up, above which no tree can grow because of the cold and wind and dryness, and poor rocky soil. Up here, needle trees are usually small and stunted. Some grow in mats close against the earth.



Cypress swamp

TREES FOR MANY PLACES

There are all kinds of trees suited to grow in all kinds of places, and we have hundreds of them in this country. For America is a big land. It has swamps and deserts, mountains and plains; places where the weather is usually warm, places where it is sometimes very cold; soil that is rich, soil that is poor. So it's no wonder that we have so many different kinds of trees.

There are some places, though, where the temperature and water and soil and sunlight are enough alike so that many of the same trees grow over quite large parts of our land.

In the northeastern United States, the summers are warm, winters are cold, and the ground is fairly moist. Here grow broad-leaved trees like the maples, birches, beeches, oaks, hickories, elms, ashes, lindens and aspen. Many of the needle trees grow here too: spruce, fir, hemlocks, and white, red, pitch and scrub pines.

In the southeastern part of the country it is warm and moist. This is the home of longleaf, slash and loblolly pines. Live oak, an evergreen oak, and bald cypress, a needle-leaved tree, grow in the deep South. Tulip trees and magnolias are at their finest here. Sweet gum, locusts, and hickories grow well in the South. Far south are palm trees, which, in the North, never grow outdoors in winter.



LEAVES: 3-5 inches long. Simple, alternate. Sharply toothed and pointed, and shiny bluish green, turning to yellow or russet in fall.

AMERICAN BEECH

Fagus grandifolia

Deciduous. Grows to 75 feet, sometimes more. The beautiful, smooth, blue-gray bark of this tree can be recognized anywhere. Its three-sided nuts are good to eat; birds and animals like them—so do people. In pioneer days, great forests of beech covered large parts of Ohio, Kentucky, and Indiana. The beech tree sometimes lives to be 400 years old.

FLOWERS: Two kinds: yellow-green clusters, drooping on longish stems; or small blooms in pairs on short stems.

FRUIT: Small, three-sided nuts, 2 or 3 in each bur, which opens into 4 parts in the fall.



QUAKING ASPEN

Populus tremuloides

Deciduous. Grows to 50 feet. This member of the poplar family is one of our most widely growing trees. You can tell it by its shimmering leaves. Their stems are flattened so that they act like sails, fluttering the leaves in the slightest breeze. That's why we call it "quaking" aspen.



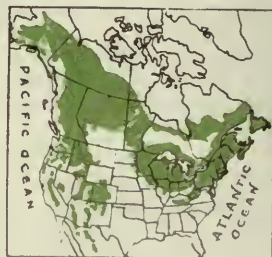
LEAVES: 1½-4 inches long. Simple; alternate. Shiny green on top, pale, dull green underneath. Golden yellow in fall.



FRUIT: Small pale-green seed pods, in early summer.



FLOWERS: Catkins, 1½-2½ inches long, before leaves in spring.





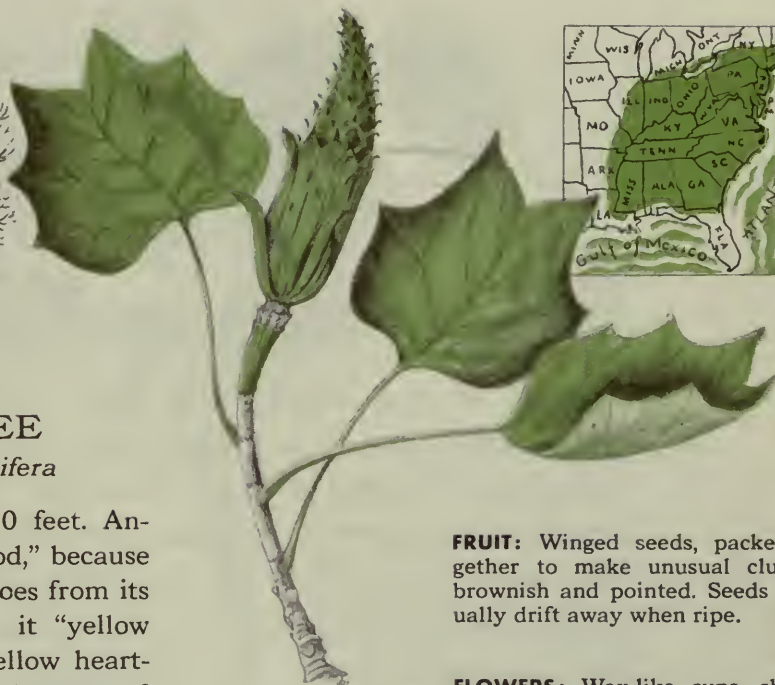
TULIP TREE

Liriodendron tulipifera

Deciduous. Grows to 150 feet. Another name is "canoe wood," because the Indians hollowed canoes from its trunks. Lumbermen call it "yellow poplar" because of its yellow heartwood, and "white poplar" because of its white sapwood. A handsome tree that grows tall and straight and free of knots. Its fine soft wood is used for furniture, boat building, woodenware.

FRUIT: Winged seeds, packed together to make unusual clusters, brownish and pointed. Seeds gradually drift away when ripe.

FLOWERS: Wax-like cups, shaped like tulips. Greenish white with orange at bottom of petals. Flowers in spring after leaves come.



LEAVES: 3-5 inches long. Simple; alternate. Shining green on top, paler underneath. Clear yellow to orange in fall. Leaf not pointed. Has bitten-out end shaped like a V.



West of the Mississippi River are the Great Plains. These were once dry, open spaces where grass grew. Only along the streams that cut through the dry plains were there willow and cottonwood trees. Few of the trees of the East grew wild here. They needed land that was moist. So the grasslands made a wide gap between the trees that grew in the East and those that grew in the West. That is one reason why the trees in the two parts of the country are so different.

West of the plains are the Rocky Mountains. Here are many evergreens, sometimes growing high up where the weather is very cold in winter. Fir, spruce, western white pine, lodgepole and other pines, western larch and western hemlock are some of the Rocky Mountain trees.

West of the Rocky Mountains, in the Southwest, there is desert. Summers are very hot, and all year round it is dry. Here are cactus plants. They are built in odd shapes, with special stems that can store water like reservoirs, and with thick spiny skins that keep the water from escaping to the air. In the desert are mesquite and sagebrush and the strange-looking Joshua tree.



LEAVES: 3-6 inches long. Simple; alternate. Long and narrow— $\frac{1}{8}$ - $\frac{3}{4}$ of an inch wide—often curving.



BLACK WILLOW

Salix nigra

Deciduous. Sometimes shrubby, sometimes growing up to 50 feet. This is one of the willows often seen. It loves damp places. Its crooked, leaning trunks and graceful branches decorate the shores of many ponds and streams. If you push a willow twig into damp ground, it will probably take root and grow.



FRUIT: Tiny light-green seed pods, about $\frac{1}{8}$ of an inch long.

FLOWERS: Drooping catkins at ends of twigs.



A pencil sketch of a plant with several thin, upright stems and a small, feathery leaf at the base. The stems are thin and slightly curved, with some branching at the top. The base of the plant is marked with a small, feathery leaf and some horizontal lines suggesting the ground. The drawing is done in a simple, sketchy style with light pencil lines.

Salix discolor

FLOWERS: Two kinds of catkins, one very small, the other larger. When in bud, the larger ones are the silky gray "pussies" that you see even in the city—at the florist's.

Two trees that can grow in this country are the pinyon pine and the Utah juniper. If you have been to the Grand Canyon of Arizona you have seen them.

Beyond the desert and mountains to the west is the Pacific coast where a great deal of rain falls. Huge trees of great beauty grow there. In California are the giant sequoias and redwood trees. In the north are big Douglas firs and western hemlock besides many other kinds of trees quite different from the ones we find on the Atlantic coast.

HOW TREES HELP US

We haven't always appreciated how lucky we are in this country to have so many trees. People who don't have them know how hard it is to do without them. When the covered wagon pioneers were traveling across the plains they had to cook their food over fires made from dried buffalo chips, or buffalo manure. There were too few trees for them to use as firewood. For centuries Eskimos burned whale oil and seal blubber because they had no wood for fuel. Many ancient peoples worshipped trees because they knew what wonderful and valuable things they were. Our Christmas tree comes from this idea. There are many myths and legends about sacred trees. The ancient Greeks thought there were dryads or wood nymphs who lived in the trees and cared for them.

Once this country had great, almost endless forests stretching from the east and west coast to the wide central plains. The pioneers needed cleared land for farms, and they cut down the trees. They thought of them as enemies; they wanted to get rid of them so that they could have more land for fields and gardens.

Then as the country grew they cut the trees for lumber. For nearly 300 years the axes rang through our forests, and our great trees fell. Few people thought of planting new ones to take their places. They thought there was no end to our forests. At last they found out their mistake. There was an end. They learned how many things our forests do for us.

For they do much more than give us wood and materials to make rayon and paper and film. Just by growing they help us.

They help keep the top earth from being washed away by rain. Leaves fall from the trees and make a thick carpet on the ground. As rain falls this carpet soaks it up like a sponge. And, as the water sinks slowly into the ground, the trees' little root hairs catch it. Without trees and their leaves and roots, the water runs swiftly along the ground, washes out deep troughs, and carries away the good top soil. Many farms have been ruined in this way.

Where there are no forests to hold rain, the water sometimes runs away so swiftly that it makes terrible floods

that cause damage to homes and farms and cities. Forests help prevent floods.

Remember also that as the green leaves make food for the trees they give back oxygen and moisture to the air. Trees are air-conditioners. They help keep the summer winds from being too dry.

It took people a long time to find out these things about trees. For many years they went on carelessly clearing away the forests. But floods were growing worse, soil was washing away, hot summer winds were drying up the crops. Then people woke up and saw how much our forests had helped us. They realized that we would some day be without them unless we began to plant new ones and to care for the ones we had.

So the national government began to make forest reserves, national forests where the trees are cared for by men trained as foresters. When trees are cut this is done carefully and new ones are planted to take their places. Wood is not left to rot on the ground and waste. The United States Forestry Service is always working to make our forests bigger and better. Today we have 152 large national forests besides hundreds of state forests.

Every year we plant more trees; we are learning how to fight the insects and diseases that harm them. And most of all, we are learning to be more careful, and less wasteful of our wood.



FRUIT: Dark blue and berry-like—about $\frac{1}{3}$ of an inch long—on the ends of crimson stalks.



LEAVES: 3-6 inches long. Simple; alternate. Grow in three forms, usually on one tree: mitten-shaped; more or less oval-shaped; or with three lobes. Brilliant shades of red, yellow or orange in fall.



SASSAFRAS

Sassafras albidum

Deciduous. Often grows to 80 feet in the South, though it is usually small—often a shrub—in the North. Its roots and bark have a pleasant flavor; people once used them as medicine, making sassafras tea. The pioneers colored their homespun woolens with an orange dye made from the bark. Choctaw Indians in Louisiana taught the white settlers to make a yellow flavoring powder from the leaves. This is a very ancient tree; millions of years ago its relatives lived on the earth.

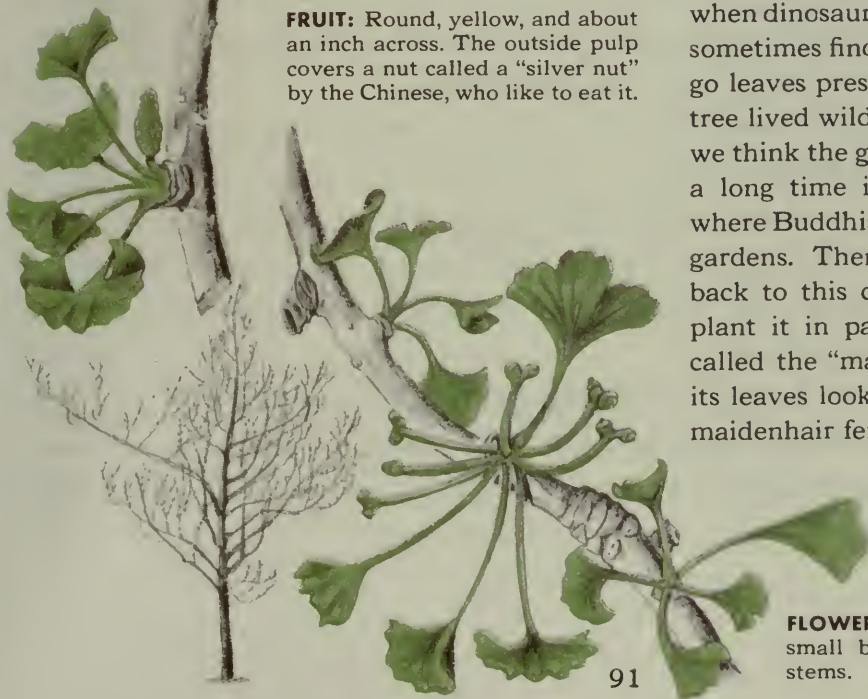


FLOWERS: Small yellow clusters, appearing with leaves in spring.



LEAVES: 2-3½ inches across. Simple; growing in clusters from stubby spurs. Fan-shaped, with veins running from the base to the outer edges. Often split on edges.

FRUIT: Round, yellow, and about an inch across. The outside pulp covers a nut called a "silver nut" by the Chinese, who like to eat it.



GINKGO

Ginkgo biloba

Deciduous. Grows to 100 feet. The ginkgo is a living fossil; there were ginkgo trees millions of years ago when dinosaurs prowled the earth. We sometimes find prints of ancient ginkgo leaves pressed into coal. Once this tree lived wild in North America, but we think the glaciers destroyed it. For a long time it lived only in China, where Buddhist monks grew it in their gardens. Then travelers brought it back to this country. Now we often plant it in parks and gardens. Also called the "maidenhair tree" because its leaves look a little like those of a maidenhair fern, but much larger.

FLOWERS: Two kinds: Catkins, and small blooms at the end of long stems.

LET'S PROTECT OUR TREES

One of the greatest dangers to forests is fire. All over the country we have lookout towers, and forest rangers who watch for forest fires and know how to fight them.

People cause many forest fires by being careless. They forget to put out their campfires, or when they are in the woods they are not careful about cigarettes and matches.

People also harm trees by stripping bark from them, by hurting their roots and branches, or by trampling down little trees and breaking them off.

Everyone can help in the important work of protecting our trees and forests. You can, yourself, by not building fires when the woods are too dry; by clearing a spot of several feet before you build a campfire; by putting out your campfires with plenty of water, and shoveling earth over the hot ashes; and by not burning grass or rubbish on a windy day, if you live near woods.

You can remember not to hurt the bark or roots of trees; and not to break down small ones. For even a little sapling that may look unimportant to you can turn out to be a great tree, if you will let it grow. Perhaps you can even help add to our trees by planting a new one somewhere. You will enjoy watching it.

We still have many, many beautiful trees in this country. They belong to us all. We can all do our part to protect them and to help others to grow. We can be proud of our American trees.



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